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Abstract

The aim of this study is to investigate the relationship between adaptive behaviours of 18-24 month-old infants and their parents' use of technology. For this purpose, a survey research method was used. The sample consisted of 116 people who are 58 volunteering married couples with 18 -24 month-old infants and were registered in family health centers in Turkey's Eastern Anatolia Region. Comparison analyses were conducted between parents' demographic variables (i.e., education background) and their use of technology (i.e., internet, smartphone) and adaptive behaviours of their 18-24 month-old infants. Adaptive behaviours of infants were measured with ABAS-III and the profiles of parents using technology were measured with a survey developed by the researchers. The results showed that parents' use of technology had an impact on adaptive behaviours of 18-24 month-old infants. Infants of mothers who did not engage in any Internet activity have higher adaptive behaviour scores. The infants of mothers who engaged in activities such as games, videos and music on theInternet together with their 18-24 month-old infants had low scores on adaptive behaviours in terms of concept, self-management, leisure and communication. According to the findings, various suggestions are presented for parents, researchers and practitioners.

Keywords: Infant; Mother; Parents; Technology; Adaptive Behaviours

1. Introduction

Today, many children grow up in a world of information and communication technologies, including the Internet, smartphones and tablet PCs, which are regarded as a part of daily life. In today's world, it is more difficult to parent children because it is not enough for parents to just have certain parenting skills. They are supposed to adapt themselves to recent technological developments in the world. In other words, parents need to be conscious about their technology use when they are near their children so that they can function as role models for their children. Conscious parenting contributes to the welfare and healthy development of children who grow up in a technology-saturated world (Byron, 2008). This has brought about the new concept of digital parenting (Rode, 2009). In the current digital era, the digital parent is responsible not only for the biological, social and psychological development of the child, but also for appropriate, safe and conscious use of digital technologies. The parent is also responsible for the child's development of technology literacy as well as for the influence of technology on the child. In this respect, parents' responsibilities are growing, and the living conditions and the changing social structures in the modern world have made these responsibilities more important.

In recent years, most infants grow up with digital technologies, which shape their behaviours (Gunuc, 2017b). Technology facilitates human life and contributes to social development (Karayağız Muslu & Bolışık, 2009). However, the use of technology in all areas of life has led to a number of psychological and sociological problems, including addiction and problematic Internet use (Corey, 2015; Gunuc, 2017a; Gunuc, 2015a; Kuss, Harkin, Kanjo & Billieux, 2018; Kuss & Griffiths, 2017). Information and communication technologies such as the Internet, computer, tablet PC and smartphones have become a part of human development and learning (Aksoy, 2002). Therefore, studies regarding the effects of technology on human behaviour should be conducted starting from the birth of the infant (or even during pregnancy). The number of such studies conducted in this field is quite limited and there is a gap in the related literature.

Researchers frequently point to the need for empirical data which will reveal the effects of technology on the developments of infants and toddlers (Wartella, Vandewater & Rideout, 2005). In the current era, it is a well-known fact that technology may have positive and negative effects on the development of an individual, whereas there are little data available for infants. One of the reasons for this is that studies on individuals of this age group have several limitations in terms of ethics, time and the techniques applied. In this respect, revealing the effects of technology in the period of infancy, which constitutes the first step of the development of a child, is important for the evaluation of the behaviours and developments of children who are born into a digital world. Studies which

examine parents' behaviours and attitudes which regard technology and assess the effects of parents' technology use on the development of their infants are valuable and important for the fields of child development and developmental psychology. Research is needed to fill the gap in the literature and to raise awareness in parents.

1.1. Literature background

1.1.1. Developmental characteristics of infants aged 18-24 months

The period of infancy, which constitutes the earliest stage of childhood, covers a period of time ranging from 0 to 24 months. The infant makes efforts to adapt to the environment starting from birth. The infant tries to recognize and understand their body, objects, people and the environment depending on their continuously developing cognitive structure. In this way, the infant with their yet limited mental skills is on the way to become a child who can use symbols to understand and adapt to the world (Charles, 2003; Arslan, 2012; Republic of Turkey Ministry of National Education, 2013). Infants are born with the capability to learn everything, and they constantly learn something new when they are awake (Lowe & Lowe, 2015). Synapse links that develop in infants' brains with about 100-200 billion neurons at birth reach the same number present in adults towards the end of the infancy period. Therefore, infancy is called a "very intensive period" in terms of brain development (Trawick Smith, 2013). Piaget states that in the period from birth to 18 months, the infant progresses from having basic schemes and a limited repertoire of schemas to using symbols, whilst the infant does not yet have internal symbols as substitutes for objects (Bee & Boyd, 2009). The period between 18 and 24 months is the last phase of the sensorimotor developmental stage, where infants use symbolic images. The infant is less concerned with trial and error during this period. They also make use of mental combinations in the process of finding solutions to problems. Object permanence, the ability to know that invisible objects actually exist, has been fully achieved, and deferred imitation, which refers to the ability to imitate a certain behaviour after a certain period of time, occurs as well (Tercan & Durmuş, 2015). In this last phase of infancy, when symbolic play and language can be used, infants start talking about non-existent things and start objectifying the self. They start using pronouns such as "I, my and me" to address themselves. Infants who start speaking when they are aged between 18 and 24 months have a good knowledge about the world and begin to learn about social interactions (Stern, 2012). Therefore, the period between 18 and 24 months can be considered the first step towards evaluating adaptive behaviours in the development of the individual. Adaptive behaviour has been conceptualized in psychology as the individual's active modifications to cope more effectively with the demands of their natural, social, or designed environment (Lazarus, 1999; Scarr, 1996).

1.1.2. Parental impact on infant development

The maternal role is an important key in the child's upbringing, care, and relationships (Newman, Sivaratnam & Komiti, 2015). Family is the leading educational environment in which children seek responses to their demands of learning, discovering and understanding, which are among their most basic innate traits. Theories and approaches regarding child development point to the roles of parents as an important factor for the infant in terms of social and physical environment (Maccoby, 2002). In infancy, which is an important period in child development, the innate traits of the child and environmental factors are influential. Environmental factors vary depending on the type of cognitive, social and biological development. However, among the environmental factors which are influential in development, the family ranks first (Kandır & Alpan, 2008). Infant are social individuals, and seek a model for their behavior, which they find within their family (Kırkıncıoğlu, 2003). Parents, especially mothers, provide their infant with unrequited love, self-confidence, values, traditions, a happy life, health, a safe environment, and skills and abilities, which are necessary for infants to become healthy, happy and skilled individuals (Shelov & Altmann, 2015).

The bio-social development theory, which considers socio-emotional development of infants cognitively-evolutionarily as well as in connection with the brain, puts forward that infants' ability to imitate includes cognitive and social skills. Infants' watching and perceiving an adult and their developing related behaviours are regarded as a powerful learning mechanism for their adaptation to society and the environment (Meltzoff, 2002; 2005). Considering an infant's socio-emotional development within the framework of this theory, the mother has an indisputable place in her child's life starting from the child's early years. The communication established by the infant with their mother, the infant's security needs met by the mother, and the relationships between the mother and her infant all determine the infant's perception of the world (Roos, Stein, Trabasso, Woody & Ross, 2005; Sands, Goldberg-Glen & Shin, 2009). In one study bringing up a child was generally considered to be the mother's duty, yet in recent years, this responsibility is now shared by both parents (Madden-Derdich & Leonard, 2000). In their study in the U.K, Parfitt and colleagues (2014) found a significant correlation between the quality of the mother–child interaction and speech development at the age of 17 months, although the correlation was not significant in motor and cognitive domains. Further appropriate mother–infant relationship had positive effects on motor and problem-solving development (Albers, Riksen-Walraven & Weerth, 2010; Rezaeian, Niknejad Jalali & Ashrafzadeh, 2013). In addition, the relationships between the father and his infant have influences on the infant's life (Ekşi, 1990). Parents' attitudes have an important influence on the infant's personality development as well as

on their physical, motor, cognitive, linguistic and socio-emotional development (Gunuc & Doğan, 2013; Köksal Akyol, 2003; Özeri, 1994).

Many other related studies demonstrated that the interactions of people in charge of their infant's care with that infant, their behaviours and positive or negative reactions to the infant, allow achieving internal control over the infant and thus facilitate or prevent the development of the infant. The interactions with and behaviours of parents/caretakers are influential on infants' academic behaviours (i.e., counting, grouping, and matching skills), on their socialization behaviours and on their attention spans (Culp, Hubbs-Tait, Culp & Starost, 2000; Rubin, Burgess, Dwyer & Hastings, 2003; Swinger, Perry, Calkins & Bell, 2017). Above all Altman and Mills (1990) investigated the effect of selected caregiver growth-facilitating behaviours (as measured by The Family Daycare Rating Scale; Harms & Clifford, 1989) on adaptive behaviour development (as measured by the VABS; Sparrow, Balla & Cicchetti, 1984) in children 18–24 months of age. Provocatively, they found higher adaptive behaviour in homecare than daycare children and in children of mothers who displayed growth facilitating behaviours.

1.1.3. Adaptive Behaviours

Adaptive behaviour refers to an individual's social responsibility and to their independent performance of daily activities (Wolf, Risley & Mess, 1964). In other words, adaptive behaviour can be defined as the total of conceptual, social and practical skills that individuals learn and apply in their daily lives (Schalock, 2000). The 2002 American Association of Intellectual and Developmental Deficiency (AAIDD) gathered adaptive behaviours data under three general headings. These dimensions are practical, conceptual and social skills (Luckasson, Borthwick-Duffy, Buntix, Coulter, Craig & Reeve, 2002). The practical dimension refers to an individual's personal independence and includes the practical skills necessary for daily life. In general, the practical dimension covers personal care, professional skills, money use, safety, health services, travel-transportation, daily schedule, routines and telephone use. The conceptual dimension includes communication as well as the individual's cognitive and academic skills. In other words, this dimension involves language skills, literacy, and understanding and using concepts, such as money, time and numbers. As for the social dimension, it involves the individual's awareness of their personal responsibilities within the social context and covers others' social expectations. Behavioural expectations include self-esteem, tolerance, naiveness, obeying rules, avoiding becoming a victim and solving social problems (American Association on Mental Retardation [AAMR], 2002). Motor efficacy or physical efficacy is a developmental expectation for adaptive behaviours, and inefficacy in this area could be an

indicator of physical limitations. Children are expected to demonstrate motor skills appropriate to their age. These skills include moving, crawling, walking, running, jumping, drawing, tearing, cutting, opening and closing (National Research Council, 2002; Harrison & Boney, 2002). Consequently, the results of factor-analytic studies carried out on adaptive behaviour in the past few decades generally put forward a four-factor solution: (i) practical skills, (ii) conceptual skills, (iii) social skills and (iv) motor skills (Thompson, McGrew & Bruininks, 1999; Widman & McGrew, 1996; Tassé et al., 2012; Arias, Verdugo, Navas & Gomez, 2013; Harrison & Oakland, 2015).

The expectations of the socio-cultural structure, the environment where the individual lives and their age have an influence on adaptive behaviours. Cultural structure and developmental tasks determine adaptive behaviours (Witt & Martens, 1984). Therefore, it is important to keep it in mind that the individual's behaviours considered to be problematic in terms of adaptive behaviours are influenced by factors such as cultural structure, appropriateness to age, intensity and permanence (Kanlıkılıçer, 2005). When adaptive behaviours are examined within the framework of system theory, family behaviours are a social system composed of patterns (Ludlow & Howard, 1990). When adaptive behaviours were considered as a general system, the sub-dimensions converged to form the general system (Connor, 2016). Sub-dimensions can also be considered as sub-systems. A problem in the development areas that constitute the sub-dimensions of adaptive behaviours is effective on the general adaptive system. Individuals who perform evaluations of infants' adaptive behaviours should know the child well enough to evaluate all of their capabilities. For example, performance evaluation of infants, who are not old enough to express themselves, is important in relation to their adaptive behaviour skills so that their developmental tasks can be completed (Harrison & Boney, 2002; Bornstein, Giusti, Leach & Venuti, 2005).

General systems theory consists of factors affecting system structure and factors affecting system control (Connors, 2016). In family systems theory, the structure of the system is related to the relationship between family elements, such as integrity, boundary, and hierarchy (Ludlow & Howard, 1990; Connors, 2016). According to this theory, the system is a whole, and each of the people in the family should be understood as an individual. The behaviour of one of the family members affects all members of the system (Bowen, 1978; Brown, 1999; Erturk, 2010). According to this theory, the quality of life of the child is influenced by the care and education services provided by the house in which they live. The child begins to understand social life according to the direction and reactions of his parents (Erturk, 2010; Sabatelli & Bartle, 1995; Ludlow & Howard, 1990). In the context of this theory, parents' use of technology will naturally affect the development of the infant. Because besides the qualification of the parent (including their educational background, their professional carrier, etc.), the features of

the culture and the environment where the parents live are likely to be influential on parenthood and on the development of their child (Eshlemen & Bulcroft, 2006). This situation can be discussed in the framework of the family systems theory. Parents' use of technology may have an impact on the sub-dimensions of self-management, social development, and other adaptive behaviours of infants aged 18-24 months, which may affect all adaptive behaviours as part of a system.

Studies evaluating adaptive behaviours in infancy seem to address the relationship between cognitive development and adaptive behaviours. Cognitive development is related to changes in lifelong mental processes. It is the development of active mental activities that enable the individual to understand and learn about the world around him / her. This development is the way of understanding the world from infancy to adulthood and making mental processes more effective (Oakley, 2004; Senemoğlu, 2012; White et al., 2012). The effectiveness of the individual in coping with the social and natural demands of the environment is referred to as adaptive behaviours. When we examine adaptive behaviours and cognitive development in accordance with this definition, cognitive development of the individual is an important factor implicated in adaptive behaviours (Mervis & Klein Tasman, 2000). Therefore, in some recent studies, cognitive development and adaptive behaviours were examined together (Schatz & Hamdan Allen, 1995). Many studies have shown a moderate relationship between intelligence and adaptive behaviours (Alexander, 2017; McGrew, 2012). There are studies investigating the relationship between cognitive development and adaptive behaviour in infancy. In one of these studies, Scattone, Raggio and May (2011) comparatively used the Bayley-III Infant Development Scale and the Vineland II Adaptive Behaviour Scale to evaluate the developments of infants and children aged from 12 to 42 months old. As a result of the research, assessing the relationship between adaptive behaviour and cognitive development of 18-24 months old infants by Atli and Baran (2018a), a positive correlation was found between cognitive development and adaptive behaviour of infants. Another study evaluated the adaptive behaviours and developmental features of homeless infants and children and those with low socio-economic level. In this study, it was found that poverty might have negative effects on adaptive behaviours (Coll, Buckner, Brooks, Weinreb & Bassuk, 1999). Matas, Arend and Sroufe (1978) investigated the continuity of adaptive behaviours at two years of age, looking at the link between quality attachment and later qualifications. As a result of the research, it has been revealed that mother's behaviours determine the adaptive behaviours of the infant for two years. As can be seen, although there are several studies evaluating the relationship between infants' adaptive behaviours and certain variables, no research has been conducted to examine the influence of parents' technology use on adaptive behaviours of infants (aged between 0 and 24 months). Information and communication technologies constitute an important factor in studies conducted

on humans and their behaviours, and there is no research revealing the influence of these technologies on infants' adaptive behaviours. In this respect, there is a great need for such studies.

1.1.4. The impact of technology on early childhood development

In the present day and age, parents use information and communication technologies increasingly. Children and even infants are interested in technological devices with a touch screen. In a study carried out in England in 2014, it was found that 71% of families were users of touch screen technological devices (News consumption in the UK: research report [NRC], 2014), with numbers rising. However, the effects of technology and its interaction with children on early childhood development are not known at all (Barr, 2010). Some researchers report that time spent by children in front of the screen had a negative influence on their reasoning, concentration, problem-solving and attention skills. In addition, other researchers considered information and communication technologies to be an opportunity for children in terms of learning and interaction (Plowman, 2014). However, it should be remembered that these studies were all carried out on children, not on infants.

In relation to the effects of technology on child development, Carr (2017) investigated the effects of touch-screen tablets on cognitive development of children aged between 24 and 36 months, such as attention, problem solving, short-term memory and concentration. In their study, the researcher revealed that the cognitive skills of children interested in toys developed more than those of children interested in tablets. Gunuc and Atli (2018) investigated the effects of technology on the behaviours of infants aged between 18 and 24 months based on their mothers' views. In the study, it was found that the parents used technology for the development of their infants' behaviours in terms of eating, sleeping, speaking and keeping quiet.

Strasberger, Jordan and Donnerstein (2010) reported seven different research studies have demonstrated language delays in infants exposed to excessive technology. Kim, LaRose and Peng (2009) found that technology negatively impacted social skills. Park and Hyun (2014) reported those engaging in excessive technology use have a decreased sense of time and concentration due to multi-tasking. Moreover, they are not prescient but more impulsive. Also, academic performance was affected more than any other factor. Furthermore, according to the Council on Communications in Media (2011), media use is associated with sleep problems, aggressive behaviour and attention problems in preschool and school-age children.

Cognitive development, social-emotional development and sexual development of children who interact with technology at an early age are adversely affected by this interaction (Kowalski & Limber, 2013). Chirico (1997)

reported that Piaget premises that child development should not be artificially rushed, but should be naturally actualized. However, excessive media use at a young age can do exactly that. Young brains are malleable and children who begin significant technology use in infancy can be adversely affected. A study conducted by Cho and Lee (2017) on problematic behaviours and emotional intelligence found that differences exist in daily-life interference according to parental ages, voluntary isolation according to parental occupations, and personality distortion according to parental academic backgrounds. Among attributes of young children's smartphone usage, differences exist in compulsory control needs and personality distortion starting from a young age, and compulsory control needs according to the child's daily smartphone usage. Bavelier, Green and Dye (2010) noted cognitive impact depends on the type of technology used, but most of all technologies cause transient mood changes and long term changes in brain function and behaviour. They also noted internet use and video gaming can become pathological.

In the relevant literature, no research on the effects of technology use on infants' adaptive behaviours is available. Therefore, the present study aims to contribute to the extant research field as it investigates the effects of technology use on early childhood development in terms of adaptive behaviours. In this respect, recent studies point to the need for policies to be developed regarding children as well as for scientific guidance and counselling for parents and teachers in relation to the effects of technology use on early childhood development (Radesky, Schumacher & Zuckerman, 2015).

1.2. Purpose of the Study and Hypotheses Development

Although there are many other studies investigating the influence of technology on other age groups, there is a great need for research conducted on infants. Due to their development, infants are more dependent on and in need of their parents' care when compared to older age groups. Because of this reason, infants are very different from other age groups. Infants often observe their parents, which helps them adapt to their surroundings and to apply what they have learned (Atli & Baran, 2018a). Factors including how long, how and for what purposes parents use technology are considered to be important for the development of infants as technology use has become an important activity for parents in their daily lives.

There is still a lack of research on adaptive behaviour of infants who do not interact with technology. To fill this gap in the existing literature, we hypothesize that:

H_1: *Parents' technology use has a negative influence on adaptive behaviours of infants who do not voluntarily interact with technology.*

2. Methods

2.1. Research Model

In order to examine the effects of parents' technology use (such as the Internet, smartphone, and tablet PC) on their infants' adaptive behaviours, a survey design was used in the study. The survey research method is defined as quantitative description of specific aspects of a given population (examining the relationships among variables). The data required for the survey method were collected from individuals, and a selected portion of the population from which the findings can later be generalized back to the population is used (Kraemer, 1991). In order to test H_1, the research sample was determined, and the survey was distributed. The research data were analyzed and lastly, the hypothesis was evaluated.

2.2. Research Sample

The sample consisted of 116 individuals enrolled in Family Health Centers of Turkey's Eastern Anatolia region with 58 volunteer married couples with 18 to 24-month-old infants (see Table 1).

Table 1. Demographic Information about Mothers and Fathers

The fact that the study involved infants from a certain age group made it difficult to reach the parents. Thus, in the present study, the convenience sampling method was used. In order to easily access the research sample, the data were collected from the participants from two institutions which were accessible to the researchers. The sample of the study consisted of housewife mothers of 18-24 months old infants and academic mothers as a different group. The research data were collected over a period of 85 days between August and November 2017.

2.3. Data Collection

Before the research process, consent for participant recruitment was obtained from the Provincial Public Health Directorate. Following this, a consent form covering the content of the study was prepared by the researchers. Parents were asked to read the form, and those willing to participate in the study on a voluntary basis were included.

The parents who accepted to take part in the study were asked to fill out a questionnaire in an appropriate and quiet place in the Family Health Centers which they were officially registered with. While the participants were responding to the questionnaire, the researcher was there to answer any questions. Completion time took 40 to 60 minutes.

2.4. Data Collection Tools

Demographic Information and Technology Use Survey: This survey was developed by the researchers and was applied to measure demographic backgrounds and technology use (i.e., Internet, smartphone, tablet PC, and computer use) of mothers and fathers. The survey had 18 multiple choice questions. The face and concept validity of the survey was assured. Two experts were consulted for this.

Demographic information included education background, gender, profession and age. In this survey, the concept of "technology use" referred to:

- Mother's/father's use of tablet PC, smartphone, computer and Internet technologies (the infant may watch their mother/father using those technological devices)
- Mother's/father's use of these technologies for their infant (the technological tool is in the parent's hand, but they put on a video online for their infant to watch; in other words, the mother/father and the infant use the technology together)
- The infant's use of these technologies (the mother/father puts on a video online and puts the technological device on their infant's lap).

Some examples of questions from the survey are presented below.

- "Do you use the Internet together with your infant? If yes, what kinds of Internet activities are you engaged with?"
- "Do you use the Internet near your infant? Do you give your smartphone to your infant?"
- "Do you show your infant the visuals you see on the Internet?"

Adaptive Behaviour Assessment System, Third Edition (ABAS-3): This scale was developed by Harrison and Oakland (2015) and is made up of six forms: Parent/Primary Caretaker Form (0 to 5 years old), Teacher/Nursery Caretaker Form (2 to 5 years old), Parent Form (5 to 21 years old), Teacher Form (5 to 21 years old), Adult Form (16 to 89 years old). However, in the present study, only the Parent/Primary Caretaker Form (0 to 5 years old) was used. This form included 241 items across ten dimensions. These dimensions were "Communication",

"Community Use", "Functional Pre-academics", "Home Living", "Health and Safety", "Leisure", "Self-Care", "Self-Direction", Social", and "Motor". The descriptions and some examples for each dimension are presented in Appendix 1.

The Parent/Primary Caretaker Form was adapted by Atli and Baran (2018b) to infants aged 18 to 24 months for use in Turkey. The raw scores obtained from each sub-scale were used as the observed variable scores, and the scale was tested with confirmatory factor analysis (CFA) and revealed that the values regarding all the items were found fit.

When the model is observed, it is seen that all coefficients are meaningful at .01 level, and the standardized load factors (Appendix 2) showing the correlation between observed variables and the factor range between .38 and .75. When error variances regarding items were observed, it was noted that error variances were between .44-.86. At the end of the analysis, it was noted that the latent variable's values explained the results; and in all observed variables it was meaningful at a level of .05. When the fit index values were examined, the model was confirmed (χ^2/sd= 4.62; RMSEA= .11; NFI= .93; NNFI= .93; GFI= .90; AGFI= .85; CFI= .94). Finally, the internal consistency coefficients of the scales were α= .86 for communication, α= .80 for community use, α= .73 for functional pre-academics, α= .83 for home living, α= .82 for health and safety, α= .81 for leisure, α= .74 for self-care, α= .74 for self-direction, α= .71 for social and α= .76 for motor, indicating reliability.

2.5. Data Analysis

The data collected were typed into the SPSS package software and checked to obtain accurate results by examining whether there were any missing data and outliers. The distribution of the data was examined with kurtosis-skewness, histogram, P-P and Q-Q values and graphics, and it was found that the data had a normal distribution. Therefore, for the analysis of the data, descriptive statistics, two-tailed t-tests and one-way ANOVAs were used.

3. Results

In the study, as the data were collected from parents, the analyses were conducted by comparing the mothers and fathers in terms of certain variables. In this respect, the research findings were obtained in relation to the parents' usages of such information and communication technologies as the Internet, computer and smartphones for themselves or for their infants as well as in relation to adaptive behaviours. Adaptive behaviours are made up of a motor dimension and three domains with nine dimensions: The conceptual domain includes the dimensions of communication, functional pre-academics and self-direction; the social domain includes the dimensions of leisure and social; and the practical domain includes the dimensions of community use, home living, health and safety and self-care. The analyses were conducted for all these dimensions.

In the study, since the data were collected from both mothers and fathers, first, the parents' scores regarding their evaluations of their infants' adaptive behaviours were compared. The related results are presented in Table 2.

Table 2. Comparison of mothers and fathers' evaluations of their infants' adaptive behaviours

When the independent t-test results are examined (presented in Table 2), it is seen that there was no significant difference between the scores of the mothers and fathers regarding their evaluations of their infants' adaptive behaviours with respect to all the domains and dimensions ($p>.05$). Also, when each couple's (one mother and one father) scale scores were compared and examined, it was seen that their scores were similar. Based on this finding, it could be stated that the data obtained from the mothers (who spent more time with their infants because of their developmental period) were confirmed by the fathers. The reason is that both the mothers and fathers evaluated their infants' adaptive behaviours similarly and assigned similar total scores.

There is more focus on the variables / analysis related to the mother because there is no significant difference between the mothers and fathers' assessments scores of adaptive behaviours (when each couple's parenthood scores are compared, the score of the mother in each couple is similar to that of the father). Findings about fathers are not included in the table since there is no meaningful conclusion within the context of the fathers' data. In this respect, firstly, the occupation and educational backgrounds of the mothers have been examined in terms of the adaptive behaviours of the infants. An independent t-test was used for mother's occupation and a one-way ANOVA for educational backgrounds.

Table 3. Comparison of mothers' infants' adaptive behaviours ratings based on mothers' occupation

As can be seen in Table 3, the mothers' scores regarding their infants' adaptive behaviours were compared with respect to their occupation. The results revealed significant differences in terms of the components of the social domain and the conceptual domain and the dimensions of communication, functional pre-academics, leisure and self-direction ($p<.05$). When the mean scores regarding these variables were examined, significant differences were found for all the variables to be in favour of the infants whose mothers were teachers/academics. In other words, the infants of the mothers who were teachers/academicians had higher adaptive behaviours scores.

When the educational backgrounds of the mothers were examined, it was found that the mothers were graduates of either elementary school, high school or university. The mothers' educational backgrounds and the infants'

adaptive behaviours scores were compared using a one-way ANOVA (seen Table 4) and used bonferroni post hoc test to avoid Type I error.

Table 4. Comparison of the infants' adaptive behaviour scores in terms of their mothers' educational backgrounds (elementary, high school, university)

Bonferroni post-hoc test was applied to determine which groups' scores differed significantly. Accordingly, there were significant differences between the mothers who were graduates of elementary school and those who were graduates of university with respect to the dimensions of communication (mean difference: 9.18; p=.006), functional pre-academics (mean difference: 4.53; p=.042) and leisure (mean difference: 6.66; p=.029), and with respect to the conceptual domain (mean difference: 18.33; p=.004) and social domain (mean difference: 8.24; p=.023). When the mean differences were examined, it was seen that the infants of the university-graduate mothers had higher adaptive behaviours scores.

In line with the purpose of the study, comparative analyses were conducted between the adaptive behaviours and certain technology-related variables such as having a computer, having a tablet PC, time spent on the Internet. Table 5 presents the independent t-test findings obtained regarding the adaptive behaviours scores of the infants with respect to having a computer at home.

Table 5. Comparison of the infants' adaptive behaviour scores in terms of having a computer at home (mother's Report)

As can be seen in Table 5, the infants' adaptive behaviours scores were compared in terms of having a computer at home, and significant differences were found with respect to the dimension of leisure and the components of the conceptual and social domains (p<.05). When the mean scores regarding these three variables were examined, it was found that the significant difference was in favour of the infants of the mothers who had a computer at home. In other words, the infants of the parents who had a computer at home had higher adaptive behaviours scores in terms of leisure, the conceptual domain and the social domain. Besides examining the concept of the computer within a general context, it was also examined with respect to the tablet PC (which is typically used in Turkish home environments) using independent t-tests, presented in Table 6.

Table 6. Comparison of the infants' adaptive behaviour scores in terms of having a tablet PC at home (mother's report)

As can be seen in Table 6, the infants' adaptive behaviours scores demonstrated a significant difference only for the dimension of communication with respect to having a tablet PC at home (p<.05). When the related mean scores were examined, it was seen that the significant difference was in favour of the infants who had a tablet PC at home. Another important analysis was conducted in relation to the time spent online by mothers with their infants using independent t-tests (see Table 7).

Table 7. Comparison of the infants' adaptive behaviour scores in terms of spending time by mothers on the Internet with their infants

According to Table 7, there was a significant difference in terms of the components of the conceptual and social domains and the dimensions of communication, leisure and self-direction with respect to whether mothers spent time on the Internet with their infants (p<.05). When the mean scores were examined for all the variables, the significant differences were found to be in favour of the infants who did not carry out Internet activities with their mothers. Based on this finding, it could be stated that the infants who did not carry out Internet activities with their mothers developed adaptive behaviours more. In other words, it was revealed that mothers spending time on the Internet with their infants was associated with decreased adaptive behaviours scores for their infants. On the other hand, fathers were also asked the same question: "Do you spend time on the Internet with your infant?". Some fathers said "yes" and others said "no". There was no significant difference (p>.05) in terms of adaptive behaviours score between "yes" and "no" answers of fathers. It could be stated that fathers making use of Internet activities while spending time with their infants did not influence their infants' adaptive behaviours scores. Therefore, the data, except for the p value, were not included in Table 7. When the activities on the Internet were examined with respect to their types, the results presented in Table 8 and Table 9 were obtained using independent t-tests.

Table 8. Comparison of the infants' adaptive behaviour scores in terms of mothers' engagement with musical activities on the Internet

As can be seen in Table 8, the infants' adaptive behaviours scores with respect to whether their mothers made use of musical activities like music videos, children's songs while spending time on the Internet with their infants demonstrated a significant difference with respect to the dimensions of leisure and self-direction and the components of the conceptual and social domains (p<.05). When the mean scores were examined for all the variables, significant differences were found to be in favour of the infants who did not engage in musical activities like watching music videos with their mothers on the Internet. Based on this finding, it could be stated that the infants who did not spend time on such musical activities as video via the Internet developed adaptive behaviours

more. On the other hand, fathers were also asked the same question. Then, no significant difference was found between the infants' adaptive behaviours scores in terms of whether their fathers made use of musical activities like music videos, children's songs on the Internet while spending time with their infants (p>.05).

Table 9. Comparison of the infants' adaptive behaviour scores in terms of mothers' engaging in activities on the Internet involving videos, pictures and animations

As can be seen in Table 9, the infants' adaptive behaviours scores demonstrated a significant difference for the dimension of self-direction with respect to whether the mothers carried out activities on the Internet involving videos and animations while spending time with their infants (p<.05). When the mean scores were examined, it was seen that the significant differences were in favour of the infants who did not carry out such activities on the Internet with their mothers. Based on this finding, it could be stated that the infants who did not spend time on activities like animations and videos on the Internet developed adaptive behaviours more. On the other hand, fathers were also asked the same question. Then, no significant differences were found between the adaptive behaviours scores of the infants with respect to whether their fathers made use of such activities on the Internet as animations and videos while spending time with their infants (p>.05).

Today, almost all individuals have their own smartphones, and it is now easier and faster to access the Internet via smartphones. Therefore, in the present study, the parents were asked whether they gave their smartphones to their infants from time to time, and the related adaptive behaviours scores were compared by independent t-tests, as can be seen in Table 10.

Table 10. Comparison of the infants' adaptive behaviour scores in terms of mothers giving their smartphones to their infants

According to Table 10, the infants' adaptive behaviours scores were compared in terms of whether the mothers gave their smartphones to their infants or not, and the results revealed significant differences with respect to the dimension of leisure and the components of the social domain (p<.05). When the mean scores were examined, it was observed that the significant difference was in favour of the infants whose mothers did not give smartphones to them. Depending on this finding, it could be stated that the infants' adaptive behaviours were influenced negatively when their mothers gave smartphones to them for any reason like entertaining or feeding them. On the

other hand, fathers were also asked the same question. Then, no significant differences were found between the infants' adaptive behaviours scores with respect to whether their fathers gave smartphones to their infants (p>.05).

4. Conclusion and Discussion

In the study, adaptive behaviour scores of infants aged 18 to 24 months were examined with respect to their parents' use of information and communication technologies. Adaptive behaviours are made up of various developmental skills, including motor and conceptual skills, such as communication, functional pre-academics and self-direction; the social domain includes the dimensions of leisure and social; and the practical domain includes the dimensions of community use, home living, health and safety and self-care. The analyses were conducted for all these dimensions. The combination of intelligence and adaptive behaviours allows individuals to cope with their environment. In this respect, the aim of this study was to investigate and reveal the effects of parents' use of technology on the adaptive behaviours of their infants aged 18 to 24 months.

In the study, both mothers and fathers evaluated their infants' adaptive behaviours, and the results revealed no significant differences between the two evaluation scores in terms of all the related domains and dimensions. This finding also showed that the data provided by the mothers who evaluated their infants' adaptive behaviours were reliable. As mothers spend more time with their infants in this age group, the focus in the present study was more on the mothers' evaluations. In many related studies, it was pointed out that during the period of early childhood, mothers have more responsibility for taking care of their infant, mothers are more involved in raising the child, and infant health and growth are related to maternal capabilities (Barnard & Solchany, 2002; Hart Research Associates, 1997; Parke, 2002; Rothbaum & Weisz, 1994).

Biological factors (genetic, gender), personal traits (general health, spiritual health and behavioural disorders), interpersonal relationships (parental relationships, social networks and relationships with friends and siblings) and environmental factors (poor financial state, parents' status and educational background and the house they live in) are all likely to be influential on individuals' general development and on their adaptive behaviours (Guerra, Williamson & Lucass-Molina, 2015; Hart-Shegos, 1999; Larson, 2007). For example, in a study (Darbeda et al., 2018), it was found that parents with low levels of education had children with low levels of adaptive behaviours. In addition, in the same study, it was also revealed that the children of parents with a low level of educational background had low levels of cognitive development and general development. These results support the related findings obtained in the present study in relation to mothers and their infants' adaptive behaviours. Accordingly,

it was found that the infants of the mothers who had a computer and Table PC at home had higher adaptive behaviours scores. In some studies, it was revealed that parents with high levels of educational background know more about developmental psychology and that they make more easy-going, child-centered and personal decisions and emphasize their children's independence (Camaioni, Longobardi, Venuti & Bornstein, 1998; Palacios & Moreno, 1996; Williams, Soetjiningsih & Williams, 2000). This shows that parents' educational background can be influential on their infants' adaptive behaviours. In the present study, the results of the analyses regarding adaptive behaviours and certain demographic variables related to the mothers demonstrated that the infants of the mothers who were teachers/academics had higher adaptive behaviours scores and that the infants of the mothers who were graduates of a university had higher adaptive behaviours scores when compared to those of the mothers who were graduates of an elementary school. This result shows that mothers' educational backgrounds are influential on infants' adaptive behaviours.

In this regard, it was revealed that the infants of the mothers who did not carry out any Internet activities with their infants, such as watching music and video clips on the Internet with their infants, animation and video activities, and lastly who did not give smartphones to their infants had higher adaptive behaviours scores. Parallel to the results of the present study, Kaya and Özkut (2016) reported that putting infants to sleep with lullaby CDs or with lullabies played directly from the Internet partially eliminates the communication functions of the lullabies. Because the communication that is provided by the sound, skin and eye contact between mother and baby during the execution of a lullaby disappears once a machine intervenes between them. In another study, it was pointed out that lullabies performed by the family play a vital role in helping strengthen the emotional bond between the baby and the family (Trehub, 2001). There is a need for more verbal stimulation and one-on-one interaction in the period of infancy for a healthy development of the infant (Coll, Buckner, Brooks, Weinreb & Bassuk, 1998).

In another study, it was revealed that parenting constructs had a considerable relationship with adaptive behaviours of young children and especially with their social skills and functional communication skills (Holowitz, 2013). On the other hand, it was seen that the fathers' technology use did not have any significant influence on their infants' adaptive behaviours, which is a striking and important finding in terms of infants of this age group. In this respect, in the related literature, it is reported that mothers have both positive and negative impact on their children and that it is important for mothers to spend time with their children by carrying out non-digital activities (Gunuc & Doğan, 2013). In one study conducted by Zhao, Zhang, Shan, Zhang and Guo (2002) with children aged between 6 and 12 years old, it was found that the mother's age and health condition had a great influence on her child's

social adaptive behaviours. Therefore, it could be stated that mothers should not only be aware of their own technology use near their infants, but also of their infants' technology use when they let them use it. Mothers should also consider the fact that their behaviours may have effects on their infants as they are a role model for them. These results do not mean that fathers do not have any impact on their children or infants, or that these results are true for all fathers. However, the mother is important for raising her infant and child. When we examine the research results in terms of family systems theory, we need to examine the connection and relational processes of the individual as a whole because relational processes pertaining to the individual's and family member's behaviour occur in the family environment where parentification is evidenced (Alexander, 2003; Marotta, 2003). After all, family is a system and a father has an influence on the infant like a mother. However, it is necessary to consider the issue culturally. In Turkey, a mother is the primary person responsible for care and development of the infant (especially 0-24 month old). In a culture where a father is more responsible, similar results will come out for the father. At this point, the focus should be that parent's technology use rather than a mother's or father's influence on the infant.

In relation to the results obtained in this study, the following interpretations could be made. First of all, although the results revealed that the infants of the mothers with a computer or tablet PC at home had higher adaptive behaviours scores, it is possible that that the mothers did not use technology with their infants and that the infants' adaptive behaviours were not negatively influenced by this technology use. In a previous study, Gunuc and Atli (2018) found that mothers gave their smartphones to their infants for any reason like entertaining and feeding them, which had a negative influence on the adaptive behaviours of their infants. In other words, it was seen that the mothers preferred to give their smartphones to their infants instead of giving them a computer which is arguably less convenient to use.

The results obtained in the present study also demonstrated that the infants of the mothers who gave their smartphones to their infants to engage in activities such as watching videos, animations and video clips, had lower levels of self-direction skills (behaviours). Our knowledge on the positive or negative factors that lead to infants' self-direction behaviours is limited (Fuertes, Beeghly, Santos & Tronick, 2011). However, these factors could be said to be related to the infant's socio-emotional development. Different interactions between the mother and her infant and their attachment are regarded as important predictors of self-direction (Fuertes, Lopes-dos-Santos, Beeghly & Tronick, 2009). This shows that parents' use of technology has negative effects on the development of their infants' internal discipline and on their decision-making skills at early ages. Fuertes, Beeghly, Santos and

Tronick (2011) found that the mother's control over her infant and their safe attachment were more influential on the infant's self-direction behaviours than the neonatal status. Based on this result, it could be stated that the mother's control over her infant thanks to technology has negative effects on the infant's self-direction behaviours. Therefore, it should be remembered that it is important to consider under which conditions and for which activities the digital environment is used rather than which piece of hardware is used. Mothers, when they feel helpless in a difficult situation, make use of technology to entertain and support feeding their infants or putting them to sleep (Gunuc & Atli, 2018). Although this situation seems to be for the mother's benefit even for a short period of time, it could lead to problems in terms of the infants' development in the long term.

In this study, it was a striking result that in terms of the infants of the parents who spent time on the Internet with them, especially the conceptual domain and the dimensions of leisure and communication among all the adaptive behaviours were influenced negatively. Besides the communication and interaction between the child and the adult, especially the language spoken near the child is important for the development of their language and communication skills. However, in the digital age, children are exposed to an artificial language produced by technological tools rather than by humans. This brings about a new research topic in terms of social development and social learning (Tomasello, 2003). It could be concluded that infants who have started to develop their linguistic skills and to form sentences are in need of interactive non-digital activities rather than digital tools as a means of communication. Gaming is a leisure activity for infants and toddlers (Atli & Baran, 2017). Today, there are two types of games: traditional games and digital games. Traditional games are those based on creativity, physical activities and communication between individuals. The child uses the current place and physical tools for entertainment. As for digital games, they are games which are programmed with various technologies and which require users to log in to a visual environment (Çetin, 2013). Therefore, based on the results of the present study, it could be stated that mothers spending increased amounts of time using technology had negative influences on their infants' leisure and communication behaviours, which require one-on-one communication and interaction. As mentioned before, Carr (2017) reported that among children aged between 24 and 36 months, those interested in toys demonstrated a better development in cognitive skills (attention, problem solving, short-term memory and concentration), which could be regarded as sub-dimensions of conceptual behaviours), when compared to those interested in touch-screen tablets. This result partially supports the related finding obtained in the present study. In addition, in the period of 18 to 24 months, when infants start to develop problem solving skills and to make mental combinations, which are important for cognitive development, a non-mediated environment has positive effects on the acquisition of basic conceptual skills. Cognitive development affects self-direction, which is a

particular dimension of adaptive behaviours. Self-direction includes goal setting, using effective strategies for making arrangements, coding and repeating information, observing performance, asking for help when needed, and having positive beliefs about owned skills and similar processes (Dabbagh & Kitsantas, 2005). Self-directed infants engage in continuous planning, organization, observation and evaluation (Butler & Winne, 1995). We cannot treat these skills differently from cognitive development. In this study, the low self-direction skills of infants who are interested in technology also support Carr's research (2017).

The adaptive behaviours scores of the infants of mothers who had them engage in visual activities such as music, video clips, animations and videos in digital environments and who gave smartphones to their infants were influenced negatively. This result is in line with previous literature. Although videos, visuals and cartoons that infants watch thanks to technology contribute positively to their mental and cognitive development, it is suggested that this process should start after the age of two years due to the harmful aspects of technology for brain development, as suggested by the American Pediatric Academy (2011). In addition, it is not known what sorts of cognitive, psychological and sociological problems will be experienced by infants exposed to technology at such an early age. Therefore, in order to be cautious, technology should be included in family life carefully until sufficient research results are obtained.

The results obtained in the present study regarding the infants of the mothers who did not give smartphones to them were better in terms of leisure and social domain skills (behaviours) demonstrates that infants' socio-emotional development is influenced by technology use at early ages. This situation shows that technology may have negative effects on the social development of individuals starting from an early age as well as on their leisure skills.

5. Implications to research and practice

Research indicates that the behavioural definition of technology is still incomplete and emphasizes that the effects of technology on human beings are not fully understood in the long run (Bleed, 1997; Lenhard, 2015). This research tested the hypothesis that the use of communication technologies by parents (especially mothers) would have an adverse effect on adaptive behaviours as communication, social, play, preschool, self-management, self-care, community behaviour and motor skills of infants aged 18-24 months. As a result of this hypothesis, the mother's use of technology with her babies proved to have a negative impact on the infant's self-management, play skills and communication skills. This suggests that parents, caregivers and trainers should be more cautious in

terms of using technology when they spend time with infants. It is important that educators, carers and parents use children's books, interactive games of natural objects to support their developmental areas (Atli & Baran, 2017). Cho and Lee (2017) suggest that parents' self-reflective attitudes towards smartphone usage can undermine the negative effects of smartphone overuse by young children.

The American Academy of Pediatrics (2014) found that sleep deprivation linked with excessive technology use can increase obesity as well. Moreover, according to the Department of Health and Human Services (2013), excessive technology use can cause disordered and unhealthy eating. Pies (2009) and Cash, Rae, Steel and Winkler (2012) called for technology addiction to be considered for inclusion in the American Psychiatric Association (APA) (2015) Diagnostic and Statistical Manual of Mental Disorders (DSM) update. In the 5th edition, *Internet Gaming Disorder* was added as a condition warranting more research before it is considered for inclusion in the main manual. Obviously, the unhealthy use of technology has begun to cause important health problems in children and young people. The results of research on healthy child development show that the use of technology negatively affects infant adaptive behaviour. For this reason, the parents of health workers should be directed towards using technology and healthy internet. Experts should state the effects of technology on the development of the infant.

5. Limitations and Future Research

In this study, much time was spent on selecting parents and collecting the research data. This situation contributed to the related literature with respect to obtaining results related to this age group, yet it also constituted an obstacle for future similar studies as it was difficult to design and conduct this research process (due to ethical issues, reaching voluntary participants, etc.). This situation could be regarded as a limitation to the present study. The reason is that while determining the research sample, volunteerism was taken as basis, and the generalizability of results was not guaranteed. On the other hand, there is still a need for longitudinal studies which investigate the (positive and negative) effects of technology use on this age group.

People learn knowledge, skills, attitudes and values that result in their interaction with the environment. Today, there is abundant evidence for cognitive education theory and approaches that provide explanations for the development of individual mental and intellectual skills (Neary, 2002). Cognitive Psychology focuses on the study of how people think, understand, and know. Cognitive theories present a positive view of development, emphasizing conscious thinking. Cognitive theories (especially Piaget's and Vygotsky's) emphasize the individual's active construction of understanding. On the other hand, parents seem to use technology for the

behaviours they want to observe in a simple and mechanical manner as action and reaction which are principles of behavioural approaches. Parental use of technology may have negative influences on infants' self-direction skills (for example, making choices, starting and completing tasks, following a daily routine, and following a directions), which are part of adaptive behaviours. According to this result, parents' purposes of technology use influence their infants' learning and thinking skills. Therefore, use of technology at an early age should be evaluated in terms of learning theories and approaches as well.

Educational activities have important tasks in terms of early childhood development support efforts and the correct usage of technology in educational practices. Therefore, educators should keep this age group away from technological devices, as there is limited commentary on the positive and negative effects of technology on child development in the 0-24 month period. They should also inform their parents about the use of healthy technology at an early age.

We measured the amount of time parents spent using technology in this study. The answers were usually one hour or two hours per day or they were not using technology for their infants. The data regarding time spent using technology were not included in the analyses. Because we didnt get enough data regarding "the amount of time" for analyses. On the other hand, we have seen in the study that it is important whether or not parents use technology for their infants rather than "the amount of time". We recommend large-scale studies for the future because in larger samples, more data about the amount of time of technology use and its effect on adaptive behaviors of infants should be examined.

Lastly, the present study revealed that infants aged 18 to 24 months use technology. Children, now called the new generation or digital natives, are born and grow up in technology culture. This technology culture can be introduced by parents appropriately. Whether parents use technology for themselves or for their infants at home for various purposes such as entertaining their infants, development of their infants may in some cases be negatively influenced. More research is needed to understand the impact of parental technology use on developing infants and children over time.

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Appendix 1. Adaptive behaviours dimensions, descriptions and examples

Communication	Speech, language and listening skill needed for communication with other people (for example, vocabulary, responding to questions). *For example: "Repeats words others say (for example, says 'baby' when an adult says 'baby')"*
Community Use	Skill needed for functioning and performing important behaviours in the community (for example, getting around in the community, recognizing different facilities). *For example: "Asks to go to park or other favourite community places"*
Functional Pre-Academics	Basic skills that form the foundations for reading, writing, mathematics, and other skills needed for daily (for example, counting, drawing simple shapes). *For example: "Turns book pages one by one"*
Home Living	Skills needed for basic care of a home or living setting or a school or classroom (for example, cleaning, straightening, helping adults with household). *For example: "Points to the place where his or her clothes are stored"*
Health and safety	Skills needed for protecting health and responding to illness and injury (for example, following safety rules, using medicines, keeping out of physical danger). *For example: "Avoids bumping into walls or objects when crawling or walking"*
Leisure	Skills needed for engaging in and planning leisure and recreational activities (for example, playing with other, playing with toys, following rules in games). *For example: "Plays with a single toy or game for at least 1 minute"*
Self-care	Skills needed for personal care (for example, eating, dressing, bathing, toileting, hygiene). *For example: "Drinks from a cup or glass, even if another person must hold it"*
Self-Direction	Skill needed for independence, responsibility, and self-control (for example, making choices, following a daily routine, following directions). *For example: "Finds something to do for at least 5 minutes without demanding attention"*
Social	Skills needed for interacting socially and getting along with other people (for example, expressing affection, having friend, assisting other). *For example: "Hugs and kisses parents or others"*
Motor	Basic fine and gross motor skills needed for locomotion, manipulating the environment and developing more complex skills such as those used in sports (for example, basic skills such as sitting, standing, walking etc.). *For example: "Runs without falling"*

Appendix 2. Standardised path diagram