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The role of pictures and gestures as a support mechanism for novel word learning: A training study with 2-year-old children

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Abstract

A training study examined novel word learning in 2-year-old children and assessed two nonverbal mechanisms, pictures and gestures, which are commonly used as communication support. The aim was to (1) compare these two support mechanisms and measure their effects on expressive word learning and (2) to investigate these effects on word production over an extended time period. At baseline, the children's performance was assessed on vocabulary and grammatical skills, and the groups were matched on these key variables. Eighteen participants were taught novel words either accompanied by a gesture or by a picture. The training consisted of four 20-minute sessions per week over a period of four weeks. Following training, the children were assessed on their ability to produce novel words at three time points: immediately after training, at a 2-week follow-up and at a 6-week follow-up. Gesture training supported word learning significantly better than picture training across all three testing points. Children in both groups showed the best production immediately after training, with a small but nonsignificant decline at 2-week follow-up. There was a significant decline in time 3 compared to time 1, but the children were still able to produce 6.8 out of 10 novel words, suggesting long-term learning. Our findings suggest that gesture may be used to support word learning and could benefit children with late emerging language. The importance of these findings for language development and language intervention are discussed.

Keywords

gesture, nonwords, picture, production, word learning

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1 Introduction

Nonlinguistic support mechanisms are commonly used to enhance communication, but their use in promoting expressive language is less widespread, with some parents and professionals concerned that additional support mechanisms may encourage nonverbal communication while discouraging progress towards spoken language (e.g. Beukelman, 1987). More recent studies (e.g. Romski and Sevcik, 1996, 2005) argued against these concerns, and proposed that spoken language is a more efficient means of communication and that children will choose spoken language over augmentative and alternative communication (AAC) where possible.

A systematic review looking at the impact of AAC intervention on speech production (Millar, Light and Schlosser, 2006) confirmed this positive effect, with 55 of the 67 participants (82%) showing increased speech production following AAC intervention. Although this finding is apparently promising, many questions remain. For example, do different nonverbal support mechanisms affect learning and/or the retention of words differently? If children are exposed to multimodal stimuli (spoken word forms + gestures/pictures), will production of novel words continue, even without further exposure? Leech and Cress (2011) suggested that pictures and gestures may be appropriate AAC strategies due to their iconicity. For the sake of simplicity, we use the term gestures in this article. This type of gesture can be described as representational gesture. As pointed out by Capone and McGregor (2004: 174) it has been labelled in many ways, including symbolic, iconic, empty-handed, or referential gesture and baby signs. These kinds of gestures carry meaning in their form to symbolize a referent, and their form does not change with context. The current study pitted the two support methods (gestures and pictures) against each other and evaluated whether pictures or gestures provide better support for word production in Slovak-speaking 2-year-old children. The aim was to (1) compare two commonly used support mechanisms and measure their effects on expressive word learning and (2) to investigate the effects of support mechanisms on word production over an extended time period.

The systematic review by Millar et al. (2006) also highlighted shortcomings of previous studies, including the limited number of participants (some studies only having between 1–6 participants), and lack of a control group or alternative treatment group. Similarly, Johnston et al. (2005) reviewed the research evidence for the claim that teaching gestural signs advances children's communication; they concluded that the available research suffers from serious methodological weaknesses and called for better research designs that would allow for the creation of evidence-based language support programs. Taken together, the majority of published research evaluating the effects of AAC on language production has suffered from methodological issues, and previous studies do not allow for direct comparisons of the effects of different support mechanisms on language production.

There is considerable evidence from observational and experimental studies that gesture is closely linked to language development and can predict later lexical development (Iverson and Goldin-Meadow, 2005; Kapalková, 2008; Kuvač Kraljević et al., 2014; Rowe et al., 2008). Previous experimental studies with young children (e.g. Ellis Weismer and Hesketh, 1993; Goodrich and Hudson Kam, 2009; Goodwyn et al., 2000) have demonstrated that the use of gestures helps to facilitate verbal development. Capone and McGregor (2005) showed that 2-year-old children learned more novel words (only assessed for comprehension) in conditions when a word was accompanied by a gesture, compared to a control condition without a gesture. Similarly, a study by Wilbourn and Sims (2013) found that 26-month-old children interpreted arbitrary gestures as labels when the gestures were presented in a multimodal context with auditory words. In contrast, a recent study by Puccini and Liszkowski (2012) showed that 15-month-old infants did not benefit from gestural support in a fast mapping task. Instead, infants showed the best performance when a word was presented on its own and significantly worse performance when a word was accompanied by a gesture. The authors argued that the additional processing demands of the

gesture alongside the auditory processing actually interfered with word learning. It should be noted that the studies looked at different age groups, and it might be the case that the facilitative effect of a gesture changes with age.

Picture support is another technique in word learning that has received attention in the literature. The use of pictures in therapy has a long tradition, and pictures are often used to teach vocabulary in both a classroom setting and with vocabulary intervention (see Loftus et al., 2010 for examples). A recent study by Buschmann et al. (2009) evaluated a parent-based intervention for 2-year-old children who had expressive language delay that featured picture books as one of the main elements of the intervention program. The language of the children in the intervention group significantly improved compared to the waiting group, suggesting a positive effect from the picture support.

Very few studies have compared the effectiveness of gestures vs. pictures when used as word-learning support mechanisms. Leech and Cress (2011) used a single-paricipant study to compare the effectiveness of these two support mechanisms. A 3-year-old boy with language delay was found to improve in language production following AAC intervention, but no difference was found between the support methods. Other studies directly comparing support mechanisms have focused on comprehension. McGregor et al. (2009) compared the comprehension of prepositions in typically developing children aged 1;8–2;0 following the use of three support mechanisms: (1) verbal input only, (2) verbal input + gesture, or (3) verbal input + picture. The study found a gesture advantage, but it was only apparent two to three days after training. Although McGregor et al.'s study did not involve word production, some insight was still provided into the role of support mechanisms in language development.

Rowe et al. (2013) also compared word-learning support mechanisms but with much older typically developing children. In their study, pre-school children (mean age 4 years 8 months) were presented with words in three conditions: (1) accompanied by gestures, (2) accompanied by pictures or (3) no support. No clear advantage was found for gesture-based support over picture-based support. However, there were interactions between the support method and the type of learner, and all types of support provided in the study were more beneficial for the less advanced children. This finding has implications for the use of the support mechanisms in intervention, suggesting that support for word learning may be more beneficial for those children who need the most support. However, research into the role of symbolic support for word learning, e.g. pictures and gestures, is limited and the findings are mixed.

The most powerful way to test causal hypotheses about the role of different support mechanisms in word learning tasks is to manipulate the training methods and observe the effects on the production of newly learned words. While there are studies that have looked at gesture or picture support separately, little research has compared each method's impact on expressive word learning. While gestures are used as a consistent and transparent way of intentional communication by children as young as eight months (e.g. Bates, 1976; Kapalková, 2008; Owens, 1996), it is not clear if children understand the symbolic nature of a picture. Rowe et al. (2013) focused on 4-year-old children – an age group in which children which were assumed to have this kind of understanding – but it appears that much younger children also have the same kind of symbolic understanding. Preissler and Carey (2004) and Ganea et al. (2008) showed that even very young children (15- to 24-month-olds) understood that a label applied to a picture of an object also referred to a real object. This suggests that young children should be able to make use of pictures as part of a support mechanism for word learning, and the current study is investigating the extent to which this may be the case.

The novelty of our study lies in providing a comparison of two supporting methods (gestures and pictures), and also using a production task as the outcome variable. Although fast-mapping is well studied, children's ability to retain a spoken form linked to the referent beyond the initial exposure has received little attention, despite the relevance of this issue for real-world word learning. Horst and Samuelson (2008) challenged the robustness of lexical retention in 2-year-olds,

showing that infants were excellent at referent selection but less successful with lexical retention. The majority of studies have focused on children's comprehension of newly learned words, but we set out to investigate the process of learning words where it is useful to comprehend a new word and also to produce the word and retain it over time. To address these issues, we carried out the study with 2-year-old children in a nursery school and assessed their production of novel words over a period or weeks rather than just immediately following training. The ecological validity was increased in two ways: (1) learning occurred in the children's natural environment as part of daily routine, rather than in a lab; (2) retention of novel words was monitored over a longer period of time. The current study was carried out with typically developing children in order to gain insight into word learning mechanisms. We expect that a better understanding of how the word learning process is affected by nonverbal support mechanisms can then be utilized in the design of intervention programs for children with language delay. Two-year-old children were chosen for the following reasons: First, screening procedures are usually carried out between 2 and 3 years of age in Slovakia. Children with delayed language are likely to be noticed by paediatricians and speech and language therapists at this time and attendance at speech language therapy (SLT) clinics and early intervention is likely to take place. Second, we aimed to investigate children at an age of intensive vocabulary acquisition. The specific research questions were:

1. Do children learn more novel words when supported by gestures or by pictures?
2. Can children produce the novel words immediately after training, after 2 weeks and after 6 weeks?
3. Is a particular training method more successful for retaining words over the longer period of time (2 and 6 weeks)?

II Method

1 Participants

The participants were 18 typically developing 2-year-old children (6 boys and 12 girls; age range 24–34 months) from a nursery in Bratislava, Slovakia. Typical development was confirmed by a screening of psychomotoric development, standardized for children in Slovakia between 24 and 36 months of age (Matušková et al., 2014). All of the children met the developmental milestones covered by this tool and no concerns had been expressed about their development. Before training, children were assessed on lexical and grammatical skills using the Slovak adaptation of the *MacArthur Communicative Development Inventory: Words and Sentences* (TEKOS: Kapalková et al., 2010), a standardized version of a parental checklist, and percentiles were calculated according to the manual. All children scored above the 10th percentile for all parts of TEKOS. Children were allocated randomly into two training groups (gesture vs. picture). There were no statistically significant differences between the two training groups on any of the key selection measures before the training commenced. Independent *t*-tests confirmed that the picture group did not significantly differ from the gesture group in terms of their expressive vocabulary ($t(16) = .376$), receptive vocabulary ($t(16) = .742$) or grammatical skills ($t(16) = .852$). Written informed consent forms were obtained from the nursery and from parents before the training commenced.

2 Materials

The stimuli were 10 novel words with a CVCV syllable structure (C = consonant, V = vowel), for full list of items, see Appendix 1. The items had a simple syllable structure to minimize the effect

of articulation difficulties and the appropriate age of acquisition for the selected speech sounds were based on a longitudinal study of phonological development in Slovak (Bónová, 2008; Guthová, 2009). Horst (2013) argued that when designing a word learning experiment, the novelty of target words is necessary to ensure learning is due to training and not a priori partial knowledge. Following this argument, we decided to create novel stimuli rather than test real words that children might have had some exposure to.

The novel items were created by adding a novel aspect to a real object, e.g. we added a red comb from a rooster to a picture of a dolphin. This particular example was called a 'mepo'. We also checked that novel items that were modified were not expected to be part of 2-year-olds' vocabulary. This was done by a pilot with 10 children of the target age who did not participate in the main study. Children were shown a picture or a gesture and were asked what it was. None of the children were familiar with the original items, and they did not appear in the TEKOS filled in by their parents. This suggests that the novel words used in this study were unknown to the target population of 2-year-old children.

3 Procedure

Half of the children were randomly allocated to a picture-support group and half to a gesture-support group, with both receiving four weeks of training. During this time, the experimenter worked with the children in a quiet area of the children's nursery four times a week in the mornings, with each session lasting 20 minutes. Children were seen in groups of nine and both types of training were delivered by the same person. The order of the groups was counterbalanced across the four weeks. At the beginning and end of each session, the children were presented with all 10 novel words. The researcher produced the words which were accompanied by either a picture or gesture depending on the group they had been allocated to. The experimenter verbally introduced the word and then intensive work on one novel word followed, meaning that the focus was on a different word each session. After 10 sessions, when all 10 items had been the subject of a 20-minute training session, the novel words were combined and children worked on these combinations for another five sessions, again covering all 10 novel words. The order of the items was as follows: 1. HEDO, 2. TYDÁ, 3. MEPO, 4. BEJE, 5. PIFA, 6. FOJE, 7. KUVA, 8. MUPE, 9. BUSA, 10. PAME, 11. PIFA + FOJE, 12. MEPO + TYDÁ, 13. HEDO + PAME, 14. BUSA + BEJE, 15. KUVA + MUPE.

The children in each group received 15 sessions, each lasting 20 minutes. Unlike previous studies (e.g. McGregor et al., 2009; Puccini and Liszkowski, 2012), our study did not have a baseline condition that only included word forms without support mechanisms (pictures or gesture). Previous studies focused on comprehension, while the current study assesses production of novel words and it would not be possible to elicit responses without providing a referent for the word form. Importantly, if no activity was included (only a gesture or picture provided), it would have been too difficult in most cases to keep the groups of 2-year-old children engaged as was confirmed during our pilot studies.

The task was administered at group rather than individual level. Due to increasing caseloads, many SLTs choose group therapy over individual therapy, and a study by Boyle et al. (2007) showed that group therapy is more cost-effective. In addition to cost-effectiveness, another advantage of group therapy is the opportunity for children to motivate each other and the feeling of belonging to the same group and sharing the same learning experience (Mikulajová and Kapalková, 2002). Fidelity to the training protocol was evaluated from video-recordings of four sessions, two from the picture group and two from the gesture group. The recordings confirmed that the SLT who delivered the training sessions adhered to the procedures for the administration of each task. We

used activities that were related to the novel items for both groups and both groups of children manipulated objects.

a Picture-group training. Children in this group were given a picture associated with a novel word and also crayons, scissors and glue, and they were then encouraged to engage in an activity related to this picture (for details, see Appendix 1). The experimenter used the novel word throughout the session and at the end of the session, the children were asked to stick the picture of the novel word into their booklet and encouraged to name the novel word. If they made an attempt to name the picture, they were rewarded by receiving a stamp. The booklets with pictures were collected by the experimenter and retained until the next session, so there was no additional exposure to either referents or novel word forms. For example, when children were learning the novel word /busa/, they would be given a big picture of 'busa' and told: 'Busa. Look, busa'. They were then given several small pictures of 'busa' and again the experimenter repeatedly said 'Look. This is busa.' Then children were encouraged to stick the small pictures onto the big picture. At the end of the session, the big picture was glued into the booklet and children were encouraged to produce the novel item.

b Gesture-group training. The children in these sessions were shown gestures associated with a novel word and were then encouraged to perform the gesture themselves. Each time the experimenter labelled the objects/actions, she produced both a word and a gesture that were presented simultaneously. The gestures were based on real signs from a Slovak Sign Language and were iconic. Iconic gestures were chosen over arbitrary gestures as research suggested that 1- and 2-year-old children were willing to learn iconic gestures as labels for objects (Tomasello et al., 1999), while 2-year-olds struggled to learn arbitrary gestures that bear no resemblance to the referent (Namy and Waxman, 1998). Each novel word was associated with a particular activity and provided a reference for the novel object/action (for details, see Appendix 1). The experimenter repeated the novel word throughout the session and at the end of the session, the children were asked to demonstrate the gesture and to say the novel word. Any attempt to repeat the gesture or novel word was rewarded with a stamp. Using the example 'busa' again, children were shown the gesture and told the novel word. They were then asked to come to a box which was wrapped with a ribbon and instructed to open it to find a smaller box inside. Throughout the session, children were told the word 'busa' and encouraged to attempt the gesture.

c Post-training testing. After training, the children from both groups were tested on their oral production of the novel words. The first testing (Time 1) took place the day after the training finished. To assess retention on the newly learned stimuli, the second testing (Time 2) was carried out 2 weeks after the training had finished and the last follow-up was conducted 6 weeks after the training had finished (Time 3). Children were tested individually in their nursery and the experimenter showed the child either the gesture or the picture associated with the specific novel item in order to elicit the production of the target item. Each gesture/picture was shown a maximum of two times and the child was asked to name it. If no answer was provided by the child after two trials, the experimenter moved onto the next item. The order of tested items was identical for both groups. Production of the novel words were scored as correct/incorrect (max. 10 points); in order to score a point, children had to produce all four phonemes of the novel words in the correct order.

III Results

The Shapiro-Wilk test confirmed that data were normally distributed (all ps > 0.05) and tests of homogeneity were also nonsignificant (all ps > 0.05). To determine the influence of training

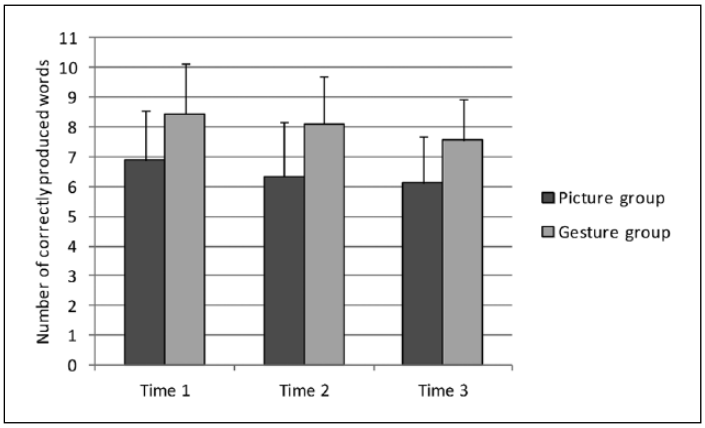

Figure 1. Mean scores for production of novel words according to Time points and support-method.

method (two levels: picture vs. gesture groups) on the production pattern across the three testing points (three levels: Time 1, Time 2 and Time 3), a mixed ANOVA with the number of correct responses as the dependent variable was conducted. The ANOVA revealed a significant effect of *Time* ($F(2, 32) = 5.52$, $p = 0.009$, $\eta^2 = 0.256$), and a significant effect of Training method ($F(1, 16) = 5.03$, $p = 0.039$, $\eta^2 = 0.239$. The interaction between *Time* * *Training method* was not significant ($F(2, 32) = .23$, $p = 0.797$, $\eta^2 = 0.014$). Figure 1 shows the means according to Time and Training method. The post-hoc analyses (Bonferroni) showed that the Training method significantly affected the results, with children taught by the gesture method learning more novel words (Picture group: $M = 6.44$, $SE = 0.50$; Gesture group: $M = 8.04$, $SE = 0.50$). Results looking at children's ability to retain novel words showed that children accurately produced 7.67 ($SE = 0.40$) words at Time 1, 7.22 ($SE = 0.40$) words at Time 2, and 6.83 ($SE = 0.35$) words at Time 3. Although the largest gain occurred immediately after training (T1), the analyses suggest that the newly acquired words were maintained during the 2-week (T2) and 6-week long retention interval (T3). There was no significant difference between T1 and T2 ($p = 0.339$) and between T2 and T3 ($p = 0.153$). Children produced significantly more words in T1 compared to T3 ($p = 0.034$).

IV Discussion

Word learning is a complex task that requires children to create new semantic and lexical representations, then link these new representations and integrate them with existing phonological, lexical, and semantic representations (Storkel, 2009). Fast mapping may initially help children to discover these links (Gershkoff-Stowe and Hahn, 2007), and additional exposure in meaningful contexts can help to consolidate the child's knowledge of the word (Bloom, 2000). Although previous research has extensively examined early word learning, past focus has often been on referent selection and comprehension of fast-mapped words, and many questions remain, particularly about children's ability to produce newly acquired words. The current study compared the effect of two nonverbal methods (pictures vs. gestures) on novel word learning and examined if 2-year-old children who were taught novel words were able to learn and retain and produce these words over a longer period. The study extends the previous research through its focus on (1) production of the novel words learned and (2) establishing if the longer-term retention varies depending on the method of nonverbal support. Children in both groups were matched on language skills at the

baseline, and both training methods were delivered by the same therapist. This allowed for a direct comparison of the effects of different support mechanisms while accounting for vocabulary and grammar knowledge and minimizing individual differences in the delivery of the programs.

Children in the group that received gesture support were able to produce more novel words and demonstrated significantly larger gains in novel word learning compared to the group provided with the picture-support method. This suggested that the children's learning was significantly affected by the type of support method used. This work is consistent with previous research carried out with young children (McGregor et al., 2009), which considered the effect of the support method on the comprehension of newly learned words. Despite the differences in modality, the results seem to be pointing in the same direction and favor gesture support for word learning in the receptive domain in addition to the expressive domains. Indeed, there is a growing body of evidence showing that gesture is closely linked to language development and facilitates word learning (e.g. Capone and McGregor, 2004, 2005; Goodwyn and Acredolo, 1993; Goodwyn, Acredolo and Brown, 2000). However, the findings are not in line with Puccini and Liszkowski (2012), who argued for a disadvantage from gesture support due to interference. The children in their study were younger (15-month-olds), and it is possible that gestures are more likely to lead to interference at such a young age. A study by Wilbourn and Sims (2013) carried out with 26-month-old children indeed confirmed the beneficial effect of gesture in combination with a word as opposed to a gestural label alone, negating the potential interference in the older age group. Our study confirms the findings of studies with older children while extending it to the modality of production.

The evaluation of children's responses across three time points revealed that 2-year-old children were able to retain the majority of the novel words they had learnt over a long-term basis. Although there was a significant decline in production between time points 1 and 3, children were able to produce the novel words over all of the time periods tested. The current findings go beyond previous work by demonstrating that learners can retain novel words for production in addition to comprehension. No interaction between training method and testing points was found, suggesting that no particular method was more successful at different time points; instead, the gesture group outperformed the picture group at all times.

While we aimed to choose the referents in both picture and gesture groups to be iconic and similar for both groups, it is possible that the items displayed a different level of iconicity. The concept of iconicity is complex, and there is no easy way how to objectively measure this feature (Kuntze and Stone, 2014). It should be noted that the effect found might not be entirely due to the use of pictures or gestures but could occur, at least partially, because of the iconicity of the referents.

There are several ways that future research can improve on the present study design. First, the sample in our study was relatively small. The main reason was the intensity of the training programs (children in each group received 15 sessions, each lasting 20 minutes). The small sample size limits the extent to which the findings can be generalized to a wider population and does not allow for more detailed investigation of individual differences and other factors that may contribute to differential responses to the intervention (e.g. pre-existing vocabulary). Future studies should include a larger sample to check if the results will be replicated and investigate other factors that may contribute to the results. Another shortcoming of our study was the lack of control of the amount of exposure to the stimuli across the groups. Although there was only one person who administered training for both groups and similar administration was used, the amount of actual exposure was not controlled. Future studies should incorporate exposure into the research protocol and ensure that the amount of exposure to the novel words does not differ across the groups. While the design of this study incorporated a way to check the fidelity of intervention, it was limited to observation of four sessions out of 30. Nonetheless, this suggested that the training methods were implemented with a sufficient degree of fidelity.

We aimed to simulate the conditions of speech and language group therapy. The focus on children's engagement and compliance was prioritized but we appreciate that there might have been differences in the activities designed for each group. The aim of these activities was to keep children engaged. All children in our study completed the sessions. In studies with similar designs, such as Rowe et al. (2013) with older children (mean age 4;8), trained on 3 conditions (word, word + picture, word + gesture), 14% (10 out of 72 children) have been excluded from the study due to noncompliance. This was despite the older age and the fact that children were trained individually. The noncompliance in Wilbourn and Sims (2013) was even higher: 29% (14 out of 49 2-year-old children) in experiment 1 and 44% (19 out of 43 2-year-old children) in experiment 2. All of the children in our study, however, completed the sessions, and we believe this is a positive reflection on the suitability of our tasks for a group therapy for the target age group.

Results from our study suggest that gestures can enhance word learning in 2-year-old children. Future work should examine if similar findings can be replicated with larger samples and in other age groups. From an intervention perspective, it would be good to establish if this method provides similar, or perhaps even better, support for children older than 2 years. If the benefits are age-limited, then attempts could be made to establish the age window when training would be most beneficial. Similarly, if gesture can serve as a tool for helping children with language delay/disorder, more research is needed into the benefits of gesture for these populations. Rowe et al.'s (2013) study highlighted individual differences between young learners and suggested that support mechanisms used in their study were most beneficial for less advanced children. A small-scale study carried out with children at risk for language disorder also pointed to the beneficial effect of gesture (McGregor and Capone, 2004). Together, these two previously published studies suggest that clinical populations might show even larger individual differences, which could mean even greater benefits from nonverbal support; further research is needed to evaluate these possibilities.

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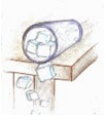
Appendix 1. Full list of stimuli, supported by pictures or gestures.

	Item	Picture	Activity	Gesture	Activity
1	HEDO /hɛdɔ/		*Tools*: crayons, paint set *Task*: add trees to a picture of a park		*Tools*: model of a park, animal toys *Task*: say what goes to/from the park
2	TYDÁ /tɪda:/		*Tools*: scissors, scotch tape, toothpick *Task*: cut out picture and glue it on the toothpick		*Tools*: walnut shells, bowl, water *Task*: place nutshell on water and demonstrate action
3	MEPO /mɛpɔ/		*Tools*: scissors, glue *Task*: cut picture into 4 pieces, put pieces together again, and then glue picture to paper		*Tools*: plastic dolphins, bowl, water *Task*: put dolphin into the water and remove it
4	BEJE /bɛjɛ/		*Tools*: paint *Task*: color a picture		*Tools*: crayons, string *Task*: wind a string around a crayon
5	PIFA /pɪfa/		*Tools*: crayons, paint set *Task*: draw pictures of plants in a vase		*Tools*: cardboard tubes, colored paper *Task*: make a vase with tube and colored papers
6	FOJE /fɔjɛ/		*Tools*: water-drop shaped paper, glue *Task*: glue the paper pieces onto the picture		*Tools*: juice, cup *Task*: pour juice into a cup
7	KUVA /kʊva/		*Tools*: glue, picture, painting *Task*: glue the picture onto the painting		*Tools*: toy medical tools, box *Task*: choose one tool from a box
8	MUPE /mʊpɛ/		*Tools*: pieces of colored paper, glue *Task*: glue paper pieces around the picture		*Tools*: animal pictures *Task*: remember where animals were hidden
9	BUSA /bʊsa/		*Tools*: paper bows, glue *Task*: glue small bows onto a picture of a bow		*Tools*: box, bow *Task*: untie a large bow from around a box
10	PAME /pamɛ/		*Tools*: pieces of colored paper, glue *Task*: glue paper pieces onto the picture		*Tools*: key, box, animal toys *Task*: open the box, put in an animal, lock box