Effects of the Firstart Method of Prenatal Stimulation on Psychomotor Development: From Six to Twelve Months

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Abstract: None available.

Full Text: Headnote 1 ABSTRACT of the first paper: Effects of the Firstart Method of Prenatal Stimulation on Psychomotor Development: The First Six Months, explored the effectiveness of the Firstart prenatal stimulation method applied to a sample of maternity patients at University Hospital "La Fe" in Valencia, Spain. Both groups of women, (71 control and 101 experimental) were enrolled in the birth preparation class provided at the hospital. Chi-Squared statistical tests indicated that both groups were comparable in a number of variables. In both groups more than 90% were married or living in stable relationships and both groups had similar child birth and life experience records. The mothers in the experimental group wore a waistband equipped with small speakers connected to a tape recorder which played a series of eight tapes of violin sounds. Mothers exposed the unborn babies to an average of 70 hours of music from about 28 weeks gestation to the end of pregnancy. After birth the "Observational Scale of Development" originated by F. Secadas was used by Mothers to chart developmental behaviors from 0 to 6 months. On 22 items of the scale, behaviors of the experimental babies were significantly advanced from those of the control group. ABSTRACT: In a previous paper, we reported the developmental advantages found in the first semester of life, in a sample of babies that had been prenatally stimulated using the Firstart program. In this paper we offer the results obtained comparing the control and the experimental groups in the second semester of life. Although children in the experimental group are again more advanced than children in the control group, in some behaviors related to memory, fine motor activities, gross motor activities, cooperation in learning, imitation, and self-recognition, the advantages at this age level are fewer than at the preceding level. INTRODUCTION Research has confirmed data that supports the efficacy of certain kinds of prenatal stimulation. The future child starts to move at about seven and a half weeks and his repertory of spontaneous and provoked movements is nearly complete around the fifteenth week (Piontelli, 1992; Chamberlain, 1999). At the second quarter of gestation organic sensorial structures of the fetus reach a level of development advanced enough to enable reaction to a wide range of inner and outer stimulation (Ferreira, 1965; Read and Miller, 1977; Peleg and Goldman, 1980; Busnel, 1993; Odent, 1993; Shahidullah and Hepper 1992; Marlier, Schaal, Orgeur, and Rognon, 1995; Schaal and Soussignan, 1998). During the last months of intrauterine life the fetal nervous system in general and the brain in particular are capable of performing some functions (remembering, discrimination of stimuli, habituation, learning by conditioning) (Spelt, 1948; Busnel, 1993; Childs, 1998), and the uterus is not an isolated, silent, protected, homogeneous, and nonstimulated environment. Prenatal literature (Spelt, 1948; Busnel, 1993; Childs; 1998 Chamberlain, 1998) has shown that the fetus has the learning ability that is the foundation of the effectiveness of prenatal stimulation. Some women in different countries have stimulated their babies before birth, because they wanted their babies to be more intelligent. However, the studies in this field are scarce (Manrique, 1989, 1998; Logan, 1987, 1991; Panthuraamphorn, 1993, 1994, 1998a, 1998b; Sallenback, 1993, 1994, 1998; Van de Carr, 1986, 1988, 1998) and only a few of them have been done under scientific conditions. But it is clear that the fetal child, whose abilities have been revealed by the new technologies, reacts in a physiological and in a behavioral way to light, internal and external sounds, cold, sweet and bitter substances, touch, and to the intake of alcohol or tobacco by their mother or to the hormonal flood triggered by her emotions. It must also be taken into account that the younger the unborn child, the bigger the plasticity of his brain, and as a result he can be more receptive to the influence of stimulation and he is at the best moment to be shaped. In order to illustrate these ideas, we

began a longitudinal study using the Firstart program. THE FIRSTART METHOD The purpose of the Firstart program of prenatal stimulation is to advance the intellectual and physical development of the fetus by means of musical stimuli presented to the fetus for a few minutes per day from about 28 weeks gestation to the end of pregnancy. The creators of Firstart, Rosa Plaza and Manuel Alonso, suggest that pregnant mothers set aside time to listen to classical music selected and recommended for the macro and micro rhythms appropriate for relaxation. The Firstart program includes eight audio tapes containing violin sounds similar to those vocalized by the mother and others speaking to an infant. As is well known, those who speak to infants modify their language with elevated voice, simple and brief sentences and constant repetition. This verbal process is instinctive but conforms to the needs of a baby. The music was conceived as a series of short sounds followed by a moment of silence. An additional consideration in constructing the tapes was the natural rhythm of the heart, which for the fetus is a sound of utmost importance and significance. As a result, the musical compositions presented have a metronome marking of 65 to 80 beats per minute. The tapes follow a controlled learning sequence starting with elemental sounds and progressing over time to more complex sounds. Tape 1 repeats the first three notes of the C-major scale followed by a silent pause. Tape 2 is the same as Tape 1 but is performed in C-minor. Tape 3 and 4 are melodies of progressive complexity. Tapes 5 and 6 present the fundamentals of the occidental musical system (i.e. two Greek tetrachords). Tape 7 is a C-major trichord arpeggio with three repetitions and silent pause. In addition, the program urges parents to make a recording of the voices of the mother, father, siblings or other relatives so that the unborn infant can listen and become familiar with them. Included with the tapes is an adjustable waistband containing a small speaker aimed at the womb. These are attached to a small tape player which plays the music for the fetus to hear. A manual explains the method and contains a time card used to record the frequency and length of the listening sessions. Method Researchers have shown the different responses of the fetus to different musical stimuli (Shetler, 1989; Hepper, 1991;) and the positive effects of prenatal exposure to music (Shetler, 1985; Cary, 1987; Rozada, 1996; Whitwell, 1999). The intention of our research has been to provide answers to the following questions: 1) Is prenatal stimulation truly effective, or more exactly, is the Firstart procedure a good system of prenatal stimulation? 2) If so, what are the abilities that can be enhanced? The analysis of our data in the first semester has shown some advantages in the experimental group (See, Lafuente et al., 1997). In this paper we will explain the results of the second semester. Sample In this research, as we described in our first paper (Lafiiente et al., 1997), a longitudinal study was proposed, with an experimental group, which received prenatal stimulation with the Firstart procedure and a control group, without any kind of stimulation. There were 200 pregnant women in each of these groups. All these women attended the birth preparation course offered at the "La Fe" Hospital in Valencia (Spain). However, during the second study, the number of mothers who filled in the Observational Scales about the development of their babies after birth, at the successive age levels, decreased and the observable scales changed with only slight fluctuations. At the 0-6 months level we could rely on 71 individuals in the control group and on 101 individuals in the experimental group; At the 6-12 months level we have been able to count on 70 individuals in the control group and on 108 individuals in the experimental group. Instruments and procedure The features of both sample groups, the procedure followed during the prenatal phase, and the variables controlled after birth are described in the already mentioned paper (Lafuente et al., 1997). The Observational Scale of Development from 6 to 12 months, adapted from that of F. Secadas (1988, 1992), was applied at home by mothers themselves. They received the Scale by mail and recorded at what age each behavior first appeared in their children. Results Using Student's t-test we obtained significant differences between the control group and the experimental group in the average age of performance for fourteen behaviors. Children in the experimental group were significantly more advanced than children in the control group in eleven of the behaviors (see Table 1). However we found three behaviors where children in the control group were significantly more advanced (see Table 2). The behaviors where children in the experimental group were significantly more advanced than children in the control group were related to memorization of sequences of

daily activities, in other words, recognition of "scripts"; some fine motor activities like changing objects from one hand to the other, shaking a rattle, or catching an object in each hand, and gross motor activities, like walking alone, climbing on a chair or standing up without support. Children in the experimental group were more cooperative in learning routines related to dressing, they started earlier to imitating some household chores, and they reacting to their image reflected in a mirror.

Table 1.
Behaviors Where Experimental Group Was Significantly Better

Behavior	*t*	*p*
Recognizes the actions that precede going for a walk	2.03	0.02
Changes objects from one hand to another	2.17	0.01
Shakes something if it makes a noise, e.g. a rattle	1.83	0.03
Moves hand towards the mirror to touch own image	2.52	0.00
Takes two objects one; in each hand	2.76	0.00
Takes some little steps unaided	2.24	0.01
Collaborates when he/she is dressed	2.15	0.01
Climbs on a chair to reach something	2.25	0.01
Stands up with agility without any support	1.81	0.03
Walks unaided but with knees still a little rigid	2.39	0.00
Imitates some chores; e.g. sweeping and washing	2.88	0.00

Note: Complete list of behaviors shown in Appendix 1.

The three behaviors where children in the control group stood out were of the linguistic or the imitative type. If we observe the whole of the behaviors in the Observational Scale of Development from 6 to 12 months (N = 86), we can see that the average age of performance was more advanced in the experimental group in 50 (58.1%) behaviors, although the difference reached the significant level only in eleven of them. Five behaviors (5.8%) were not carried out by any child in either groups, because these behaviors normatively belonged to ages clearly higher than twelve months.

Table 2.
Behaviors Where Control Group Was Significantly Better

Behavior	*t*	*p*
Closes and opens mouth imitating another person	2.42	0.00
Says two words in addition to daddy & mummy	1.93	0.02
Says three words in addition to daddy & mummy	1.70	0.04

DISCUSSION AND CONCLUSIONS We must point out that during this second semester of life there are fewer differences between the control and the experimental groups than during the first semester. We must also underline that the majority of the behaviors in which the control group was ahead of the experimental group were related to the production and understanding of language. However, the analysis about the behaviors in the first semester of life seemed to predict a more advanced linguistic development in the experimental group, because this group was more precocious in the emission of the first sounds. How can we interpret such inconsistency in our results? Researchers of the life span indicate the existence of continuities and discontinuities in our development, of periods of acceleration and deceleration and of stagnation, of different rhythms. It is possible that the age intervals analyzed may not be wide enough to enable us to adopt a completely correct perspective, that only the passage of time would be able to provide us. How can we explain

the fact that we found 22 significant differences in favor of the experimental group in the 0-6 months interval, and that we found only 11 significant differences in the 6-12 months interval? It is possible that stimulation supplied during the prenatal period may give some advantages to the experimental group for a limited period of time, and that if Firstart children don't continue being stimulated in a special way in the postnatal period, they gradually become equal to the other children. In any case, we must be cautious when evaluating these first data and we must not extract hasty conclusions from them. The analysis of the data from the subsequent years will help us to confirm or to refute the trends verified during the first year of life, that on the whole tend to show a bigger advance in the experimental group, although in the second semester the differences are reduced. Moreover, it must be taken into account that the cognitive abilities (linguistic, reading and writing, spatial, logical reasoning, mathematical, etc.) displayed by the older children are to a large extent not comparable and not predictable from the basically sensory motor abilities of smaller children. It is also important to remember that the kind of stimulation provided by the Firstart method is of a basically auditive type and of a musical nature, so it is possible for the most improved capacities to be related, in one way or another, with hearing and musical talent. Our intention is to obtain data in the two groups of children about the different intellectual skills enumerated earlier, and to carry out at the same time an evaluation of their musical aptitudes, at about seven or eight years of age, when all these children will be fully integrated into their school centers, when they will have already begun their basic training in writing and reading and mathematics, and when (or if) they have received some kind of musical instruction. At that point they will be able to undertake some tests to measure their aptitudes. Footnote 1 Editors Note: This article is a continuation of a paper published in Journal 11(3), Spring 1997, 151-162. I have added an edited version of the original abstract and of the description of the Firststart Method. References REFERENCES Busnel, M.C. (1993). Aspects scientifiques de la sensorialité foetale. Primer Congreso Mundial sobre la Education Prenatal. Granada, junio 1993, 51-60. Cary, E.P. (1987). 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10-15 minutes without support 34) Can sit unaided after crawling 35) Cries when mother leaves 36) Looks attentively at the drawings in a book 37) Overcomes obstacles by going around them 38) Can walk, when held by both hands 39) Tries to imitate a scribble 40) Tries to eat using a spoon 41) Imitates the "Five Little Wolves" (Spanish nursery rhyme with gesticulation) 42) Crawls backwards 43) Cries when told off/rebuked 44) Listens to music attentively 45) Uncovers a box to take out a toy that was seen being put into it 46) Sits in front of the mirror and looks at own image 47) Gives an object, when someone says, "give it to me," hand out-stretched 48) Says one word besides of daddy and mummy 49) Scribbles 50) Inserts objects into slots and holes 51) Takes toys to pieces 52) Drinks from a glass, holding it with both hands 53) Stands up by leaning on something and then lowers again unaided 54) Moves by grasping the furniture 55) Can walk when held by only one hand 56) Stands up unaided 57) Takes some little steps unaided 58) Collaborates when is dressed 59) Answers when someone says his/her name 60) Says two words in addition to daddy and mummy 61) Climbs on a chair to reach something 62) Rings the doorbell if it is within reach 63) Makes a two blocks high tower 64) Discerns different noises e.g. plane, car, door 65) Understands and executes simple orders e.g. put that away 66) Stands up with agility without any support 67) Walks unaided more easily, but with knees still a little rigid 68) Recognizes some drawings 69) Imitates some chores e.g. sweeping, washing 70) Points at something that he/she wants 71) Says words to name something, by its sound e.g. rin-rin for bell 72) Asks someone to do something: open, take, give me 73) Turns lights on and off 74) Unwraps a sweet, peels a banana (when first cut made) 75) Asks for food, water, and the bathroom 76) Makes a three blocks high tower 77) Walks easily 78) Climbs stairs, holding the banister, and putting two feet on each step 79) Usually able to remain toilet trained during day 80) Points at parts of the human body: eyes, mouth, feet, etc 81) Says three words in addition to daddy and mummy 82) Plays, simulating things: e.g. feeding dolls, fight between two dolls 83) Says two word sentences: e.g. daddy car 84) Dresses unaided if clothes are simple 85) Comes down stairs holding the banister 86) Runs

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