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The Effects of the Play-Based Father-Infant Interaction Programme on Father and Infant Behaviour *

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Abstract

The present study was conducted to observe the effects of the Play-Based Father-Infant Interaction Programme (PBFIIP) on the interactional behaviour of fathers and infants. The study group was composed of 40 12-month-old infants and their fathers in central Muş, Turkey. For data collection, the 'Personal Information Form', the 'Caregiver-Child Affect, Responsiveness, and Engagement Scale', and the 'Denver Developmental Screening Test were used. The study was conducted as an experimental implementation. The evaluation of the study data involved descriptive statistical methods. For normally distributed quantitative data, the Student t Test was used for comparisons between the two groups and the Dependent Groups t Test was used for in-group comparisons. For variables which were not normally distributed, the Mann Whitney U Test was used for their comparisons and the Wilcoxon Signed Rank Test was used for in-group comparisons. The research findings revealed a significant difference in favour of the experiment group ($p<0.05$) between the pre-test and post-test average scores on the C-CARES father-child and pair forms. Among the infants in the experiment and control groups, no significant difference was detected between their pre-test total score averages in the personal-social, fine motor, language, and gross motor fields; a significant difference in favour of the experiment group was detected between their post-test average scores in the personal-social, language, and gross motor fields; and no significant difference was detected in the fine motor field ($p>0.05$).

Keywords

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Father-infant interaction
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Introduction

The period in which development is fastest and most affected by the environment is the first few years in an individual's life. The need for social interaction manifests itself from the moment of birth. Research suggests that the universal human tendency to form close relationships starts in infancy (Bowlby, 1988; Coates, 2004). The first relationship with the parents is the determining factor in a child's healthy development and the positive relationship with others (Dönmezer, 1999). The initial years of life have a great influence over the way an individual turns out in their future years. Experiences in this period mould personal traits in the years to come (Erdiller, 2010). Interventions in early years could prevent the emergence of problems such as academic failure, developing behavioural issues, and criminal and aggressive behaviour that may take hold in an individual's school years (Shonkoff & Phillips, 2000). There are also studies that highlight the importance of focusing on the quality of childcare in the early period. The care provided should be diligent, sensitive, and encouraging. In cases where childcare is not of such quality, children have been found to develop untrusting attachment to their parents (Belsky, 2006; Soysal & Bayoğlu, 2010). In these critical years with sensitivity, parents play the role of the first and foremost educators; they must therefore provide the diligence and care necessary to support their child's development (Çağdaş & Seçer, 2015). The family environment is where a child forms the closest relationships and socializes for the first time. The family and the environment are mutually influential. (Ertürk, 2012; Kıldan, 2012). The parent-child relationship involves a two-way mutuality. This relationship reveals a structure in which both the parents and the child influence, and are influenced by, each other (Kerr, Stattin, & Özdemir, 2012). Many researchers consider socialization in the family as 'primary socialization' and that outside the family as 'secondary socialization'. Just like individuals, families, too, adapt to the changes in life, grow, and evolve (Hallaç & Öz, 2014). In the developmental family model, this involves constant renewal and change in itself. The roles and meanings attributed to men and women have changed in the political, social, and economic area of social process. In addition, the increase in the number of working mothers, mothers working full time outside of home, the increase in the divorce rates, tendency towards to being single in fathers who are consequently taking responsibility for their children's care and needs, the shrinking in size of the traditional family are the reasons resulting increase in the roles and responsibilities of fathers on their children. All these changes have encouraged fathers to take interest in early infancy and childcare (Atmaca Koçak, 2004; Cabrera, Tamis LeMonda, Bradley, Hofferth, & Lamb, 2000). Noh and Yeom (2017), Rather than questioning that if the father and baby can be bound, in their study on the father-fetus binding, showed that the father-infant interaction has even begun in the mother's womb by developing the K-PAFAS scale which scientifically measures the connection. Moreover, admitting fathers into the newborn units strengthens the father-baby bond and increases the coordination with the mothers. When fathers look at their babes in the newborn units, they experience some hormonal changes and these hormonal changes strengthen the father's sensitivity to their babes. The adoption of fathers in newborn units strengthens the baby-infant bond and increases the coordination with the mother. Fathers in their newborn units have hormonal changes when they look at their babies and these changes strengthen the father's sensitivity (Fisher et al., 2018). Asserts that the father-child interaction has a direct influence on the child (Lamb, 2000). In contrast to mothers spending time with their children mostly for physical care and the child's needs, the father-child interaction is based on physical activities and games. The difference in interaction means that the father; independent of the mother, plays a crucial role in the child's socialization, meeting its needs, providing socially required skills, and preventing problematic behaviours (Demir Öztürk, 2018; Nordahl, 2014; Özyürek & Tezel Şahin, 2015; Sımsıkı & Şendil, 2014).

Studies on fathers suggest that children who are distant from their fathers and deprived of interaction have a more negative self-concept (Alston & Williams, 1982); fathers push their children towards more independence and encourage them to explore their surroundings (Tamis LeMonda, Shannon, Cabrera, & Lamb, 2004); children of loving and caring fathers have better relationships with their friends and tend to show leadership skills (Kuzucu, 2011); children in families with fathers showing great care turn out to be more independent with a well-developed internal control focus and a positive opinion of parental roles (Carlson, 1984); children who share more activities with their fathers are more successful than those who do not (Güngörmüş, 2001); father involvement improves the child's cognitive development and problem-solving skills (Nugent, 1991); children who grow up without a father perform poorly at school and active father involvement in the child's life improves its empathetic and cognitive skills, internal control focus (Coltrane, 1990), problem-solving skills, self-confidence, and adaptation (Yılmazçetin, 2003); It is pointed out that, rather than the socioeconomic level, the stimulatory activities that the fathers present to the child in the domestic environment have more positive effect on the child (Melvin et al., 2017). These studies demonstrate that fathers play a crucial role in their children's lives from the early years on.

It is therefore of paramount importance that fathers, who play such a key role in children's lives in early childhood, should be supported by various programmes. There are educational programmes designed to lend support to parents in performing their duties to help their children socialize (Decker & Decker, 2005). They are also intended to help with the acquisition of the previously mentioned knowledge and skills (Aral et al., 2011). With the help of such programmes, the importance of highly stimulating environment and qualification were emphasised, communication between the parents and the child was enriched, effectiveness of physical contact was disclosed and the process was experienced with the children. According to the results of research conducted with the participation of 3325 fathers from 51 provinces in Turkey; 57% of fathers never play with their children, 50% of fathers never read books to their children, and 36% of fathers never change the diaper of their own baby (Anne Çocuk Eğitim Vakfı [AÇEV], 2017). Fathers need support in supporting their children, being efficient fathers, establishing healthy communication with their children, developing a positive attitude and behaviour towards their children, recognising needs of children and improving their self-confidence. Therefore it is important to inform fathers systematically and increase their sensitivity towards the importance of early childhood which progress rapidly and baseline of developmental process. Supporting the father, who is considered to be the basic source of the child's development, with a well-prepared educational programme focusing on the early years of life, will help him feel safe as a father, identify and improve his own potential, and share his knowledge and experience with other fathers. International research includes studies that have been conducted on infant development, father-infant interaction in early years, similarities and differences between father-infant and mother-infant interactions, attachment development in infants, father involvement, fathers' roles, and the theoretical framework (Parke & O'levy, 1976; Lamb, 1978; Brophy Herb, Gibbons, Omar, & Schiffman, 1999; Shannon, Tamis LeMonda, & Margolin, 2005; Brown, 2008; Cerniglia, Cimino, & Ballarotto, 2014; Dayton, Walsh, Oh, & Volling, 2015). In Turkey, however, research has mostly focused on father involvement and fathers' roles (Taşkın & Erkan, 2009; Ersan, 2015). As a result of this, a limited number of studies have been found in the literature on father and infant interaction, informing fathers about infant development, the interactional implementation method, and home-based implementations. More sensitivity and control is needed in studies involving infants. Little or no research exists on fathers and 12 to 15-month-old toddlers who have just taken their first steps, the initial sign of opening to the world and moving independently. Giving timely support to fathers to be trained towards early critical years of life, come to be considered extremely important for healthy development of children. Such research would also provide guidance

to practitioners and researchers in studies involving father and child together in an educational setting. The present study aims to examine the effects of the Play-Based Father-Infant Interaction Programme (PBFIIP) designed to support father-infant interaction and the infant's development, on the behaviour of fathers and infants. For this purpose, answers have been sought to the following research questions:

1. Is there any significant difference between the pre-test, post-test and permanence test average C-CARES scores of the fathers in the experiment and control groups?
2. Is there any significant difference between the tests, pre-test, post-test and permanence test average C-CARES scores of the infants in the experiment and control groups?
3. Is there any significant difference between the pre-test, post-test and permanence test average scores at Denver II Developmental Screening Tests sub-dimensions of the infants in the experiment and control groups?

Method

Research Model

The present study was conducted as an experimental pattern. Experimental pattern reveals the cause-and-effect links between variables, the effects of which are to be measured, following implementations under specific rules and conditions. In the pre-test / post-test control group experimental pattern, the experiment and control groups are formed by random assignment and measurements are done in both groups before and after the experiment (Balcı, 2010; Karasar, 2000). In the study, the observation technique was used to evaluate the fathers' interactional behaviour, and the longitudinal model was used to evaluate the infants' development. Longitudinal research is a process of constant or regular observation of a variable, whose development or change over time is to be determined, from a specific starting point by the same elements or units (Deniz Başar, Özden, & Bağdatlı Kalkan, 2013). Observation is a method which aims to describe in detail any behaviour that occurs in a given environment (Yıldırım & Şimşek, 2008). In the study, father-infant interactions were obtained through observations and the development of normally growing infants was monitored for a while.

Study Group

The study group was composed of fathers and their 12-month-old infants. Which makes it possible to have an in-depth examination of contexts thought to be highly informative (Yıldırım & Şimşek, 2008). Contact was made with the industrial organization targeted, and the required permissions were obtained. Some of the workers were interviewed and information was elicited on who were fathers, who were expecting babies, and who would voluntarily participate in the study. The suggested names were contacted and, upon their advice, more working fathers and their infants were reached. The criterion-sampling technique was also considered in the study. In order to eliminate factors that could have a negative impact on the internal validity of the experimental implementation and to form a homogenous group, fathers who were socio-economically disadvantaged workers in industrial labour, who volunteered to take part in the study, who had not participated in an educational programme before, and who had 12-month-old normally developing infants were selected by the researcher. Random assignment of the fathers to the experiment and control groups ensured that likely errors were minimized. In light of these criteria, 12 of the 52 fathers reached were excluded from the study on grounds that their participation could be interrupted during the experimental implementation. In the end, of the remaining fathers and infants, 20 were assigned to the experiment group and 20 to the control group, making up the study group of 40 pairs of fathers and infants.

Table 1. Distribution by Demographics of Participants

Demographics		**n**	**%**
Father's age	≤ 25 years	3	7,5
	26-35 years	13	32,5
	≥36 years	24	60,0
Father's education level	Primary	4	10,0
	Secondary	25	62,5
	Tertiary	11	27,5
Years of marriage	≤ 1 year	3	7,5
	2-5 years	8	20,0
	5-8 years	8	20,0
	≥ 9 years	21	52,5
Family type	Nuclear	15	37,5
	Extended	25	62,5
Infant's gender	Male	20	50,0
	Female	20	50,0
Birth order	Firstborn	16	40,0
	Middle child(ren)	5	12,5
	Last-born	19	47,5
Number of siblings	1 sibling	6	15,0
	2 siblings	5	12,5
	3 siblings	5	12,5
	≥ 4 siblings	9	22,5
	No siblings	15	37,5

Participants of the study, 60% (n=24) were 36 years of age or older, 62.5% (n=25) were secondary school leavers, 62.5% (n=25) had extended families, and 52.5% (n=21) had been married for nine years or more. Of the infants in the study, 50% (n=20) were girls, 50% (n=20) were boys, 47.5% (n=19) were the last-born, and 37.5% (n=15) had no siblings (Table 1).

Data Collection Tools

In the study, the 'Personal Information Form' was used to gather general information about the fathers and their infants, and the 'Denver II Developmental Screening Test' was used to select normally developing infants and to monitor their development. In order to examine the interactional behaviour of the fathers and infants, the 'Caregiver-Child Affect, Responsiveness, and Engagement Scale' was used.

The **Personal Information Form** was used to collect information about the infant's age (in months), gender, birth order, number of siblings, and family type; and the father's age, education level, and marriage duration.

The Denver Developmental Screening Test II (DDST II) is a scale was designed for developmental evaluation of children between 0 and 6 years of age by Frankenburg and Dodds in 1967 and revised in 1971. It was adapted and standardized for Turkish society by Yalaz and Epir in 1982, and revised by Yalaz, Anlar, and Bayoğlu in 2009 since when it has been known as Denver II (Yalaz, Anlar, & Bayoğlu, 2009). The test form has 134 items on children's fine motor, gross motor, personal-social, and language development skills. It makes it possible to evaluate certain skills suitable to the child's age, to objectively measure developmentally suspicious cases, and to monitor under-risk children (Yalaz et al., 2009).

The **Caregiver-Child Affect, Responsiveness, and Engagement Scale (C-CARES)** was designed by Catherine Tamis LeMonda, Vanessa Rodriguez, Jacqueline Shannon, Bonnie Hannibal, Poonam Ahuja, and Mark Spellmann in 2002 in order to evaluate interaction manners of fathers and their infants / children between 0 and 36 months of age (Tamis LeMonda et al., 2013). The Turkish adaptation of the scale was done by Demir and Aksoy (2016). The C-CARES includes three parts a father form, a child form, and a pair form and 34 items. The scale is a five-level Likert and has a coding guidance for users. The father and child forms have a two sub- factor structure, and the pair form has a single factor structure. The internal coherence factors of the father form vary between .80 and .93, and its observational consistency factor varies between .72 and .95. The internal coherence factors of the child form vary between .67 and .94, and its observational consistency factor varies between .74 and 1.000. The internal coherence factor of the pair form is .84, with an observational consistency factor varying between .72 and .82. Process of using the scale consists of videotaping the father and infant interaction by researcher, coding and scoring stages.

Development of the Play-Based Father-Infant Interaction Programme

According to the ecological approach, the family and the environment initiate a two-way communication in the early support programmes involving families. This system highlights parental responsibility and the environmental impact in child development, claiming that designing educational programmes for the father could strengthen the family structure, support fathers on their way to becoming conscious fathers, and positively affect the environment when two individuals are jointly responsible for the child, as foreseen by the ecological theory. The effects of this educational programme designed around father and child are expected to spread out from the other individuals in the family and the family to the outside. Consequently, not only is the family shaped by environmental factors but it also shapes these environmental factors (Chibucos & Leite, 2005).

The theory of ecological systems allows us to understand, model, and interpret the relationships inside the family. According to this theory, parental behaviours are defined as relationships inside the family and are evaluated by considering all social, cultural, local, and familial interactions. It asserts that parental behaviours are influenced by personal goals, attitudes, and characteristics along with the social and cultural context outside the family. Therefore, all these contexts should be considered simultaneously (Baydar, Akçinar, & İmer, 2012). For the Play-Based Father-Infant Interaction Programme based on the ecological systems theory and aiming to develop father-infant interaction, first a literature review was conducted, and then the existing family educational programmes were examined, considering the scales evaluating fathers' interactional behaviours. The infant indicators in the Play-Based Father-Infant Interaction Programme (PBFIIP) were prepared in light of the educational programme of Ministry of National Education (MoNE, 2013) for children between 0 and 36 months of age. In line with the infant development indicators, the father-infant interactional behaviour features were determined and goals were set for fathers. Various play activities were planned in order to fulfil the infant development indicators and the goals set for fathers. The goals set for both fathers and infants were divided into sessions and were to be reached through different activities. The opinions of seven field experts from different universities were sought for the development of the programme. These experts were asked to express their views on the suitability of the father / infant activities to the goals, the sufficiency of the sessions in reflecting the session content, the suitability of the passages from one session to the next, and the clarity and intelligibility of the instructions. The programme was modified in light of the expert opinions and made ready for implementation. This was followed by the preparation of the materials to be used in the programme. The programme was implemented in three stages – in a total of 12 sessions – over a period of three months. In the first stage, the fathers were met and informed about the programme. In the PBFIIP, the goals set for fathers and the behaviours describing the father-infant interaction features were determined. The implementation of the activities was home-based. These sessions comprised of developmental activities about father-infant interactional behaviour features, the father's sensitivity, involvement, affect, verbal expressions, flexibility, and use of verbal expressions; and the infant's cognitive, linguistic, social, emotional, and motor development. In the last stage, the evaluation session was held and suggestions were put forward to the fathers about their infants' development.

Data Collection

A meeting was held in the first session with the fathers in the study group. In this meeting, information was given on the programme content and the process. A parent permission form was designed for the home visits and the work with their infants, and was signed by the fathers. Planning was done for the home visits and reminders were sent to the fathers before the visits. The implementation involved the researcher telling the father about the week's plays, setting a model, and having him attempt implementation during the home visits every week. The Play-Based Father-Infant Interaction Programme was implemented through home-based work once a week for 45 minutes over a period of three months (12 weeks). The fathers' interaction with their infants was evaluated by means of C-CARES. The participating fathers and infants were given the relevant tests, and the data obtained was administered to the experiment and control groups as the pre-test and post-test. Three weeks after the administration of the post-test, the permanence test was given to the fathers and infants in the study group.

Data Analysis

In both the experiment and control groups, the fathers' and infants' pre-test and post-test scores from the Caregiver-Child Affect, Responsiveness, and Engagement Scale, the infants' pre-test and post-test scores from the Denver Developmental Screening Test II, and the permanence test scores were kept on the records form and computerized. The NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) Program was used for the statistical analysis of the data obtained. In the evaluation of the study data, descriptive statistical methods (average, standard deviation, median, frequency, rates, minimum, maximum) were used. Increasing the reliability of a study and interpreting the findings in a consistent manner primarily require the selection of appropriate statistical techniques. The type of the research pattern, the measurement level of the dependent variable, their distribution, the number of factors effective on the dependent variable, and the sample size are all influential on the selection of appropriate statistical techniques (Büyüköztürk, 2014; Çepni, 2007). For this reason, first the data was tested for normal distribution. The suitability of the quantitative data to normal distribution was tested by means of the Shapiro-Wilk test and graphical assessments. Following the normalcy tests, the statistical analysis methods were selected. The Student t Test was used in dual group comparisons for normally distributed variables, and the Mann Whitney U test was used in comparisons of non-normally distributed variables. The Dependent Sample t Test (Paired Samples Test) was used for the in-group evaluations of normally distributed variables and the Wilcoxon Signed Ranks Test was used for the in-group comparisons of non-normally distributed variables. The non-normal distribution Wilcoxon Signed Ranks Test was used where one in the same group showed normal distribution and the other showed non-normal distribution. Significance levels were set between $p<0.01$ and $p<0.05$.

Results and Discussion

The findings from the C-CARES and Denver II Developmental Screening Test are presented in tables, interpreted, and discussed.

Table 2. Comparison of the Pre-Test and Post-Test Scores from the C-CARES Father Form Sub-Dimensions for the Experiment and Control Groups

FATHER FORM		Experiment	Control	p
		Ave±Sd	Ave±Sd	
Teaching-Responsiveness	Pre-Test	22,75±7,12 (22,0)	21,90±4,53 (21,0)	[a]*0,978*
	Post-Test	38,00±5,75 (37,5)	23,50±4,56 (23,0)	[f]*0,001***
	Gain Score	15,25±9,24 (15,5)	1,60±0,50 (2,0)	[a]*0,001***
Negativity-Interference	Pre-Test	11,75±2,63 (11,5)	11,80±2,44 (11,5)	[a]*0,967*
	Post-Test	7,35±1,23 (7,0)	11,80±2,44 (11,5)	[a]*0,001***
	Gain Score	-4,40±2,84 (-4,5)	0,00±0,00 (0)	[a]*0,001***

[a]*Mann Whitney U Test* [f]*Student t Test* [e]*Wilcoxon Signed Ranks Test* [s]*Paired Samples Test* ***p<0.01*

As shown by Table 2, no statistically significant difference was detected between the pre-test and post-test average scores of the experiment and control groups in both sub-dimensions (p=0,978; p>0,05; p=0,967; p>0,05). This suggests that, prior to the implementation of the programme, the fathers in the experiment and control groups were similar in terms of the pre-test teaching-responsive and negative-interfering behaviours, and the groups were homogenous.

The fact that the fathers in the experiment group had higher post-test scores in the *teaching-responsiveness* sub-dimension than the fathers in the control group was found statistically significant (p=0.001; p<0.01). The difference between the pre-test and post-test average scores of the experiment and control groups was significant in favour of the experiment group. This could be accounted for by the Play-Based Father-Infant Interaction Programme increasing participating fathers' teaching-responsive behaviours and decreasing their negative-interfering behaviours. The fathers in the educational programme came to realize that the time they spent with their infants was valuable in terms of the infant's development, that it was important to try to understand the infant's reactions and to respond with appropriate reactions, that the infant was open and receptive to external stimuli, and that the infant mimicked whatever was done, good or bad. It was also realized that the infant was expected to show developmental features and that they were to be supported by the fathers; and that making eye contact with the infant, using understandable gestures and facial expressions, and speaking clearly by giving the infant a chance would be beneficial for the baby. Such conscious behaviour can be said to strengthen the tie between father and infant and to enrich their mutual interaction. The relevant literature suggests that fathers' positive reactions are crucial to the development of infants' social communicative behaviour (Benzies, Evans, Harrison, MacPhail, & Cathhy, 2008; Cerniglia et al., 2014; Dayton et al., 2015; Horesh, Sommerfeld, Wolf, Zubery, & Zalsman, 2015; Tamis Lemonda et al., 2004; Yago et al., 2014). The conscious establishment of interaction between father and infant has been shown to bring out the positive behaviours in fathers and to strengthen their interaction with their infants. Uçar Çabuk (2017), in the research which is exploring the effect of Parent-child communication training program on the parent-child relationship and communication, it is observed that the conducted training program has a positive effect on the relations and communication between parents and their children. After the training program, it is observed that the fathers and mothers are speaking with short clear sentences that the child could understand, they are using their body langue, they are showing empathy towards their children, they are maintaining eye contact with their children while they are listening to them, they are playing with their children by touching on the children's back and shaking their had, and finally, they are making participative listening.

These studies have also demonstrated, in line with the findings of the current study, the effectiveness of educational programmes in raising fathers' awareness and helping them correct their unintentional mistakes in the establishment of father-infant interaction.

A statistically significant difference was detected between the pre-test and post-test changes in the *negativity-interference* sub-dimension scores for the experiment group (p=0.001; p<0.01). The change in the experiment group was significantly higher than in the control group. The interaction-breaking negative and interfering behaviour scores of the fathers in the experiment group were found to be low. While these negativity-interference scores were high in the experiment group's pre-test, such behaviours showed a dramatic fall in the post-test following the education. On the other hand, the control group had high levels of negative-interfering behaviour and no difference was found between their pre-test and the post-test scores. The decrease in the experiment group's negative and interfering behaviours could be attributed to the father's smiling look at the child and his accepting-approving facial expressions and words. The fall in the father's negativity and interference could also be linked to words and behaviours avoiding harm to the child and leading the father in a positive way, such as a soft and understandable voice, a seating arrangement facing the child, approving and soothing touches, and leading the play according to the child's wishes and interests.

Research shows that the father's negative words and facial expressions destroy the interaction between father and infant. In his study on the effects of father-infant interaction in the early period on behavioural problems in children around one year of age, Rispoli (2011) concludes that fathers who are disinterested and distant in their interaction with their infants pave the way to behavioural problems in one-year-old children. The father's negative behaviour during the father and infant's play has negative effects on the father-infant interaction and especially the infant's social skills (Ramchandani et al., 2013).

Horesh et al. (2015) hold that, while fathers' positive behaviours have positive effects on infant development, their negative behaviours could lead to a number of psychological disorders topped by eating disorders. In their study on parents' shouting at their infants, Dayton et al. (2015) find that fathers use the shouting technique less often than mothers but are more influential when they do. Hall et al. (2014), on the other hand, claims that fathers' shows of interest towards their infants also provide clues for detecting unbalanced behaviours in fathers. In conclusion, negativity and interfering behaviours may have a negative impact on infant development.

Table 3. Comparison of the Pre-Test and Post-Test Scores from the C-CARES Child Form Sub-Dimensions

CHILD FORM		**Experiment**	**Control**	**p**
		Ave±Sd	**Ave±Sd**	
Affect-Responsiveness	Pre-Test	21,90±5,33 (21,0)	21,50±5,02 (21,5)	*[f]0,808*
	Post-Test	35,05±4,31 (35,5)	23,70±5,30 (23,5)	*[f]0,001***
	Gain Score	13,15±5,15 (13,5)	2,20±0,52 (2,0)	*[a]0,001***
Negativity	Pre-Test	6,15±1,63 (6)	6,80±2,02 (6)	*[a]0,394*
	Post-Test	4,30±0,57 (4)	6,80±2,02 (6)	*[a]0,001***
	Gain Score	-1,85±1,69 (-2)	0,00±0,00 (0)	*[a]0,001***

*[a]Mann Whitney U Test [f]Student t Test [g]Paired Samples Test [e]Wilcoxon Signed Ranks Test **p<0.01*

As shown by Table 3, the difference between the pre-test and post-test average scores from the C-CARES Child Form *affect-responsiveness* sub-factor for the infants in the experiment and control groups was found to be statistically significant (p=0.001; p<0.01). While the infants in the experiment group had low affect-responsiveness scores in the pre-test, they had much higher scores in the post-test. The control group exhibited no change in their pre-test and post-test scores. This result could be accounted for by the Play-Based Father-Infant Interaction Programme raising infants' affect-responsiveness behaviours.

With regard to the children's sub-dimension of being Sensitive-Responsive, in the study in which the similarity of the father and child personality is examined; Turhan (2019), observed that fathers and children have different "openness towards development" characteristics of personality. According to the research, it is also observed that boys and girls have higher total score averages on "openness towards development" characteristics with respect to the total score averages of their fathers. In light of this information, it can be said that children are more open to development and they are also more eager, curious and sensitive than their fathers.

The examination of the C-CARES Child Form *Negativity* sub-dimension scores led to detect a statistically significant difference between the pre-test and post-test scores in the negativity sub-dimension for the experiment and control groups (p=0.001; p<0.01). While the infants in the experiment group had high negativity scores in the pre-test, they had much lower scores in the post-test. This result could be interpreted as the Play-Based Father-Infant Interaction Programme eliminating negative emotions, harmful and unwanted touches, aggressive behaviour, and unwillingness towards play and interaction in babies.

Studies suggest that negativity in infant behaviour impedes interaction with the surroundings. Katch (2012), holds that infant crying is a result of father stress, depression, and self-sufficiency but that colic – long crying spells in babies – is in turn a cause of intense stress in fathers. Again infants with negative emotional traits have been found to show less affect and cooperation towards their caregivers (Albers, Riksen Walraven, & Weerth, 2007). In their study on infant crying, Raiha, Lehtonen, Huhtala, Saleva, and Korvenranta (2002), conclude that fathers of infants with baby colic have lower levels of interaction with them. In another study on the relation between infant crying and fathers' psychological well-being, baby crying is found to cause stress and depression in fathers (Katch, 2012). In the Play-Based Father-Infant Interaction Programme, fathers' enabling their infants to express their feelings and thoughts through rhythm and melody, giving them the chance to move independently, being aware of the infants' needs, and giving instant feedback could be interpreted as being conducive to minimizing negativity in infant behaviour and strengthening the interaction between father and infant.

Table 4. Comparison of the Pre-Test and Post-Test Scores from the C-CARES Pair Form Mutuality Sub-Dimension

PAIR FORM		**Experiment**	**Control**	***Test value***	***p***
		Ave±Sd	**Ave±Sd**		
Mutuality	Pre-Test	7,35±3,10 (6,5)	5,45±1,67 (5)	*Z: -1,850*	*[a]0,064*
	Post-Test	11,90±1,74 (13)	5,75±2,07 (5)	*Z: -5,332*	*[a]0,001***
	Gain Score	4,55±2,82 (5,5)	0,30±0,47 (0)	*Z:-4,497*	*[a]0,001***

[a]Mann Whitney U Test *[e]Wilcoxon Signed Ranks Test* ***p<0.01* **p<0.05*

As can be seen from Table 4, there is a statistically significant difference between the groups' mutuality scores in the pre-test and the post-test (p=0.001; p<0.01). While no difference was detected between the experiment and control groups in terms of the mutuality behaviour of the fathers and infants in them, the post-test scores following the education exhibited a significant difference. This could be interpreted as the Play-Based Father-Infant Interaction Programme improving mutuality behaviours between father and infant and enhancing the interaction between them. In the literature, Jia (2014) asserts that infants receive emotional response from their parents and play a determining role in parental interaction. His study includes video recordings of interactions between parents and infants and concludes that emotional changes in parents affect infants' emotional states, too. Similarly, crying and restlessness in infants cause in turn emotional changes in parents. Devising a growth model for father-infant interaction in their study, Malmberg et al. (2007), present various patterns. Based on parent-infant interaction, parents' and infants' moods are found to get lower as play time increases and these swings are more frequent and salient in the mother than in the father. Sensitivity behaviours shown by parents in one part of the play are seen to affect both parents' and infants' sensitivity in the next. Shannon et al. (2005) draw parallels between the positive or negative emotions of fathers in the interaction process and infants' behaviours in father-infant interaction between 8 and 16 months. In the study which is conducted with regard to the bonding security and mind-raising capacity; Cantaş (2018), observed that the father-child mind-raising capacities directly affect each other in the father and child interaction. With regard to the relationship between children and fathers' mind-raising capacities, a significant positive relationship is found between the opacity of children's mind-state speech and fathers' self-directed state of mind words.

It could therefore be argued that the positive or negative behaviours of both sides in father-infant interaction clearly have a mutual impact on each other.

Table 5. Comparison of the Post-Test and Permanence Test Scores from the Caregiver-Child Affect, Responsiveness, and Engagement Scale for the Experiment Group

Caregiver-Child Affect, Responsiveness, and Engagement Scale			Experiment		p
			Ave±Sd	Median	
Father Form	Teaching-Responsiveness	Post-Test	38,00±5,75	37,5	[g]0,020*
		Permanence Test	40,00±5,71	40,0	
	Negativity-Interference	Post-Test	7,35±1,23	7,0	[e]0,001**
		Permanence Test	11,20±0,70	11,0	
Child Form	Sensitivity-Responsiveness	Post-Test	35,05±4,31	35,5	[g]0,082
		Permanence Test	36,30±5,07	36,0	
	Negativity	Post-Test	4,30±0,57	4,0	[e]0,157
		Permanence Test	4,60±0,99	4,0	
Pair Form	Mutuality	Post-Test	11,90±1,74	13,0	[e]0,102
		Permanence Test	12,30±1,56	13,0	

As can be seen from Table 5, the 2.00±3.51 unit increase in the permanence test average score since the post-test for the teaching-responsiveness sub-dimension for the fathers in the experiment group is considered to be statistically significant (p=0.020; p<0.05). Likewise, the 3.85±1.42 unit increase in the permanence test average score since the post-test for the negativity-interference sub-dimension for the fathers in the experiment group is considered to be statistically significant (p=0.001; p<0.01). Based on these results, it can be argued that, over the three-week period between the post-test and the permanence test, the C-CARES father-child and pair sub-dimensional behaviours became permanent for the fathers in the experiment group of the Play-Based Father-Infant Interaction Programme. It could be further argued that the duration of the educational programme was sufficient for permanence to take hold, the education responded to the fathers' needs, the fathers actively participated in the programme with the implementation continuing also outside the educational process, and what was learnt in the programme left permanent marks on the fathers' behaviours.

Table 6. Comparison of the Pre-test and Post-test Scores from the Denver II Developmental Screening Test Sub-dimensions

DENVER II Developmental Screening Test		Experiment	Control	*p*
		Ave±Sd	Ave±Sd	
Personal-Social	Pre-Test	5,25±1,25 (5,0)	6,25±1,55 (6,5)	[a]0,027*
	Post-Test	4,45±0,83 (5,0)	3,55±1,10 (3,0)	[a]0,009**
	Gain Score	-0,80±1,15 (-1,0)	-2,70±1,17 (-3,0)	[a]0,001**
Fine Motor	Pre-Test	3,45±0,76 (3,0)	3,80±1,01 (3,0)	[a]0,302
	Post-Test	6,10±1,41 (7,0)	5,65±1,31 (6,0)	[a]0,206
	Gain Score	2,65±1,63 (3,5)	1,85±0,67 (2,0)	[a]0,044*
Language	Pre-Test	4,05±1,19 (3,5)	4,80±1,40 (5,0)	[a]0,075
	Post-Test	5,60±0,99 (6,0)	4,20±1,51 (3,0)	[a]0,002**
	Gain Score	0.36±1.05	0.14±1.04	[a]0,001**
Gross Motor	Pre-Test	5,00±1,72 (4,0)	5,30±2,30 (4,0)	[a]0,820
	Post-Test	8,35±1,27 (9,0)	6,65±2,41 (7,0)	[a]0,014*
	Gain Score	3,35±2,18 (4,0)	1,35±1,35 (1,0)	[a]0,002**

[a]*Mann Whitney U Test* [e]*Wilcoxon Signed Ranks Test* **p<0.01 *p<0.05

According to the findings presented in the table, the changes between the pre-test and post-test average scores for the **personal-social sub-dimension** are suggestive of a statistically significant difference ($p=0.001$; $p<0.01$). The change in the experiment group infants' personal-social average scores was considerably lower than those in the control group. The increase in the experiment group's post-test average score compared to the control group can be explained by the effects of the Play-Based Father-Infant Interaction Programme on the personal-social development of the infants in the experiment group. The father's verbal expressions during the play process as well as the infant's active participation in the play, opportunity to repeat what it finds amusing, and expression of its feelings (Driscoll & Easterbrooks, 2007). In their study on father-child interaction, Cerniglia et al. (2014) conclude that the father's interest facilitates the child's social adaptation. In another study, Hall et al. (2014) concludes that the father's care in the early period has a positive impact on the infant's behaviours.

The changes between the infants' pre-test and post-test average scores for the **fine motor sub-dimension** are indicative of a statistically significant difference ($p=0.044$; $p<0.05$). The change in the experiment group is considerably higher than in the control group. The findings suggest that the babies in the experiment group were at a more advanced level than those in the control group in terms of the Denver II fine motor behaviours such as putting the cube in the glass, holding a grape with the thumb and other fingers, smashing the cubes, scribbling with a pen, taking the grape out when shown, making a tower with two cubes, and taking the grape out without being shown. The significant difference in favour of the experiment group in the fine motor post-test score could be attributed to the plays favouring the development of skills involving the use of the hands and feet, the coordination of different parts of the body, and object control in the Play-Based Father-Infant Interaction Programme.

The changes between the infants' pre-test and post-test average scores for the **language sub-dimension** are suggestive of a statistically significant difference ($p=0.001$; $p<0.01$). The change in the experiment group is considerably higher than in the control group. This result could be attributed to the effectiveness of the Play-Based Father-Infant Interaction Programme and the fact that the infants in the experiment group formed an attachment to their fathers in terms of interaction. Research shows that educational Programmes support language development in infants. Ersan (2015) finds a great difference between the language development levels of the infants of fathers who received training with his Paternal Language Support Programme and the fathers who did not. He concludes that the Paternal Language Support Programme impacts positively on children's language development levels.

The changes between the infants' pre-test and post-test average scores for the **gross motor sub-dimension** are indicative of a statistically significant difference ($p=0.002$; $p<0.01$). The change in the experiment group is considerably higher than in the control group. The findings suggest that the infants in the experiment group were at a more advanced level than those in the control group in terms of the Denver II gross motor behaviours such as putting things in order, standing up by holding onto something, walking straight, stooping to pick something up, walking backwards, kicking a ball, climbing up stairs, and throwing a ball. The significant difference in favour of the experiment group in the gross motor post-test score could be attributed to the plays favouring the development of skills involving standing up holding onto things, crawling, putting things in order, walking with and without support, crouching, crouching and standing back up, walking without help, turning the body around, and doing strength-requiring moves with the arms in the Play-Based Father-Infant Interaction Programme. The Programme also includes opportunities for the father to have information on the infant's gross motor development level, to be a positive model for the infant, and to promote moving. During the plays, the fathers were able to encourage the babies to move, to make repetitions, to provide feedback on the infants' behaviours, and to have the babies repeat these behaviours; which helped with the infants' development of gross motor skills.

Table 7. Comparison of the Post-test and Permanence Test Scores from the Denver II Developmental Screening Test Total and Sub-dimension Scores for the Experiment Group

DENVER II Developmental Screening Test		Experiment Group		p
		Ave±Sd	Median	
Total	Post-Test	24,40±3,09	25,5	*e0,003***
	Permanence Test	28,80±2,28	28,0	
Personal-Social	Post-Test	4,45±0,83	5,0	*e0,017**
	Permanence Test	5,35±0,59	5,0	
Fine Motor	Post-Test	6,10±1,41	7,0	*e0,023**
	Permanence Test	7,80±1,28	7,0	
Language	Post-Test	5,60±0,99	6,0	*e0,083*
	Permanence Test	6,20±0,52	6,0	
Gross Motor	Post-Test	8,35±1,27	9,0	*e0,041**
	Permanence Test	9,45±0,89	9,0	

The 4.30±5.30 unit increase in the permanence test average score since the post-test for the Denver II developmental screening test total score of the experiment group is considered to be statistically significant ($p=0.003$; $p<0.01$). Based on these results, it can be argued that, over the three-week period between the post-test and the permanence test, the Denver II Developmental Screening Test average total score and the persona-social, fine motor, language, and gross motor sub-dimension average score behaviours became permanent for the experiment group of the Play-Based Father-Infant Interaction Programme. This is evidence that the educational Programme remains permanent in the persona-social, fine motor, language, and gross motor sub-dimensions, the information on child development and education is put into practice, fathers consider themselves adequate in parenting even in the absence of the trainer, and they are eager to play, open to learning, and careful and diligent in the implementations. It could also be concluded that the amount of stimuli presented to the infant and the length of care are sufficient.

Conclusion and Suggestions

This study was conducted to reveal the effects of the Play-Based Father-Infant Interaction Programme on the behaviours of father and infant. The research findings suggest that the Play-Based Father-Infant Interaction Programme is indeed effective on the interactional behaviours of father and child and the infant's personal-social, fine motor, language, and gross motor development. When given support, guidance, and the chance to interact, fathers and infants have been observed to make progress in terms of mutual interactional behaviour and multi-faceted development, respectively. It can be argued that, over the three-week period between the post-test and the permanence test, increase in teaching-responsiveness and decrease in negativity became permanent for the fathers in the experiment group of the Play-Based Father-Infant Interaction Programme. As for the infants, their affective-responsive behaviour has increased while their negative behaviour has decreased. A rise has also been observed in the mutuality sub-dimension showing father-infant interaction. It has also been concluded that permanence continues in the Denver II developmental screening test sub-dimensions for the babies in the experiment group.

In light of the research findings, it could be suggested that institutions of higher education, local governments, and media and voluntary organizations could collaborate to set up training centres and to offer fathers counselling services. Nurses, midwives, and child development experts in health centres could be given in-service training on paternal behaviour, father roles, and paternal interaction behaviour; home-based counselling could be provided; and booklets, leaflets, and other such materials could be brought along to home visits. Multi-purpose early intervention centres could be set up especially in areas populated by disadvantaged families in order to provide parents and infants with

educational programmes and practice. The educational programmes could be implemented with different professional groups. This study, conducted with 12-15-month-olds, could be replicated with different age groups, and its research method, the experimental pattern, could be replaced with triangulation in future studies.

Limitations

This study is limited to fathers resident in central Muş, Turkey, who have not previously participated in training programmes on interaction and infant development, and their 12-15 month-old infants. It is also limited to the scores obtained from the 'Caregiver-Child Affect, Responsiveness, and Engagement Scale' (C-CARES), and the 'Denver Developmental Screening Test II'.

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