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Teaching through the Environment Children and Adults with Moderate or Severe Mental Retardation

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Abstract: *Threegroups of children with moderate or severe mental retardation and other handicaps at a special school and three groups of adults with moderate or severe mental retardation and Down syndrome at a residential facility were selected for introduction to common animals and their habits, of which they had little or no prior knowledge. All participants were assigned in six small groups of two or three pupils matched for their mental capacity. Two different puzzle games were used to introduce the names, eating habits and habitats of 14 common animals. All participants acquired the names, preferred foods and dwellings of the taught animals through engaging in structured exchanges on those animals within 2 to 6 training sessions. They all generalized this conversation skill to new situations: a) in front of the computer with photographs of these animals, b) in the presence of these living animals, c) with peers other than their training group, and maintained their newly acquired skills during follow-up probes conducted 3 to 7 months after teaching.*
Keywords-*children and adults with mental retardation, environmental education, skill generalization, table games, teaching small groups.*

I. Introduction

SterlingandCooper in 1992 made a systematic statement based on an Unesco text [1] connecting environment with education and proposed three perspectives that characterize the identity of environmental education:a) *Education through the environment* (the environment is a field of learning, of acquisition of knowledge and skills. In addition, the development of emotions, interest and values concerning the environment itself are cultivated), b)*Education on the environment*(it is the acquisition of knowledge of the functioning of environmental systems, necessary for decisions that society needs to make) and c)*Education for the benefit of the environment*(its goal is the promotion of values and attitudes which guide the adoption of environmentally sound behavior). Furthermore, Paul Hart [2] argues that the field of environmental education is socially critical and has important contributions to mainstream education since it can provide the means to transform important aspects of schooling.

Although, environmental education is a field of science that is already manifested in schools, usually as a simple environmental activity in the field of science or social studies, it has not yet been developed for children with mental retardation. It should not be missed that science curricula provide opportunities to students with special needs which cannot be found elsewhere. Scruggs and Mastropieri [3] claim that students with mental retardation are usually characterized by ineffective thought and reasoning and that high quality teaching of science can be specially equipped to help these students acquire these important mental processes. To better achieve this goal constructive methods are preferred by professional organizations and universities for the learning of sciences which employ among others models of research and questioning for the acquisition of knowledge [4]. Finally, Mastropieri and Scruggs [5] conducted a thorough review of the science education literature and found 66 reports on students with disabilities. These reports support teaching science to students with disabilities and are based on documented characteristics of those pupils.

Pati andParimanik[6] found that with increasing severity of mental retardation social developmental also decreases. Furthermore, Indrabhushan, Amool, Akhtar [7] tried to find the effects of severity of mental retardation on social development, the possible correlation between the social quotient (SQ) and IQ and the relation between age and social development. This study showed that as the level of mental retardation increases social development decreases correspondingly. They also found a significant relationship 0.785 between IQ and SQ and that age does not have any effect on social development.

More specifically, children with mental disabilities can acquire basic use of language but the finer elements of the ability to converse are not present as compared to their age cohorts [8]. Children with Down syndrome have specific language deficits compared to normal in the number of different words, in the total number of words and in the mean length of utterance [9]. To amend these problems studies in teaching communication, social skills and conversation have been effective in developing and strengthening socialization and in decreasing anti- social behavior in a large spectrum of populations (pre-school children with problem behavior, children with mental retardation, with Down syndrome, with psychiatric problems and with autism), in addition to many studies done that improved communication skills after training individuals of all ages with mental retardation [10-24]. In all of these studies teaching was based on an objective evaluation of baseline levels of the targeted behavior. Although there were little changes in the levels of mental functioning, usually the levels of social skills functioning were improved through social skills training [25].

Wilkins and Matson [26] claim that the most familiar basic elements of conversation are the following: conversational questions, personal statements, acknowledging and reinforcing comments, duration and delay of exchanges, eye contact, emotional voice tone and conversational context. Conversational questions are any questions addressed to another person to retrieve information from the other person. Effective communication demands responses to conversational questions. Teaching questions has been shown to be one of the simplest, yet effective, mean for an individual to participate in a conversation [27]. For this reason many studies engaging individuals with special needs targeted teaching of conversational questions and responses.

Moreover, teaching conversation in small groups simulates the natural conditions of conversation and is expected to be more effective and to generalize better to other conditions. Many studies had as their goal to teach children with disabilities in groups, to acquire the ability to exchange while they participate in group activities. [11,28,23]. There is a plethora of studies as well that used peers with better abilities to help less able children to socialize and converse [28-36]. Other studies investigated the ways teachers can assist children with delays in socialization and acquire conversational skills [37, 38].

The present study was an attempt to apply *education through the environment* [39] by teaching questions and responses on common animals. Using more able peers in small groups of children and adults with moderate or severe mental retardation this study targeted the skills of observing the environment and acquiring knowledge. The participants of the present study had no expressed knowledge of the targeted animals and their caregivers have never observed them to talk to each other, although they had some basic language and they enrolled together for many years at their corresponding placements. The expectation was that with increased knowledge of the environment values and attitudes will follow, which will allow our participants a) to describe, interpret and to some degree predict functions, relations and interactions of the natural environment, and b) to develop social skills, specifically conversational skills, thus, to socialize. Specifically, this study taught three questions: a) *What is this?* b) *What does it eat?* c) *Where does it live?*, as well as, the responses to those questions with the help of two table games of puzzle pairs of animals and their preferred food or their dwelling.

II. Method

2.1. *Participants*

The participants in the study were eight children 9-16 years old with moderate or severe mental retardation and other handicaps in a special primary school and eight adults 22-36 years old with moderate or severe mental retardation and Down syndrome in a residential facility. All children and adults were selected because they had some speech which allowed them to engage in simple conversations but caregivers reported that they have never seen them converse. All participants were evaluated before the onset of the study using the Wechsler Intelligence Scales for Children (WISC- III) and were assigned in six groups according to their mental scores. Participants were assigned to six groups according to their scores, four groups of three participants (Stelios 31-Mina 31-Kleanthis 66*, Gregory 44-Manos 38-Ninos 45*, Giorgos 58-Alekos 34-Vicky 53, Gogo 35-Christos 34-Stathis 35) and two groups of 2 participants (Vaggelis 49*-Kostas 42*, Chrisostomos 34-Sakis 30). The number following each name represents the General Intelligent Quotient of each participant. The asterisk shows scores of only the verbal scales of the WISC III for 4 participants with mobility problems (brain injury or cerebral palsy), who could not be scored on the Practical Scales of the WISC III. The groups consisted of participants of similar ability, with one peer in each group being the more able, in order to assist the rest in the group.

2.2. *Setting*

All experimental sessions took place at the two placements: the one a day special primary school, and the other a closed residential facility. In each of those placements a quite room was allocated where each group took turns to meet and talk for the whole duration of this intervention.

2.3. *Materials and Procedure*

Two simple table games available in the local market containing puzzle pairs of 14 common animals along with their preferred food or their common habitat were used as the training stimuli for conversational exchanges in the present study. The other independent variables planned for this study were the verbal models and the corrections of errors by the experimenter, the verbal praise for good conversational behavior and the final tangible reward for good participation (balloons).

During all experimental conditions each group was brought into the designated room and seated in around a table with a video camera facing the group of participants. The experimenter turned on the camera, placed the puzzle pieces of a table game on the table and gave the instruction "Talk about what you see!" Each session lasted approximately 15 minutes.

During baseline four puzzle pieces of a table game were available and the direction to talk was given to each group. The experimenter did not interact in anyway with participants, waited for 15 minutes and then turned off the camera.

During training eight sets of puzzle pieces were placed sequentially on the table and again the direction to talk was given. Initially the experimenter provided models of all questions and answers, but as training proceeded she provided models of appropriate exchanges only when members of the group could not respond. For the whole duration of training verbal praise for appropriate exchanges was given, as well as, a final reward to each subject for good participation.Training lasted from 2 to 6 sessions, depending on the learning rate of each group. The questions were taught in the following order: "What is this?", "What does it eat?" and "Where does it live?"

After termination of training, all participants were taught in individual sessions to recognize new animals and to ask for their eating and living habits. Each student required a different number (1 to 5) of approximately 15-minute-sessions depending on the practice they needed to acquire the name, the preferred food and habitat of the new animals. With the termination of the individual training sessions both initial and new animals were incorporated for all six groups in the subsequent phases of the study.

During initial and subsequent (follow-up) probes no corrections, verbal models or praise were provided and only the final reward for good participation was available. After the initial probe was conducted in all groups, sessions were interrupted for one month at the institution and for five months at the special school. The subsequent probes were conducted in the following manner. The second follow-up probe was done a month after the first follow-up probe at the institution and three months after the first follow-up probe at the special school. These follow-up probes were conducted to evaluate the level of maintenance of the taught skills. Some of the children at the special school (Ninos, Gregory, Mina, Kleanthis, Kostas) had no opportunity to participate in another group during the subsequent probes, because problems with their health caused them to be absent from these sessions. The remaining children were tested for generalization during some follow ups in groups consisting of peers other than their training group.

Two generalization measures followed: the first measure was conducted with the use of pictures of the taught animals on a computer screen and the second measure was exposure to six different living animals familiar from their training. During all generalization probes no verbal models, corrections, praise or final reward for good participation were provided. During the first generalization measure each group of participants was brought and seated in front of a computer which by pressing the return button projected novel photographs of all the animals presented during the previous phases of the experiment with the direction to talk. During the second generalization probe each group of participants were brought outside their facilities where the experimenter had brought some alive animals (a rabbit, a lamb, a goat, a cat, a dog and a duck), and once again the direction to talk was given. During the third generalization measure all three groups of adult participants were brought outdoors, they were presented with the real animals and their exchanges were recorded.

2.4. *Experimental design*

A within-subject quasi-experimental withdrawal design across conditions of baseline, teaching, probes and generalization measures through sixteen subjects was used to show the acquisition of the ability to converse on common animals and its generalization.

2.5. *Dependent variables and measurements*

Individual data were collected on each participant's exchanges. The dependent measures were <u>the mean number of unprompted exchanges</u>,<u>the mean number of prompted exchanges</u> and <u>the mean number of non-contextual exchanges</u> between participants <u>per presented stimulus, per session</u>. The presented stimuli were either the animal puzzle pairs, or the animal photographs on a computer screen, or the living animals themselves.

As unprompted exchanges were counted any completely independent exchanges (words, phrases or sentences), that were *audible, comprehensible, and contextual*, that is, they referred directly to the proceeding exchange of another peer. Prompted exchanges were any exchanges that were in any way assisted by the experimenter. Non-contextual exchanges were any audible and comprehensible exchanges that were unrelated to the conversation topic. Data collection lasted eleven months for the children at the special school and eight months for the adults in the residential facility.

2.6. *Inter-observer agreement*

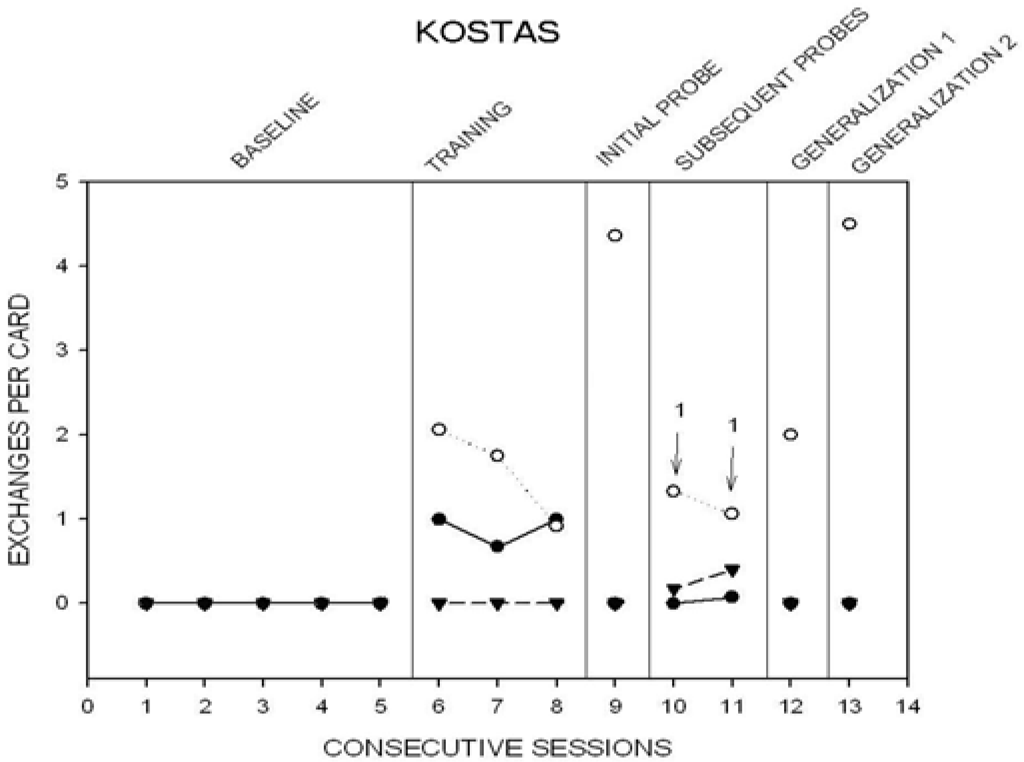
All sessions were recorded on video and were scored by the experimenter and one other trained observer. Inter-observer agreement was scored on all exchanges and was calculated as the number of agreements, minus the number of disagreements over the total number of exchanges. The mean inter-observer agreement was found 93%.

2.7. *Social validity measures*

Two social validity measures were conducted in order to verify the improvements and increases in conversational ability reported below. One group of 5 regular education second-grade teachers and another of 10 primary special-education teachers were assembled and shown in random order video excerpts of baseline and end of treatment performances from each of the six groups of participants.

III. Results

The results are presented in individual graphs for each participant, with the graphs of the members of each group presented together on a page, in order for the dynamics of their participation in the conversations in their group to be apparent. In all graphs the abscissa refers to consecutive sessions, while the ordinate to mean number of exchanges per presented stimulus. Unprompted exchanges are represented by the open circles, prompted exchanges by the closed circles and non-contextual exchanges by the closed triangles. The vertical lines show changes in experimental conditions from baseline to training, to initial probe, subsequent probes and generalization measures. Arrow 1 represents subsequent probes with training-group peers, while Arrow 2 represents subsequent probes with peers from other groups. The names of the participants have been changed to conceal their identity.



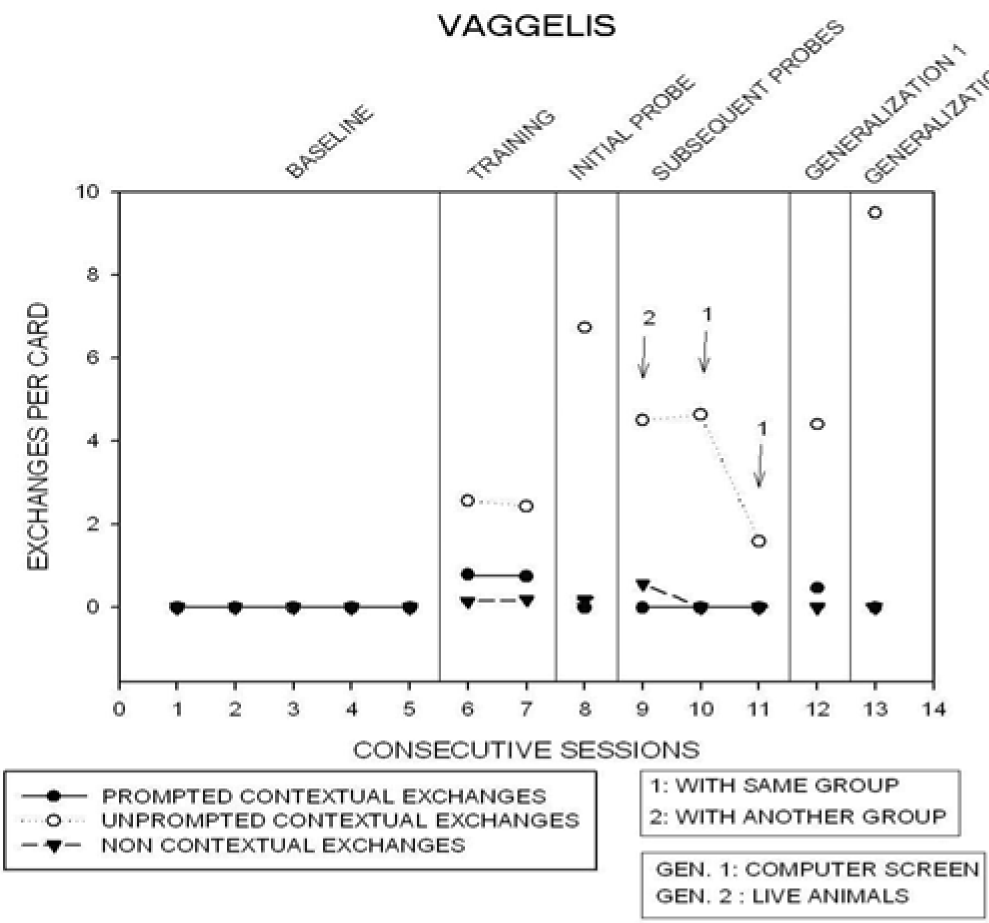
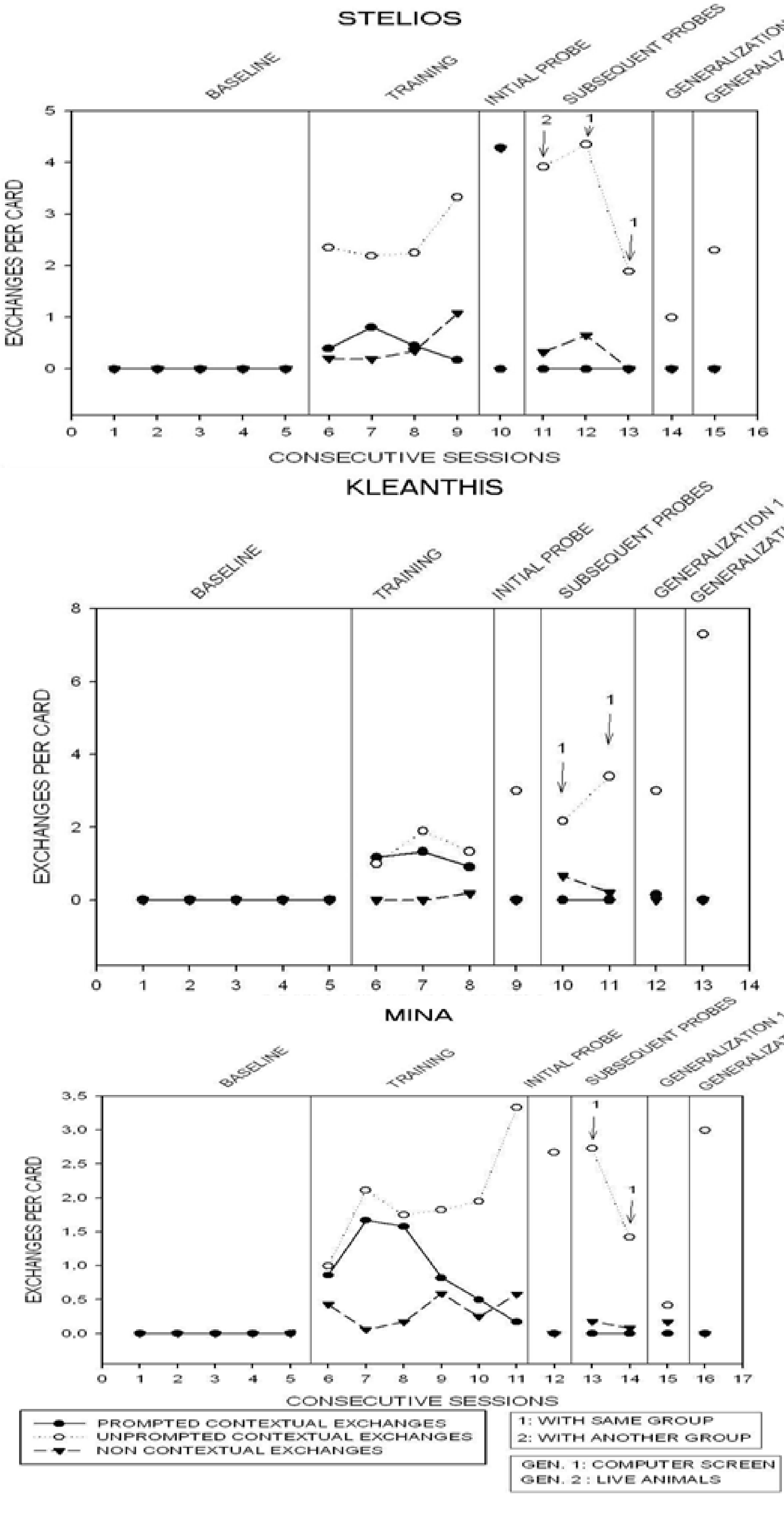


Figure Caption
The mean number of unprompted, prompted and non-contextual exchanges per stimulus across consecutive sessions for participants in Group 1 (Kostas and Vaggelis).

Fig. 1 shows the results of Kostas and Vaggelis (Group 1). During baseline both children made no exchanges. Kostas during his three training sessions made around 1 prompted contextual exchange per puzzle pair, while his unprompted exchanges descended from a level of 2 to a level of 1 on the third training session. During the initial probe he reached a level of more than 4 unprompted exchanges. During the two subsequent probes with his group he had around 1 unprompted exchange, while he exchanged non-contextually at a level less than 1. During generalization at the computer he reached a level of 2 unprompted exchanges per animal picture, while during generalization with the animals he reached at a level 4.5 unprompted exchanges. During his two training sessions Vaggelis had an average level of more than 2 unprompted exchanges and less than 1 prompted exchange. During the initial probe he increased to more than 6 unprompted exchanges, while his prompted and non contextual exchanges were close to 0. During subsequent probes after five and seven months Vaggelis made more than 4 unprompted exchanges with both his and other groups, while in the final subsequent probe with his group he dropped to 2 unprompted exchanges. During the generalization at the computer Vaggelis resumed to 4 unprompted exchanges per animal picture, while during the generalization with the animals themselves he reached the level of more than 9 unprompted exchanges.


STELIOS
BASELINE
TRAINING
INITIAL PROBE
SUBSEQUENT PROBES
GENERALIZATION 1
GENERALIZATION 2
EXCHANGES PER CARD
CONSECUTIVE SESSIONS
KLEANTHIS
BASELINE
TRAINING
INITIAL PROBE
SUBSEQUENT PROBES
GENERALIZATION 1
GENERALIZATION 2
EXCHANGES PER CARD
MINA
BASELINE
TRAINING
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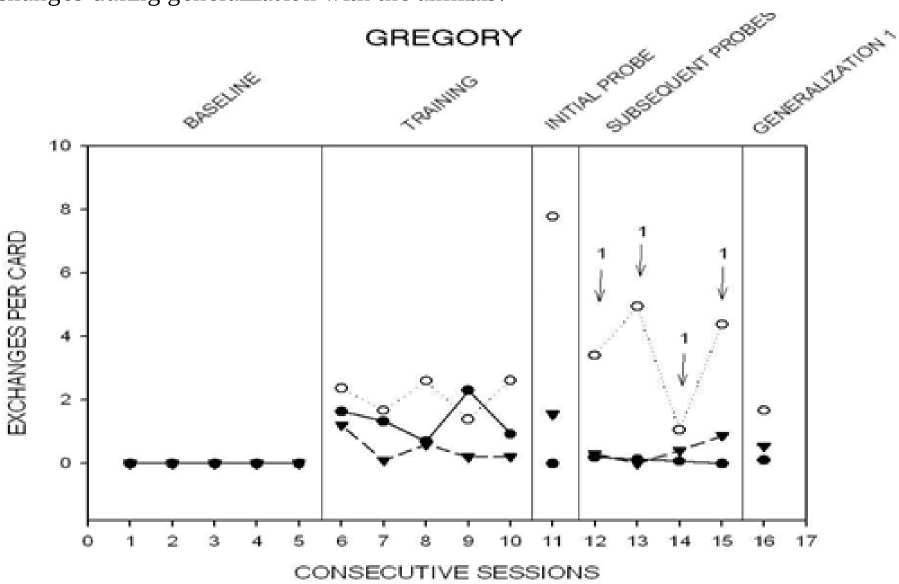
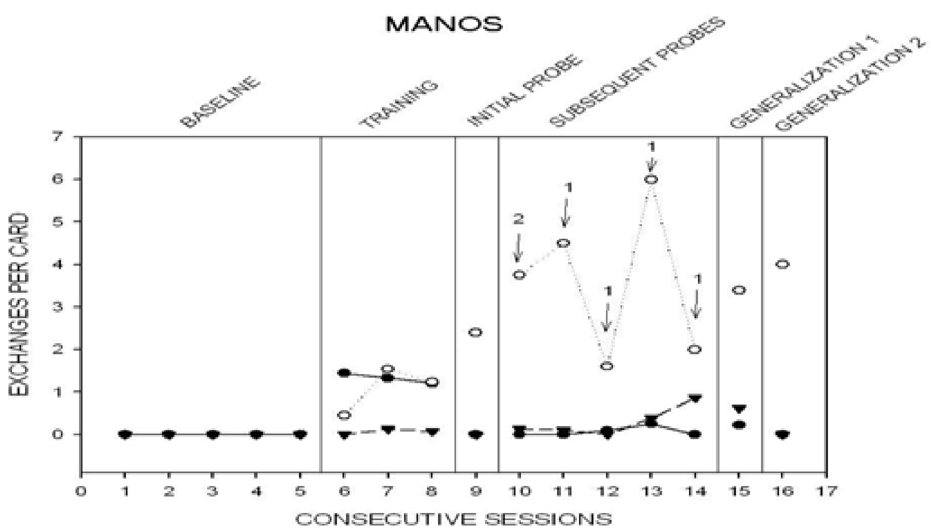
SUBSEQUENT PROBES
GENERALIZATION 1
EXCHANGES PER CARD
CONSECUTIVE SESSIONS
PROMPTED CONTEXTUAL EXCHANGES
UNPROMPTED CONTEXTUAL EXCHANGES
NON CONTEXTUAL EXCHANGES
1: WITH SAME GROUP
2: WITH ANOTHER GROUP
GEN. 1: COMPUTER SCREEN
GEN. 2 : LIVE ANIMALS

Figure Caption

The mean number of unprompted, prompted and non-contextual exchanges per stimulus across consecutive sessions for participants in Group 2 (Stelios, Kleanthis and Mina).

Fig. 2 shows the results of Stelios, Kleanthis and Mina (Group 2). These three children made no exchange during baseline. During his four training sessions Stelios had an average of more than 2 unprompted exchanges in the first three sessions, while during the fourth session he reached more than 3. His non-contextual exchanges changed similarly, from a near 0 level to a level of 1. At the same time, his prompted exchanges reached 0.5 during the first three sessions and dropped to almost 0 during the fourth training session. During the initial probe he made an average of more than 4 unprompted and more than 4 non-contextual exchanges. During the subsequent probes both with his and other groups he maintained a level of 4 unprompted exchanges, while in the last subsequent probe with his group he dropped to 2. His non-contextual exchanges remained around 0.5 during the first two subsequent probes, while they dropped to 0 during the last subsequent probe. During the generalization at the computer he made around 1 exchange per picture, while during the generalization with the animals he made more than 2 unprompted exchanges. Kleanthis during his three training sessions had less than 2 prompted and 2 unprompted exchanges, while during his initial probe he reached a level of 3, which he maintained during the two subsequent probes and the generalization at the computer, while he reached a high level of 7 unprompted exchanges in the presence of the real animals. Mina in her six training sessions showed an overall ascending trend in her unprompted exchanges form a level of 1 to a level almost 3.5, while at the same time her prompted contextual exchanges showed a descending trend from a level of 1.5 to a level almost 0. During her initial and subsequent probes she maintained a level between 2.5 and 1.5 unprompted exchanges per. Mina had a level 0.5 unprompted exchanges during generalization at the computer, but she returned to 3 exchanges during generalization with the animals.





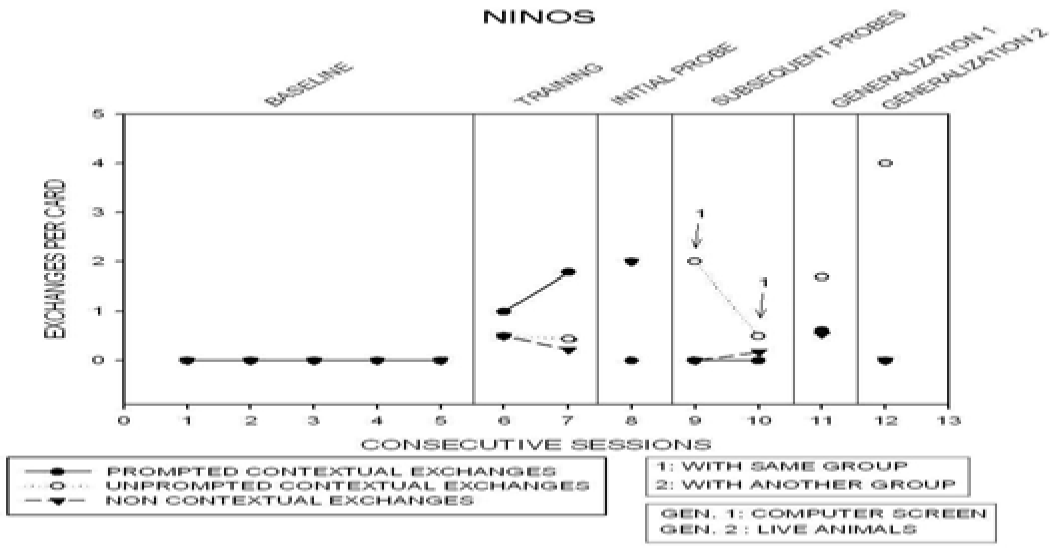
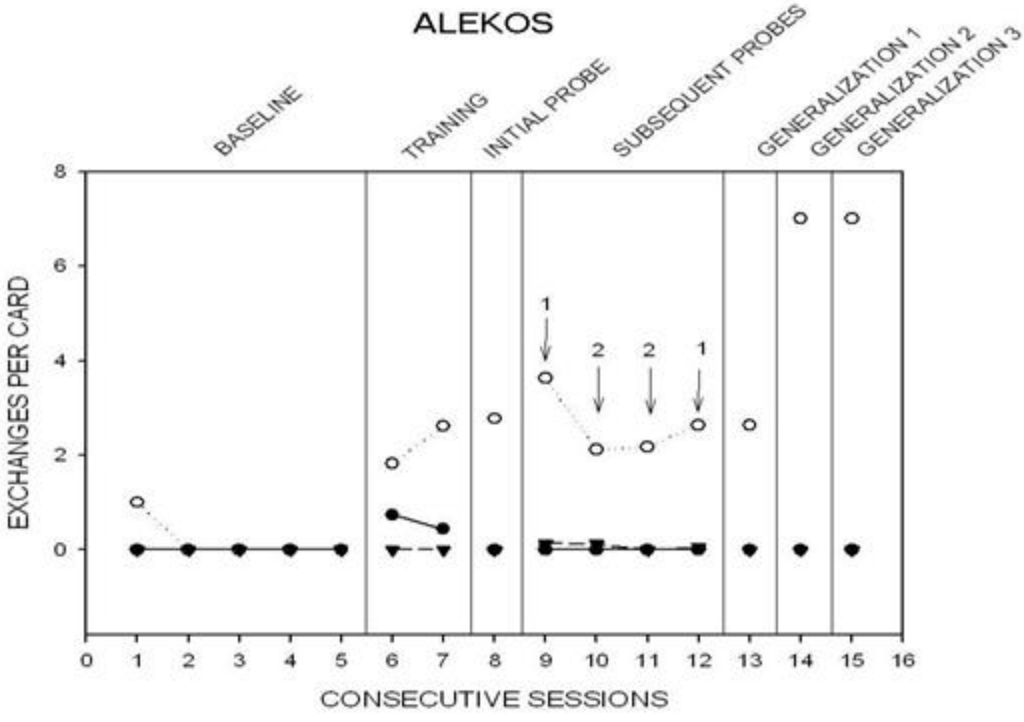


Figure Caption

The mean number of unprompted, prompted and non-contextual exchanges per stimulus across consecutive sessions for participants in Group 3 (Gregory, Manos and Ninos).

Fig. 3 shows the results ofGregory, Manos and Ninos (Group 3). Again, during baseline all three children made no exchanges. During Gregory's five training sessions he had around 2 unprompted exchanges, less than 2 prompted exchanges and a descending trend from 1 to almost 0 non- contextual exchanges. During his initial probe he reached a high level of 8 unprompted exchanges, while during his four subsequent probes with his group he made between 1 and 5 unprompted exchanges. Gregory participated only in the generalization at the computer where he made an average of more than 1 unprompted exchange per animal picture. Manos in his three training sessions reached a level of more than 1 unprompted exchange. During his initial and his five subsequent probes he made between 2 and 6 unprompted exchanges and he stabilized his performance to around 4 unprompted exchanges during the computer and animal generalization probes. Ninos was absent from some sessions and had only two training sessions with an average of 0.5 unprompted exchanges and between 1 and 2 prompted exchanges. During his initial and his first subsequent probe he had a level of 2 unprompted exchanges, while in his second subsequent probe he dropped to a level of 0.5. During generalization at the computer he reached a level of 2, while during generalization with animals he topped at 4 unprompted exchanges.



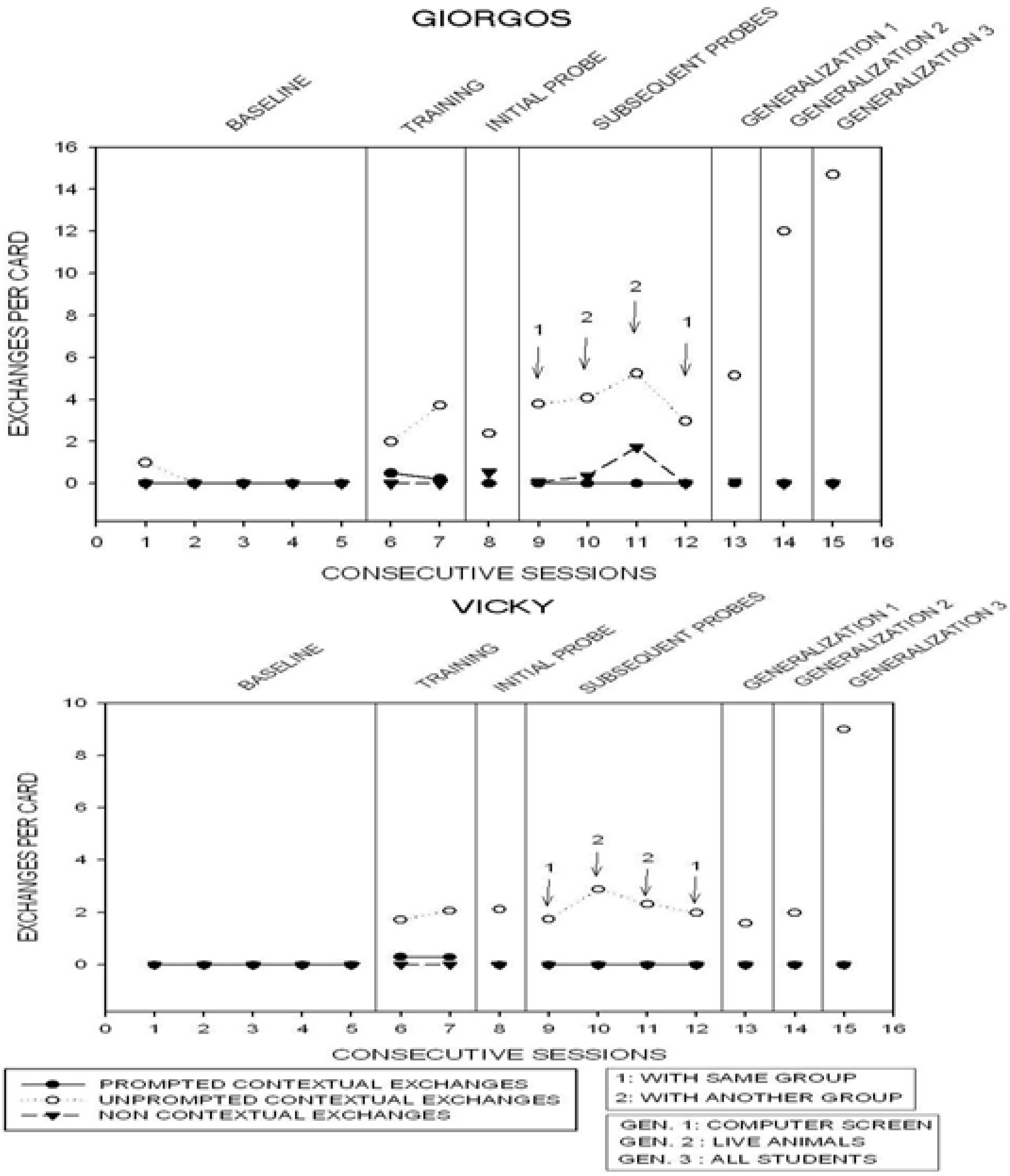
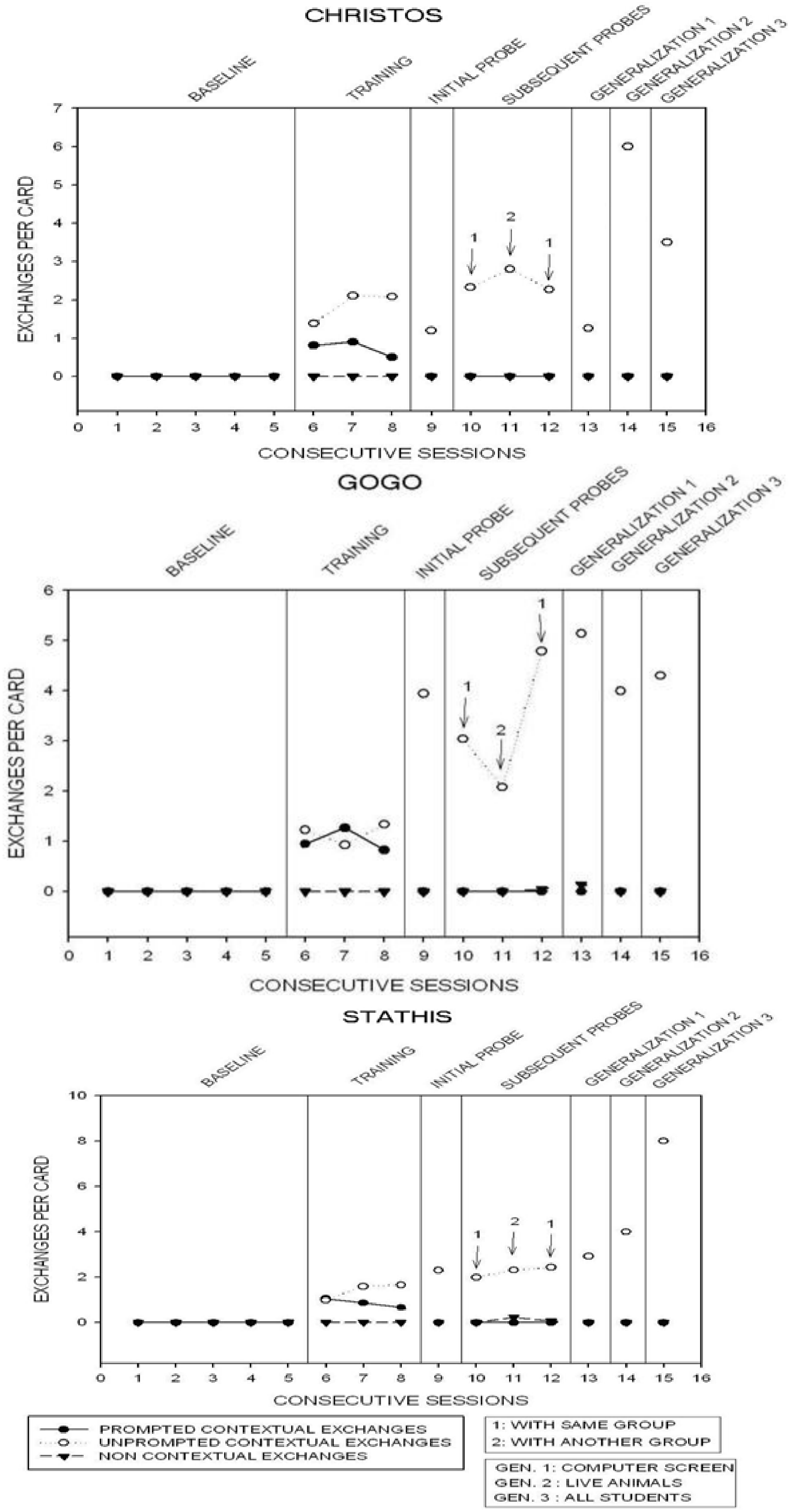


Figure Caption
The mean number of unprompted, prompted and non-contextual exchanges per stimulus across consecutive sessions for participants in Group 4 (Alekos, Giorgos and Vicky).

Fig. 4 shows the results of Alekos, Giorgos and Vicky (Group 4). During the first session of baseline Giorgos exchanged with Alekos once after viewing a card of an animal, but they made no exchanges in the four remaining baseline sessions. Vicky made no exchanges during baseline. During training all three adults made between 1.5 and 3.5 unprompted exchanges. During the initial probe they all maintained a level between 2 and 3 unprompted exchanges. During the four subsequent probes, they all reached between 2 and 4 unprompted exchanges, slightly higher than in training and initial probe conditions. During the generalization probes that followed Giorgos showed a continuous increase in unprompted exchanges, from 5 at the computer, to 12 with animals with his group, to 15 with animals and all three groups of adults present. Alekos remained steady at 3 unprompted exchanges during generalization at the computer, while he peaked with 7 unprompted exchanges during contact with animals with his group and with all three groups present. Vicky maintained her level of 2 exchanges during generalization at the computer, she made little more than 2 during generalization with animals, while during generalization with animals and all adults present she peaked at 9 unprompted exchanges per viewed animal.


CHRISTOS
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GENERALIZATION 3
EXCHANGES PER CARD
CONSECUTIVE SESSIONS
GOGO
BASELINE
TRAINING
INITIAL PROBE
SUBSEQUENT PROBES
GENERALIZATION 1
GENERALIZATION 2
GENERALIZATION 3
EXCHANGES PER CARD
CONSECUTIVE SESSIONS
STATHIS
BASELINE
TRAINING
INITIAL PROBE
SUBSEQUENT PROBES
GENERALIZATION 1
GENERALIZATION 2
GENERALIZATION 3
EXCHANGES PER CARD
CONSECUTIVE SESSIONS
PROMPTED CONTEXTUAL EXCHANGES
UNPROMPTED CONTEXTUAL EXCHANGES
NON CONTEXTUAL EXCHANGES
1: WITH SAME GROUP
2: WITH ANOTHER GROUP
GEN. 1: COMPUTER SCREEN
GEN. 2 : LIVE ANIMALS
GEN. 3 : ALL STUDENTS

Figure Caption
The mean number of unprompted, prompted and non-contextual exchanges per stimulus across consecutive sessions for participants in Group 5 (Christos,Gogo and Stathis).

Fig. 5 shows the results of Christos, Gogo and Stathis (Group 5). All adults in this group made no exchanges during baseline. During the three training sessions Christos and Stathis reached 2 unprompted exchanges, while Gogo made around 1. At the same time, they all showed a descending trend from near 1 to almost 0 prompted. During the initial probe both Gogo and Stathis showed further increases in unprompted exchanges to 4 and more than 2, respectively, while Christos showed a small decrease to around 1. In the three subsequent probes Gogo maintained her level of performance between 2 and 5 unprompted exchanges, so did Stathis (around 2), while Christos' performance remained overall stable (around 2.5). During the generalization probes that followed all adults continued to improve in their performance, with Gogo having a mean of 5 unprompted exchanges at the computer, 4 per animal with her group and around 4 per animal and all adults together. Stathis made an average of 3 unprompted exchanges during computer generalization, 4 per animal and his group and 8 exchanges per animal and all adults together. Christos showed a small decrease to an average of more than 1 unprompted exchange during generalization at the computer, while he increased to 6 during animals and his group and an average of 3.5 during animals and all adults together.

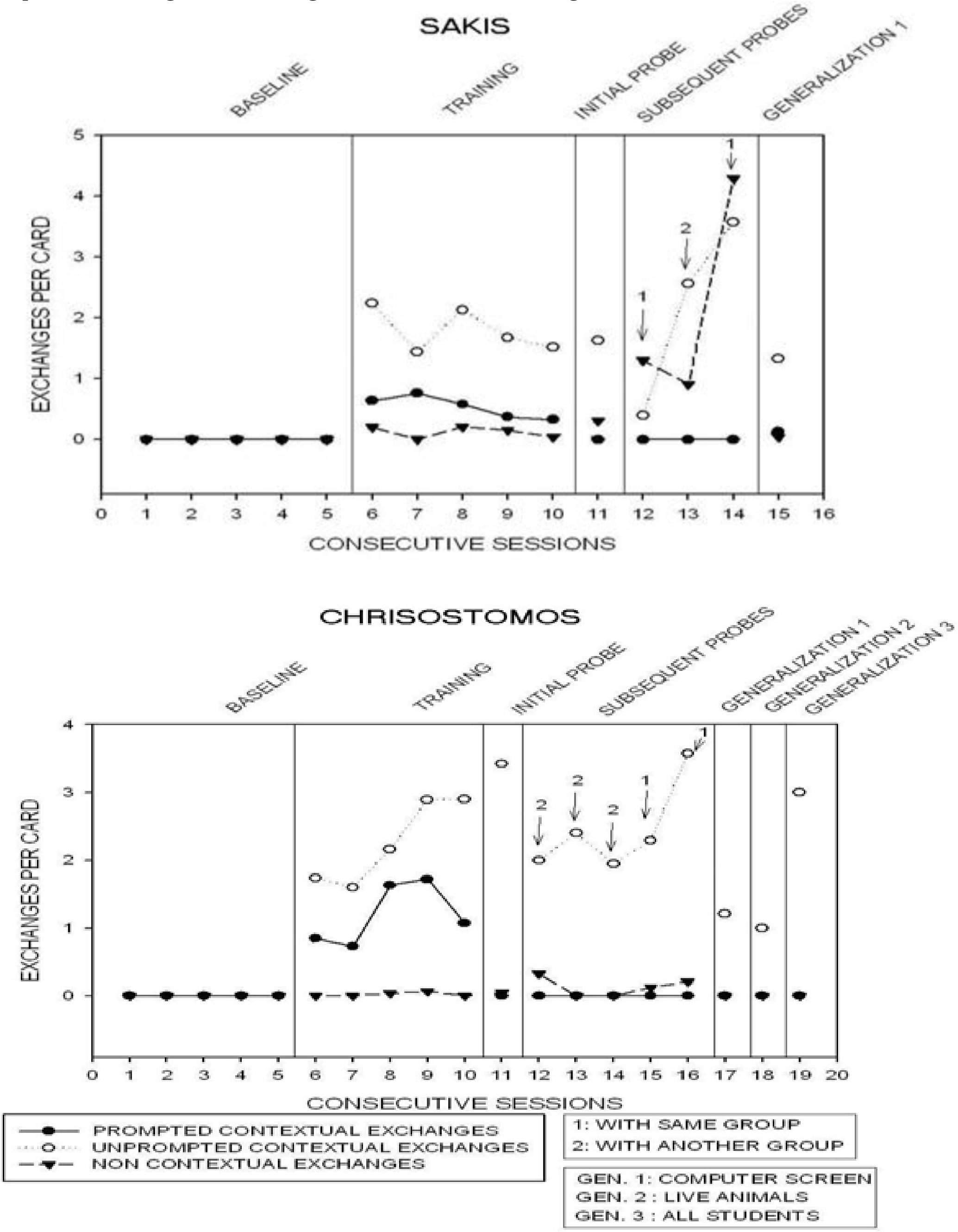

Figure Caption
The mean number of unprompted, prompted and non-contextual exchanges per stimulus across consecutive sessions for participants in Group 6 (Sakis and Chrisostomos).

Fig. 6 shows the results of Sakis and Chrisostomos (Group 6). During baseline both adults made no exchanges. During the five training sessions Chrisostomos showed a steady increase in the mean number of unprompted exchanges from the level 1.5 to that of 3, while Sakis reached around a level of 2. During the initial probe Chrisostomos showed an increase to 3.5 unprompted exchanges, while Sakis maintained his training level of around 2 exchanges. During the subsequent probes Chrisostomos made between 2 and 3.5 unprompted exchanges, while Sakis ranged between 0.5 and 4. During the generalization at the computer and with real animals with his group Chrisostomos had an average of 1 unprompted exchange, while he reached a level of 3 unprompted exchanges during generalization with animals and all groups. Sakis participated only in the generalization at the computer where he reached an average level of more than 1 unprompted exchange per animal picture.

3.1. *Results of social validity measures*

In general, both groups of evaluators affirmed the below reported improvements in the participants' ability to converse. The five regular education secondary school teachers found that 5 out of 6 groups of participants (Groups 1,2,3,4 &5) discussed more after training and only one evaluator judged that one of the groups participated equally before and after training (Group 6). All those evaluators judged these improvements as large for 3 of the 6 groups (Groups 2,3 & 5) and for the remaining three groups (Groups 1,6 & 4) 80% of them (4 out of 5 evaluators) reported large improvements while one evaluator reported moderate improvements for these groups.

The 10 primary school special education teachers found that 5 out of 6 groups of participants (Groups 1,2,3,4 &5) discussed more after training and only one evaluator judged that one of the groups participated equally before and after training (Group 6). All those evaluators judged these improvements as large for Group 2, 90% of them for Group 1, 70% for Group 3, 50, 40 and 30% for Groups 4, 5 and 6, respectively.

IV. Conclusion

The goal of the present intervention was on the one hand to help children and adults study the environment in order to acquire knowledge about animals and their habits, and on the other hand, to develop social skills necessary for maintaining conversation. The participants knew little about the taught animals and they were not observed to exchange among them although they had the ability to talk, as it was also evident in the initial baseline sessions. This study taught exchanges in the form of questions and answers relating to animals with the aim of the acquisition of the ability to discuss on common animals. Specifically, the participants were taught three questions "What is this?", "What does it eat?" and "Where does it live?", and the answers to these questions for each animal with the help of two table games depicting animals with their preferred food and natural habitat. The focus was on the skills of listening to peers, of asking and of answering questions about animals. These goals were expected to help the participants broaden their knowledge of the natural environment and strengthen their interpersonal relations.

The results showed that school children and adults with moderate or severe mental retardation can acquire basic knowledge of the environment, that is, they can obtain knowledge of common animals and their habits and apply this knowledge in conversations among them. For most participants through training sessions unprompted exchanges increased while prompted exchanges decreased. Furthermore, the results showed that all participants were able to use this newly acquired knowledge either in class or when they were brought in direct contact with these animals during the generalization phases of this intervention. The research literature also reports that the training persons with severe disabilities in conversational skills, such as to begin an interaction and to take turns, generalize in opportunities for conversation, in conversation partners and in different settings from those in which training occurred [29].

The participants of the present study, after being taught to make generalized questions, were able to generalize these conversational skills to different animals from those taught, to children and adults from other groups, to pictures of animals on a computer screen and to living animals. Actually, all participants, children and adults, achieved their highest levels of independent exchanges during initial, subsequent or generalization probes. The effect of the intervention (conversational exchanges) continued to increase during the follow-up probes and the different generalization conditions. The increased number of exchanges among participants during the generalization conditions in the present study can be possibly explained by the fact that stimuli which approach those in the natural environment are more interesting and more reinforcing than those further removed from it. These results emphasize the importance of the transition from the materials used in class for teaching about the environment to the stimuli present in the natural environment, which most of the times are multidimensional and placed in their enriched natural context and thus more interesting and reinforcing.

It is of practical importance that the reported learning and generalization was achieved through a very brief and simple intervention. The present intervention which combined teaching in small groups, individual teaching, table games, support from the investigator and the more able peers, achieved learning, maintenance and generalization of the taught skills with maximum economy, that is, with relatively very few training and individual sessions (2 to 6 and 1 to 5, respectively, depending on the participant). Recent literature [40] indicates that the good effects produced by this intervention in knowledge about the environment and socialization in small groups could be equally achieved in whole class group settings. In their study Newman and Kaefer compared vocabulary instruction in whole class groups and insmall group configurations. What they found is that all children gained significantly in word knowledge, concepts and categories regardless of whether they were in small or whole groups.

The application of the present intervention in groups of persons with a variety of disabilities is expected to be equally or more effective, if thought is given in adapting the above procedures to the special needs of each kind of disability. Special teachers of children and adults with disabilities can easily apply a very simple intervention such as the present to facilitate the task of teaching important aspects of the environment to their students and can help as well in their socialization. The present study was designed as a naturalistic teaching intervention that provided the opportunity for peers to communicate among themselves in their every-day placements (a special school and a residential facility), thus, helping them to socialize more effectively. This intervention attempted to address an important problem facing children with disabilities and specially those with severe handicaps in developing friendships [41]. The results are in agreement with the research literature which shows that teaching social skills represents a dynamically effective approach for a successful socialization of handicapped children [42]. Furthermore, these results provide evidence for developing applications in environmental education for children with mental retardation and possibly for other disabilities.

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References

[1]. UNESCO-UNEP,*International Environmental Education Programme, Environmental Education Series, No 1,* 1985.

[2]. P. Hart, No longer a "Little Added Frill": The transformative potential of environmental education for educational change,*Teacher Education Quarterly, 37,* 2010, 155-177.

[3]. T.E. Scruggs, and M.A.Mastropieri, Science and students with mentalretardation: an analysis of curriculum features and learners characteristics, *ScienceEducation, 79,* 1995, 251-271.

[4]. F.J. Rutherford, and A. Ahlgren, *Science for all American(* New York: Oxford University Press, 1990).

[5]. M.A. Mastropieri, and T.E. Scruggs, Science for students with disabilities,*Review of Educational Research, 62,* 1992, 377-411.

[6]. N.C. Pati, and R. Parimanik, Social development of children with mental retardation, *Indian Journal of Clinical Disability,* 1996, 22-24.

[7]. K. Indrabhushan, R.S. Amool, and S. Akhtar, Social development of children with mental retardation,*Indian Psychiatry, 18,* 2009, 56-59.

[8]. G. Pruthi,Language development in children with mental retardation, *Dynamical Psychology,* 1988, Retrieved from http://www.goertzel.org/dynapsyc/2007/Language%20development.htm

[9]. R.S. Chapman, H. Seung, S.E. Schwartz, and E. Kay-Raining Bird, Language skills of children and adolescents with Down syndrome,*Journal of Speech, Language, and Hearing Research, 41,* 1998,861-873.

[10]. P.H. Bornstein,J.P. Bach,M.E. McFall,P.C. Friman,and P.D.Lyons, Application of a social skills training program in the modification ofinterpersonal deficits among retarded adults: a clinical replication,*Journal of Applied Behavior Analysis, 13,* 1980,171-176.

[11]. A.S. Bradlyn,W.G. Himadi,D.B. Crimmins,K.A.Christoff,K.G. Graves and G.A.Kelly,Conversational skills training for retarded adolescents, *Behavior Therapy, 14,* 1983,314-325.

[12]. B.A. Chadwick, and R.C. Day, Systematic reinforcement: Academic performance of underachieving students,*Journal of Applied Behavior Analysis, 4,*1971, 311-319.

[13]. E. Garcia,The training and generalization of a conversational speech form in nonverbal retardates, *JournalofAppliedBehaviorAnalysis, 7,*1974, 137-149.

[14]. F.W. Gibson, P.S. Lawrence, and R.O.Nelson,Comparison of three training procedures for teaching social responses to developmentally disabled adults,*American Journal of Mental Deficiency, 81,* 1976,379-387.

[15]. J.A. Kelly, W. Furman, J. Phillips, S. Hathorn, and T. Wilson, Teaching conversational skills to retarded adolescents,*Child Behavior Therapy, 1,* 1979,85-97.

[16]. J.A. Kelly,B.G. Wildman, and E.S. Berler, Small group behavioral training to improve the job interview skills repertoire of mildly retarded adolescents,*Journal of Applied Behavior Analysis, 13,* 1980,461-471.

[17]. T.M. Longhurst, Assessing and increasing descriptive communication skills in retarded children, *Mental Retardation, 10,* 1972,42-45.

[18]. R.F. McClure, Reinforcement of verbal social behaviour in moderatelyretarded children, *Psychological Reports, 23,* 1968,317-376.

[19]. R.O. Nelson, F. Gibson, and D.S. Cutting,Video taped modeling: the developments of three appropriate social responses in a mildly retarded child,*Mental Retardation, 11,* 1973,24-28.

[20]. R.G. Rychtarik, and P.H. Bornstein, Training conversational skills in mentally retarded adults: A multiple baseline analysis, *Mental Retardation, 17,* 1979,289- 293.

[21]. S.M. Turner, M. Hersen, and A. Bellack, Social skills training to teach prosocial behaviors in an organically impaired and retarded patient, *Journal Behavior Therapy & Experimental Psychiatry, 9,*1978, 253-258.

[22]. S. Twardosz, and D.M. Baer,Training two severely retarded adolescents to ask questions, *Journal of Applied Behavior Analysis,6,*1973, 655-661.

[23]. B.G. Wildman, H.E. Wildman, and W.J. Kelly, Group conversational-skills, training and social validation with mentally retarded adults, *Applied Researchin Mental Retardation, 7,* 1986,443-458.

[24]. T.L. Whitman, J.R. Mercurio, and V. Caponigri, Development of social responses in two severely retarded children, *Journal of Applied Behavior Analysis, 3*,1970, 133-138.

[25]. L. Hazinski, and J.L. Matson, A comparison of social skills training and direct reinforcement methods with mentally retarded adults,*Scandinavian Journal of Behavior Therapy, 14,* 1985,23-31.

[26]. J. Wilkins, and J.L. Matson, Social Skills,*International Review of Research in Mental Retardation, 34,* 2007,321-363.

[27]. E.T. Ingvarsson,J. Tiger,G. Hanley, and K. Stephenson, An evaluation of intraverbal training to generate socially appropriate responses to novel questions,*Journal of Applied Behavior Analysis, 40,* 2007,411-429.

[28]. T.G. Haring B. Roger M. Lee, C. Breen and R. Gaylord-ross, Teaching social language to moderately handicapped students,*Journal of Applied BehaviorAnalysis, 19,* 1986, 159-171.

[29]. P. Hunt, M. Alwell, L. Goetz, and W. Sailor,Generalized effects of conversation skill training,*Journal of the Association for Persons with SevereHandicaps, 15,* 1990,250-260.

[30]. P.J. Krantz, S.E.Ramsland, and L.E.McClannahan, Conversational skills for autistic adolescents: an autistic peer as prompter,*Behavioral ResidentialTreatment, 4,* 1989,171-189.

[31]. G.E. Lancioni, Normal childrenas tutors to teach social responses towithdrawn mentally retarded schoolmates: training, maintenance, andgeneralization, *Journal of Applied Behavior Analysis, 15,* 1982,17-40.

[32]. D.M. Maloney, T.M. Happer, C.J. Braukmann, D.L. Fixsen, E.L. Philips, and W.W. Wolf, Teaching conversation-related skills to predeliquent girls,*Journal of Applied Behavior Analysis, 9,* 1976,371.

[33]. S.L. Odom, M. Houson, B. Jamieson, and P.S. Strain,Increasing handicapped preschoolers' peer social interactions: cross-setting and component analysis,*Journal of Applied Behavior Analysis, 18,* 1985,3-16.

[34]. S.L. Odom, and P.S. Strain, A comparison of peer-initiation and teacherantecedent interventions for promoting reciprocal social interaction of autisticpreschoolers. *Journal of Applied Behavior Analysis, 19,* 1986,59-71.

[35]. G.R. Patterson, and D. Andreson, Peers as social reinforcers, *ChildDevelopment, 35,* 1964,951-960.

[36]. P.S. Strain,R.E. Shores, and M.A. Timm,Effects of peer social initiations on the behavior of withdraw preschool children, *Journal of Applied BehaviorAnalysis, 10,* 1977,289-298.

[37]. M.C. Luciano, Acquisition, maintenance, and generalization of productive intraverbal behavior through transfer of stimulus control procedures,*Applied Research in Mental Retardation, 7,* 1986,1-20.

[38]. N.N. Singh, and C.J. Millichamp, Independent and social play among profoundly mentally retarded adults: training, maintenance, generalization, and long-term follow-up,*Journal of Applied Behavior Analysis,20,* 1987, 23-34.

[39]. S. Sterling, and G. Cooper, G., In Touch: *Environmental Education for Europe*, 1992, WWF U.K.

[40]. S.B. Neuman, and T. Kaefer, T, Enhancing the intensity of vocabulary instruction for preschoolers at risk: The effects of group size on word knowledge and conceptual development, *The Elementary School Journal, 113,* 2013, *589-608*.

[41]. P.A. Gordon, D. Feldman, and J. Chiriboga, Helping children with disabilities develop and maintain friendships. *Teacher Education and Special Education, 28,* 2005, 1-9.

[42]. F.M. Gresham, Social skills training with handicapped children:areview,*Review of Educational Research, 51,* 1981,139-176.