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Impact of parents' technology use on 18- to 24-month-old infants' adaptive behaviors

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Abstract

The aim of this study is to investigate the relationship between adaptive behaviors of 18- to 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- to 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 behaviors of their 18- to 24-month-old infants. Adaptive behaviors of infants were measured with ABAS-3 (Adaptive Behavior Assessment System, Third Edition) 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 behaviors of 18- to 24-month-old infants. Infants of mothers who did not engage in any Internet activity have higher adaptive behavior scores. The infants of mothers who engaged in activities such as games, videos, and music on the Internet together with their 18- to 24-month-old infants had low scores on adaptive behaviors 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 behaviors

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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 behaviors (Gunuc, 2017a). Technology facilitates human life and contributes to social development (Karayağız Muslu &

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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, 2015, 2017b; Kuss & Griffiths, 2017; Kuss, Harkin, Kanjo, & Billieux, 2018). 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 behavior 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 behaviors and developments of children who are born into a digital world. Studies which examine parents' behaviors 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 (Arslan, 2012; Charles, 2003; 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 toward 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, while 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 behavior after a certain period of time, occurs as well (Tercan & Dursun, 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 toward evaluating adaptive behaviors in the development of the individual. Adaptive behavior 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 the 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 & Altman, 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 behaviors 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 United Kingdom, Parfitt, Pike, and Ayers (2013) 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 behaviors 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 behaviors of parents/caretakers are influential on infants' academic behaviors (i.e., counting, grouping, and matching skills), on their socialization behaviors and on their attention spans (Culp, Hubbs-Tait, Culp, & Starost, 2000; Rubin, Burgess, Dwyer, & Hastings, 2003). Above all, Altman and Mills (1990) investigated the effect of selected caregiver growth-facilitating behaviors (as measured by The Family Daycare Rating Scale; Harms & Clifford, 1989) on adaptive behavior development (as measured by the Vineland Adaptive Behavior Scales (VABS); Sparrow, Balla, & Cicchetti, 1984) in children aged 18–24 months. Provocatively, they found higher adaptive behavior in homecare than daycare children and in children of mothers who displayed growth-facilitating behaviors.

1.1.3. Adaptive behaviors. Adaptive behavior refers to an individual's social responsibility and to their independent performance of daily activities (Wolf, Risley, & Mess, 1964). In other words, adaptive behavior 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 behaviors data under three general headings. These dimensions are practical, conceptual, and social skills (Luckasson et al., 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. Behavioral 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 behaviors, 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 (Harrison & Boney, 2002; National Research Council, 2002). Consequently, the results of factor-analytic studies carried out on adaptive behavior in the past few decades generally put forward a four-factor solution: (a) practical skills, (b) conceptual skills, (c) social skills, and (d) motor skills (Arias, Verdugo, Navas & Gómez, 2013; Harrison & Oakland, 2015; Tassé et al., 2012; Thompson, McGrew, & Bruininks, 1999; Widman & McGrew, 1996).

The expectations of the socio-cultural structure, the environment where the individual lives, and their age have an influence on adaptive behaviors. Cultural structure and developmental tasks determine adaptive behaviors (Witt & Martens, 1984). Therefore, it is important to keep it in mind that the individual's behaviors considered to be problematic in terms of adaptive behaviors are influenced by factors such as cultural structure, appropriateness to age, intensity, and permanence (Kanlıkılıçer, 2005). When adaptive behaviors

are examined within the framework of system theory, family behaviors are a social system composed of patterns (Ludlow & Howard, 1990). When adaptive behaviors were considered as a general system, the sub-dimensions converged to form the general system (Connors, 2016). Sub-dimensions can also be considered as sub-systems. A problem in the development areas that constitute the sub-dimensions of adaptive behaviors is effective on the general adaptive system. Individuals who perform evaluations of infants' adaptive behaviors 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 behavior skills so that their developmental tasks can be completed (Bornstein, Giusti, Leach, & Venuti, 2005; Harrison & Boney, 2002).

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 (Connors, 2016; Ludlow & Howard, 1990). According to this theory, the system is a whole, and each of the people in the family should be understood as an individual. The behavior of one of the family members affects all members of the system (Bowen, 1978; Ertürk, 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 (Ertürk, 2010; Ludlow & Howard, 1990; Sabatelli & Bartle, 1995). 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 behaviors of infants aged 18-24 months, which may affect all adaptive behaviors as part of a system.

Studies evaluating adaptive behaviors in infancy seem to address the relationship between cognitive development and adaptive behaviors. 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 or 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, Livesey, & Hayes, 2012). The effectiveness of the individual in coping with the social and natural demands of the environment is referred to as adaptive behaviors. When we examine adaptive behaviors and cognitive development in accordance with this definition, cognitive development of the individual is an important factor implicated in adaptive behaviors (Mervis & Klein Tasman, 2000). Therefore, in some recent studies, cognitive development and adaptive behaviors were examined together (Schatz & Hamdan Allen, 1995). Many studies have shown a moderate relationship between intelligence and adaptive behaviors (R. M. Alexander, 2017; McGrew, 2012). There are studies investigating the relationship between cognitive development and adaptive behavior in infancy. In one of these studies, Scattone, Raggio, and May (2011) comparatively used the Bayley-III Infant Development Scale and the VABS-II to evaluate the developments of infants and children aged from 12 to 42 months. As a result of the research, assessing the relationship between adaptive behavior and cognitive development of 18- to 24-months-old infants by Atli and Baran (2018a), a positive correlation was found between cognitive development and adaptive behavior of infants. Another study evaluated the adaptive behaviors 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 behaviors (Coll, Buckner, Brooks, Weinreb & Bassuk, 1999). Matas, Arend, and Sroufe (1978) investigated the continuity of adaptive behaviors at 2 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 behaviors determine the adaptive behaviors of the infant for 2 years. As can be seen, although there are several studies evaluating the relationship between infants' adaptive behaviors and certain variables, no research has been conducted to examine the influence of parents' technology use on adaptive behaviors of infants (aged between 0 and 24 months). Information and communication technologies constitute an important factor in studies conducted on humans and their behaviors, and there is no research revealing the influence of these technologies on infants' adaptive behaviors. 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 (Ofcom, 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 behaviors 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' behaviors in terms of eating, sleeping, speaking, and keeping quiet.

Strasburger, Jordan, and Donnerstein (2010) reported that 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 and Media (2011), media use is associated with sleep problems, aggressive behavior, 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 behaviors 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 that 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 behavior. 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 behaviors is available. Therefore, this 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 behaviors. In this respect, recent studies point to the need for policies to be developed regarding children as well as for scientific guidance and counseling 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, 2018). 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 behavior 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 behaviors of infants who do not voluntarily interact with technology.

2. Methods

2.1. Research model

To examine the effects of parents' technology use (such as the Internet, smartphone, and tablet PC) on their infants' adaptive behaviors, 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). To test H_1, the research sample was determined, and the survey was distributed. The research data were analyzed and finally, 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).

The fact that the study involved infants from a certain age group made it difficult to reach the parents. Thus, in this study, the convenience sampling method was used. 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- to 24-month-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 40–60 min.

2.4. Data collection tools

2.4.1. 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.

Table 1. Demographic information about mothers and fathers.

Variable	Mother		Father	
	n	%	*n*	%
Age				
21–25	13	22.4	–	–
26–30	15	25.9	14	24.1
31–40	27	46.6	37	63.8
41–45	3	5.2	7	12.1
Occupation				
Homemaker	42	72.4	4 (unemployed)	6.9
Teacher/academic	16	27.6	54 (employee)	93.1
Educational level				
Elementary	25	43	14	24.1
High school	12	20.7	14	24.1
University or higher	21	36.2	30	51.7
Infant age (months)				
18	10	17.2		
19	5	8.6		
20	8	13.8		
21	11	19.0		
22	7	12.1		
23	7	12.1		
24	10	17.2		
Family budget (per month)	*f*	%		
1000 TRY or less	11	19.0		
1000–3000 TRY	23	39.7		
4000–6000 TRY	9	15.5		
More than 6000 TRY	15	25.9		
Total	58	100.0		

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

- 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?"

2.4.2. Adaptive Behavior Assessment System, Third Edition. This scale was developed by Harrison and Oakland (2015) and is made up of six forms: Parent/Primary Caretaker Form (0–5 years old), Teacher/Nursery Caretaker Form (2–5 years old), Parent Form (5–21 years old), Teacher Form (5–21 years old), Adult Form (16–89 years old). However, in this study, only the Parent/Primary Caretaker Form (0–5 years old) was used. This form included 241 items across 10 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 18–24 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 and .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/standard deviation (SD) = 4.62, root mean square error approximation (RMSEA) = .11, Normed Fit Index (NFI) = .93, Non-normed Fit Index (NNFI) = .93, Goodness of Fit Index (GFI) = .90, Adjusted Goodness of Fit Index (AGFI) = .85, Comparative Fit Index (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 analyses of variance (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 behaviors. Adaptive behaviors 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 behaviors were compared. The related results are presented in Table 2.

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

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

Adaptive behavior	Parents	*N*	Mean	*SD*	*t*	*df*	*p*
Communication	Mother	58	37.36	10.20	.075	114	.940
	Father	58	37.22	9.54	.075	113.49	
Community Use	Mother	58	34.28	10.00	.244	114	.808
	Father	58	33.81	10.55	.244	113.67	
Home living	Mother	58	34.28	10.00	.244	114	.808
	Father	58	33.81	10.56	.244	113.67	
Functional pre-academics	Mother	58	8.60	6.34	.209	114	.835
	Father	58	8.36	6.07	.209	113.78	
Health and safety	Mother	58	28.40	8.08	.215	114	.830
	Father	58	28.07	8.36	.215	113.86	
Leisure	Mother	58	36.83	8.84	.072	114	.943
	Father	58	36.71	9.22	.072	113.80	
Self-care	Mother	58	34.67	5.66	.128	114	.898
	Father	58	34.54	5.92	.128	113.77	
Self-direction	Mother	58	28.38	8.69	.471	114	.638
	Father	58	27.62	8.66	.471	113.99	
Social	Mother	58	59.52	4.20	−.584	114	.560
	Father	58	59.98	4.39	−.584	113.78	
Motor	Mother	58	59.52	4.20	−.584	114	.560
	Father	58	59.98	4.39	−.584	113.78	
Conceptual domain	Mother	58	74.35	19.99	.314	114	.754
	Father	58	73.21	18.97	.314	113.69	
Social domain	Mother	58	96.35	10.73	−.168	114	.867
	Father	58	96.69	11.36	−.168	113.63	
Practical domain	Mother	58	131.62	29.56	.246	114	.806
	Father	58	130.22	31.50	.246	113.54	

SD: standard deviation; *df*: degrees of freedom.

fathers regarding their evaluations of their infants' adaptive behaviors 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 behaviors 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 behaviors (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, first, the occupation and educational backgrounds of the mothers have been examined in terms of the adaptive behaviors of the infants. An independent *t*-test was used for mother's occupation and a one-way ANOVA for educational backgrounds.

As can be seen in Table 3, the mothers' scores regarding their infants' adaptive behaviors 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 favor of the infants whose mothers were teachers/academics. In other words, the infants of the mothers who were teachers/academicians had higher adaptive behaviors scores.

When the educational backgrounds of the mothers were examined, it was found that the mothers were graduates of elementary school, high school, or university. The mothers' educational backgrounds and the infants' adaptive behaviors scores were compared using a one-way ANOVA (see Table 4) and used Bonferroni post hoc test to avoid Type I error.

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

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

Adaptive behavior	Occupation	*n*	Mean	*SD*	*df*	*t*	*p*
Communication	Housewife	42	35.38	9.17	52	−2.579	.013*
	Teacher/academic	12	43.83	12.66			
Community use	Housewife	42	33.31	8.88	52	−.975	.346
	Teacher/academic	12	37.50	14.11			
Home living	Housewife	42	33.31	8.88	52	−.975	.346
	Teacher/academic	12	37.50	14.11			
Functional pre-academics	Housewife	42	6.71	3.09	52	−2.864	.014*
	Teacher/academic	12	12.75	7.11			
Health and safety	Housewife	42	27.48	6.03	52	−1.068	.306
	Teacher/academic	12	31.50	12.65			
Leisure	Housewife	42	34.71	6.82	52	−2.981	.010*
	Teacher/academic	12	45.08	11.48			
Self-care	Housewife	42	34.43	4.45	52	−.707	.492
	Teacher/academic	12	36.08	7.75			
Self-direction	Housewife	42	26.57	6.81	52	−2.273	.041*
	Teacher/academic	12	35.08	12.45			
Social	Housewife	42	59.17	4.12	52	−.795	.430
	Teacher/academic	12	60.25	4.33			
Motor	Housewife	42	59.17	4.12	52	−.795	.430
	Teacher/academic	12	60.25	4.33			
Conceptual domain	Housewife	42	68.67	14.08	52	−2.713	.018*
	Teacher/academic	12	91.67	28.39			
Social domain	Housewife	42	93.88	8.45	52	−2.593	.022*
	Teacher/academic	12	105.33	14.62			
Practical domain	Housewife	42	128.52	24.27	52	−1.033	.321
	Teacher/academic	12	142.58	45.34			

SD: standard deviation; *df*: degrees of freedom.
*$p < .05$.

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

Adaptive behavior	Education level	Sum of squares	*df*	Mean square	*F*	*p**
Communication	Between groups	962.194	2	481.097	5.327	.008
	Within groups	4967.202	55	90.313		
	Total	5929.397	57			
Functional pre-academics	Between groups	291.110	2	145.555	3.997	.024
	Within groups	2002.770	55	36.414		
	Total	2293.879	57			
Leisure	Between groups	599.640	2	299.820	4.280	.019
	Within groups	3852.636	55	70.048		
	Total	4452.276	57			
Conceptual domain	Between groups	3956.111	2	1978.056	5.777	.005
	Within groups	18,830.992	55	342.382		
	Total	22,787.103	57			
Social domain	Between groups	970.804	2	485.402	4.777	.012
	Within groups	5588.300	55	101.605		
	Total	6559.103	57			

df: degrees of freedom.
*$p < .05$.

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 behaviors scores.

In line with the purpose of the study, comparative analyses were conducted between the adaptive behaviors and certain technology-related variables such as having a computer, having a tablet PC, and time spent on the Internet. Table 5 presents the independent *t*-test

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

Adaptive behavior	PC ownership	*n*	Mean	*SD*	*df*	*t*	*p*
Communication	Yes	30	39.17	11.63	56	1.407	.165
	No	28	35.43	8.18			
Community use	Yes	30	34.83	11.74	56	.436	.664
	No	28	33.68	7.91			
Home living	Yes	30	34.83	11.74	56	.436	.664
	No	28	33.68	7.91			
Functional pre-academics	Yes	30	9.87	8.18	56	1.591	.117
	No	28	7.25	3.06			
Health and safety	Yes	30	28.90	9.70	56	.488	.627
	No	28	27.86	5.99			
Leisure	Yes	30	40.40	9.69	56	3.484	.001*
	No	28	33.00	5.89			
Self-care	Yes	30	34.50	6.52	56	−.238	.813
	No	28	34.86	4.68			
Self-direction	Yes	30	30.37	10.45	56	1.841	.071
	No	28	26.25	5.74			
Social	Yes	30	60.33	3.69	56	1.551	.126
	No	28	58.64	4.59			
Motor	Yes	30	60.33	3.69	56	1.551	.126
	No	28	58.64	4.59			
Conceptual domain	Yes	30	79.40	23.68	56	2.085	.043*
	No	28	68.93	13.52			
Social domain	Yes	30	100.73	11.25	56	3.535	.001*
	No	28	91.64	7.92			
Practical domain	Yes	30	133.07	35.74	56	.383	.699
	No	28	130.07	21.65			

SD: standard deviation; *df*: degrees of freedom.
*$p < .05$.

findings obtained regarding the adaptive behaviors scores of the infants with respect to having a computer at home.

As can be seen in Table 5, the infants' adaptive behaviors 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 favor 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 behaviors 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.

As can be seen in Table 6, the infants' adaptive behaviors 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 favor 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).

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 favor 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 behaviors more. In other words, it was revealed that mothers spending time on the Internet with their infants was associated with decreased adaptive behaviors 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 behaviors 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 behaviors scores. Therefore, the data, except for the *p* value, were not included in Table 7. When the activities on the Internet

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

Adaptive behavior	Tablet PC ownership	*n*	Mean	*SD*	*df*	*t*	*p*
Communication	Yes	20	41.90	12.54	56	2.577	.013*
	No	38	34.97	7.90			
Community use	Yes	20	37.50	11.08	56	1.817	.075
	No	38	32.58	9.08			
Home living	Yes	20	37.50	11.08	56	1.817	.075
	No	38	32.58	9.08			
Functional pre-academics	Yes	20	9.35	6.60	56	.647	.520
	No	38	8.21	6.26			
Health and safety	Yes	20	28.65	10.39	56	.172	.864
	No	38	28.26	6.70			
Leisure	Yes	20	39.70	9.92	56	1.832	.072
	No	38	35.32	7.94			
Self-care	Yes	20	35.55	6.96	56	.855	.396
	No	38	34.21	4.88			
Self-direction	Yes	20	29.85	8.34	56	.934	.354
	No	38	27.61	8.87			
Social	Yes	20	60.00	5.11	56	.632	.530
	No	38	59.26	3.68			
Motor	Yes	20	60.00	5.11	56	.632	.530
	No	38	59.26	3.68			
Conceptual domain	Yes	20	81.10	22.65	56	1.910	.061
	No	38	70.79	17.74			
Social domain	Yes	20	99.70	12.55	56	1.760	.084
	No	38	94.58	9.34			
Practical domain	Yes	20	139.20	34.91	56	1.430	.158
	No	38	127.63	25.93			

SD: standard deviation; *df*: degrees of freedom.
*$p < .05$.

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

Adaptive behavior	Time spent on the Internet	*n*	Mean	*SD*	*df*	*t*	*p*
Communication	Yes	31	36.00	9.29	47	−2.136	.038*
	No	18	42.22	10.72			
Community use	Yes	31	33.13	8.90	47	−1.134	.262
	No	18	36.39	10.96			
Home living	Yes	31	33.13	8.90	47	−1.134	.262
	No	18	36.39	10.96			
Functional pre-academics	Yes	31	7.77	4.90	47	−1.000	.322
	No	18	9.78	9.16			
Health and safety	Yes	31	27.29	8.73	47	−1.269	.211
	No	18	30.44	7.74			
Leisure	Yes	31	34.90	9.50	47	−2.172	.035*
	No	18	40.78	8.43			
Self-care	Yes	31	34.61	5.90	47	.332	.742
	No	18	34.06	5.24			
Self-direction	Yes	31	26.48	8.28	47	−2.049	.046*
	No	18	31.72	9.21			
Social	Yes	31	59.06	3.69	47	−.996	.324
	No	18	60.28	4.76			
Motor	Yes	31	59.06	3.69	47	−.996	.324
	No	18	60.28	4.76			
Conceptual domain	Yes	31	70.26	19.19	47	−2.313	.025*
	No	18	83.72	20.43			
Social domain	Yes	31	93.97	11.18	47	−2.204	.032*
	No	18	101.06	10.25			
Practical domain	Yes	31	128.16	29.84	47	−1.040	.304
	No	18	137.28	29.14			

SD: standard deviation; *df*: degrees of freedom.
*$p < .05$.

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

Adaptive behavior	Watching music videos on the Internet	*n*	Mean	*SD*	*df*	*t*	*p*
Communication	No	23	40.87	10.19	47	1.702	.095
	Yes	26	36.00	9.81			
Community use	No	23	36.04	9.94	47	1.167	.249
	Yes	26	32.81	9.46			
Home living	No	23	36.04	9.94	47	1.167	.249
	Yes	26	32.81	9.46			
Functional pre-academics	No	23	9.13	8.34	47	.600	.551
	Yes	26	7.96	5.09			
Health and safety	No	23	29.87	8.04	47	1.111	.272
	Yes	26	27.19	8.74			
Leisure	No	23	39.91	8.36	47	2.047	.046*
	Yes	26	34.54	9.84			
Self-care	No	23	34.74	5.07	47	.384	.702
	Yes	26	34.12	6.15			
Self-direction	No	23	31.70	8.22	47	2.566	.014*
	Yes	26	25.50	8.62			
Social	No	23	60.22	4.45	47	1.137	.261
	Yes	26	58.88	3.76			
Motor	No	23	60.22	4.45	47	1.137	.261
	Yes	26	58.88	3.76			
Conceptual domain	No	23	81.70	19.16	47	2.162	.036*
	Yes	26	69.46	20.30			
Social domain	No	23	100.13	10.44	47	2.155	.036*
	Yes	26	93.42	11.24			
Practical domain	No	23	136.70	26.91	47	1.157	.253
	Yes	26	126.92	31.62			

SD: standard deviation; *df*: degrees of freedom.
*$p < .05$.

were examined with respect to their types, the results presented in Tables 8 and 9 were obtained using independent *t* tests.

As can be seen in Table 8, the infants' adaptive behaviors 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 favor 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 behaviors more. On the other hand, fathers were also asked the same question. Then, no significant difference was found between the infants' adaptive behaviors 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 ($p > .05$).

As can be seen in Table 9, the infants' adaptive behaviors 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 favor 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 behaviors more. On the other hand, fathers were also asked the same question. Then, no significant differences were found between the adaptive behaviors 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 this study, the parents were asked whether they gave their smartphones to their infants from time to time, and the related adaptive behaviors scores were compared by independent *t* tests, as can be seen in Table 10.

According to Table 10, the infants' adaptive behaviors scores were compared in terms of whether the

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

Adaptive behavior	The other activities	*n*	Mean	*SD*	*df*	*t*	*p*
Communication	No	28	39.64	9.91	46	1.077	.287
	Yes	20	36.40	10.78			
Community use	No	28	36.04	9.67	46	1.400	.168
	Yes	20	32.05	9.80			
Home living	No	28	36.04	9.67	46	1.400	.168
	Yes	20	32.05	9.80			
Functional pre-academics	No	28	8.79	7.69	46	.192	.848
	Yes	20	8.40	5.44			
Health and safety	No	28	29.54	7.58	46	.920	.363
	Yes	20	27.25	9.63			
Leisure	No	28	38.68	10.11	46	1.259	.215
	Yes	20	35.20	8.39			
Self-care	No	28	34.79	5.37	46	.470	.641
	Yes	20	34.00	6.17			
Self-direction	No	28	31.18	8.05	46	2.517	.015*
	Yes	20	24.95	9.00			
Social	No	28	59.93	4.58	46	.802	.427
	Yes	20	58.95	3.50			
Motor	No	28	59.93	4.58	46	.802	.427
	Yes	20	58.95	3.50			
Conceptual domain	No	28	79.61	18.79	46	1.663	.103
	Yes	20	69.75	22.16			
Social domain	No	28	98.61	12.06	46	1.356	.182
	Yes	20	94.15	9.93			
Practical domain	No	28	136.39	27.01	46	1.271	.210
	Yes	20	125.35	33.07			

SD: standard deviation; *df*: degrees of freedom.
*$p < .05$.

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

Adaptive behavior	Giving the smart phone	*n*	Mean	*SD*	*df*	*t*	*p*
Communication	Yes	21	39.57	10.00	47	.762	.450
	No	28	37.32	10.40			
Community use	Yes	21	32.29	9.75	47	−1.280	.207
	No	28	35.86	9.60			
Home living	Yes	21	32.29	9.75	47	−1.280	.207
	No	28	35.86	9.60			
Functional pre-academics	Yes	21	8.05	5.38	47	−.411	.683
	No	28	8.86	7.72			
Health and safety	Yes	21	28.43	9.72	47	−.015	.988
	No	28	28.46	7.52			
Leisure	Yes	21	33.43	8.48	47	−2.442	.018*
	No	28	39.79	9.40			
Self-care	Yes	21	33.19	5.73	47	−1.324	.192
	No	28	35.32	5.46			
Self-direction	Yes	21	26.10	8.79	47	−1.599	.117
	No	28	30.14	8.76			
Social	Yes	21	58.62	3.46	47	−1.325	.192
	No	28	60.18	4.48			
Motor	Yes	21	58.62	3.46	47	−1.325	.192
	No	28	60.18	4.48			
Conceptual domain	Yes	21	73.71	21.27	47	−.437	.664
	No	28	76.32	20.25			
Social domain	Yes	21	92.05	9.73	47	−2.569	.013*
	No	28	99.96	11.32			
Practical domain	Yes	21	126.19	32.52	47	−1.091	.281
	No	28	135.50	27.15			

SD: standard deviation; *df*: degrees of freedom.
*$p < .05$.

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 favor of the infants whose mothers did not give smartphones to them. Depending on this finding, it could be stated that the infants' adaptive behaviors 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 behaviors scores with respect to whether their fathers gave smartphones to their infants ($p > .05$).

4. Conclusion and discussion

In the study, adaptive behavior scores of infants aged 18–24 months were examined with respect to their parents' use of information and communication technologies. Adaptive behaviors 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 behaviors 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 behaviors of their infants aged 18–24 months.

In the study, both mothers and fathers evaluated their infants' adaptive behaviors, 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 behaviors were reliable. As mothers spend more time with their infants in this age group, the focus in this 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 behavioral 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 behaviors (Guerra, Williamson, Lucass-Molina, 2015; Hart-Shegos, 1999; Larson, 2007). For example, in a study by Darbeda et al. (2018), it was found that parents with low levels of education had children with low levels of adaptive behaviors. 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 this study in relation to mothers and their infants' adaptive behaviors. Accordingly, it was found that the infants of the mothers who had a computer and table PC at home had higher adaptive behaviors 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 behaviors. In this study, the results of the analyses regarding adaptive behaviors and certain demographic variables related to the mothers demonstrated that the infants of the mothers who were teachers/academics had higher adaptive behaviors scores and that the infants of the mothers who were graduates of a university had higher adaptive behaviors 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 behaviors.

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 finally who did not give smartphones to their infants, had higher adaptive behaviors scores. Parallel to the results of this 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 behaviors 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 behaviors, 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, it was found that the mother's age and health condition had a great influence on her child's social adaptive behaviors. Therefore, it could be stated that mothers should be aware not only 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 behaviors 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 behavior occur in the family environment where parentification is evidenced (P. C. 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 months 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 behaviors scores, it is possible that that the mothers did not use technology with their infants and that the infants' adaptive behaviors 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 behaviors 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 this 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 (behaviors). Our knowledge on the positive or negative factors that lead to infants' self-direction behaviors 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 et al. (2011) found that the mother's control over her infant and their safe attachment were more influential on the infant's self-direction behaviors 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 behaviors. 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 behaviors 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 this study, it could be stated that mothers spending increased amounts of time using technology had negative influences on their infants' leisure and communication behaviors, 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 subdimensions of conceptual behaviors), when compared to those interested in touch-screen tablets. This result partially supports the related finding obtained in this study. In addition, in the period of 18–24 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 behaviors. 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, 2009). 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 (2017) research.

The adaptive behaviors 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 2 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, to be cautious, technology should be included in family life carefully until sufficient research results are obtained.

The results obtained in this study regarding the infants of the mothers who did not give smartphones to them were better in terms of leisure and social domain skills (behaviors) 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 behavioral 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; Lenhart, 2015). This research tested the hypothesis that the use of communication technologies by parents (especially mothers) would have an adverse effect on adaptive behaviors as communication, social, play, preschool, self-management, self-care, community behavior, 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 toward 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 Psychological 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 behavior. For this reason, the parents of health workers should be directed toward using technology and healthy Internet. Experts should state the effects of technology on the development of the infant.

6. 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 this 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 behaviors they want to observe in a simple and mechanical manner as action and reaction which are principles of behavioral approaches. Parental use of technology may have negative influences on infants' self-direction skills (e.g. making choices, starting and completing tasks, following a daily routine, and following a directions), which are part of adaptive behaviors. 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- to 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 1 or 2 h 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 did not 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.

Finally, this study revealed that infants aged 18–24 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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References

Aksoy, B. A. (2002). Anne çocuk eğitim programına katılan annelerin program hakkındaki görüşleri [The opinions of the mothers who attended to the program about the training program]. *Journal of Qafqaz University*, *9*, 133–142.

Albers, E. M., Riksen-Walraven, J. M., & Weerth, C. (2010). Developmental stimulation in child care centers contributes to young infants' cognitive development. *Infant Behavior and Development*, *33*, 401–408. doi: 10.1016/j.infbeh.2010.04.004

Alexander, P. C. (2003). Understanding the effects of child sexual abuse history on current couple relationships: An attachment perspective. In S. Johnson (Ed.), *Attachment: A perspective for couple and family therapy* (pp. 342–365). New York, NY: Guilford Press.

Alexander, R. M. (2017). *The relation between intelligence and adaptive behavior: A meta-analysis* (Submitted to the Graduate Degree Program in Educational Psychology and the Graduate Faculty of the University of Kansas in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy). Lawrence: University of Kansas.

Altman, J. S., & Mill, B. C. (1990). Caregiver behaviours and adaptive behavior development of very young children in home care and daycare. *Early Child Development and Care*, *62*, 87–96. doi:10.1080/0300443900620106

American Academy of Pediatrics. (2014). *The media, children and adolescents.* Available from www.acpeds.org

American Association on Mental Retardation. (2002). *Mental retardation definition, classification, and systems of support* (10th ed.). Washington, DC: Author.

American Pediatric Academy. (2011). Media use by children younger than 2 years. *Pediatrics*, *128*, 1040–1045. doi: 10.1542/peds.2011-1753

American Psychological Association. (2015). *DSM gaming disorder*. Available from http://www.dsm5.org

Arias, B., Verdugo, M. A., Navas, P., & Gómez, L. E. (2013). Factor structure of the construct of adaptive behavior in children with and without intellectual disability. *International Journal of Clinical and Health Psychology*, *13*, 155–166.

Arslan, U. (2012). Okul öncesi eğitimde temel becerilerin ve sosyal davranışların kazandırılması [Gaining basic skills and social behavior in preschool education]. In G. Haktanır (Ed.), *Okul Öncesi Eğitime Giriş içinde* [In introduction to preschool education] (pp. 201–226). Ankara: Anı Yayıncılık.

Atli, S., & Baran, G. (2017). Gelişimin desteklenmesi [Support for development]. In A. Köksal Akyol (Ed.), *Erken çocukluk döneminde gelişim I içinde* [In early childhood development I] (p.404). Ankara: Anı Yayıncılık.

Atli, S., & Baran, G. (2018a, March). Adaptif Davranış Değerlendirme Sistemi 3 [Adaptive Behavior Assessment System-ABAS-3].'ün *Türkçeye uyarlaması* ve geçerlik güvenirlik çalışması (Abstract) [Turkish and Validity Reliability Study] (*2 International Congress Early Childhood Intervention*) Antalya, Turkey. Available from http://www.iceci2018.com/

Atli, S., & Baran, G. (2018b). *18–24 Aylık* Bebeklerin Bilişsel Gelişimleri ile Adaptif Davranışları Arasındaki ilişkinin İncelenmesi [Investigation of the relationship between cognitive development and adaptive behavior of 18–24 month old infant] (3rd International Congress on Health Sciences). Ankara, Turkey. Available from http://www.saglikbil
imlerikongresi.com/

Barnard, K. E., & Solchany, J. E. (2002). Mothering. In M. H. Bornstein (Ed.), *Handbook of Parenting: Vol. 3. Status and social conditions of parenting* (2nd edn, pp. 3–25). Mahwah, NJ: Lawrence Erlbaum.

Barr, R. (2010). Transfer of learning between 2D and 3D sources during infancy: informing theory and practice. *Developmental Review*, *30*, 28–154. doi:10.1016/j.dr.2010.03.001

Bavelier, D., Green, C. S., & Dye, M. W. (2010). Children, wired: For better and for worse. *Neuron*, *67*, 692–701.

Bee, H., & Boyd, D. (2009). *Çocuk gelişim psikolojisi* [Child development psychology] (O. Gündü, Trans.). İstanbul, Turkey: Kaknüs Yayınları.

Bleed, P. (1997). *Toward a behavioral definition of technology*. Oxford, UK: American Anthropological Association. doi:10.1525/ap3a.1997.7.1.95

Bornstein, M. H., Giusti, Z., Leach, D. B., & Venuti, P. (2005). Maternal reports of adaptive behaviours in young children: Urban–rural and gender comparisons in Italy and United States. *Infant and Child Development*, *14*, 403–424. doi:10.1002/icd.414

Bowen, M. (1978). The theory in the practice of psychotherapy. In M. Bowen (Ed.), *Family therapy in clinical practice* (pp. 337–387). New York, NY: Jason Aronson.

Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research*, *65*, 245–281.

Byron, T. (2008). *Safer children in a digital world* (Byron review—Children and new technology). http://dera.ioe.ac.uk/7332/7/Final%20Report%20Bookmarked_Redacted.pdf

Camaioni, L., Longobardi, E., Venuti, P., & Bornstein, M. H. (1998). Maternal speech to 1-year-old children in two Italian cultural contexts. *Early Development and Parenting*, *7*, 9–17. doi:10.1002/(SICI)1099-0917(199803)7:1<9::AID-EDP159>3.0.CO;2-T

Carr, A. (2017, September 13–15). *Parent support for very young children's interaction with digital technology*. In British Psychological Society Developmental Section Conference, Stratford-upon-Avon, UK. Retrieved from http://create.canterbury.ac.uk/16327/

Cash, H., Rae, C. D., Steel, A. H., & Winkler, A. (2012). Internet addiction: A brief summary of research and practice. *Current Psychiatry Review*, *8*, 292–298.

Çetin, E. (2013). Temel tanımlar ve kavramlar [Basic definitions and concepts]. In M. A. Ocak (Ed.), Eğitsel dijital oyunlar kuram, tasarım ve uygulama içinde [In educational digital games theory, design and application] (p. 26). Ankara: Pegem.

Charles, C. M. (2003). *Öğretmenler için Piaget ilkeleri* [Piaget principles for teachers] G. Ülgen (trans.) Ankara: Nobel Yayınevi.

Chirico, D. (1997). Building on shifting sand: The impact of computer use on neural and cognitive development. *Research Bulletin: Research Institute for Waldorf Education*, *2*, 13–19.

Cho, K. S., & Lee, J. M. (2017). Influence of smartphone addiction proneness of young children on problematic behaviors and emotional intelligence. *Computers in Human Behavior*, *66*, 303–311.

Coll, C. G., Buckner, J. C., Brooks, M. G., Weinreb, L. F., & Bassuk, E. L. (1998). The developmental status and adaptive behaviour of homeless and low-income housed infants and toddlers. *American Journal of Public Health*, *88*, 1371–1374.

Coll, C.G., Buckner, J.C., Brooks, M.G., Weinreb. L.F. & Bassuk, E.L. (1999) The developmental status and adaptive behavior of homeless and low-income housed infants and toddlers. *American Journal of Public Health*, 88: 1371–1374.

Connors, J. V. (2016). *System theory and interpersonal relationship*. Retrieved from https://www.academia.edu/214872/Interpersonal_Systems_Theory

Corey, G. (2015). *Psikolojik dam*şma kuram ve uygulamaları [Theory and practice of counseling and psychotherapy] (T. Ergene, Trans.). Ankara, Turkey: Mentis Yayıncılık.

Council on Communications and Media. (2011). Media use by children younger than 2 years. *Pediatrics*, *128*, 1040–1045. doi:10.1542/peds.2011-1753

Culp, A., Hubbs-Tait, L., Culp, R. E., & Starost, R. (2000). Maternal parenting characteristics and school involvement: Predictors of kindergarten cognitive competence among Head Start children. *Journal of Research in Childhood Education*, *15*, 5–17. doi:10.1080/02568540009594772

Dabbagh, N., & Kitsantas, A. (2009). Exploring how experienced online instructors use integrative learning

technologies to support self-regulated learning. *International Journal of Technology in Teaching and Learning*, *5*, 154–168.

Darbeda, S., Falissard, B., Orri, M., Barry, C., Melchior, M., Chauvin, P., & Vandentorren, S. (2018). Adaptive behavior of sheltered homeless children in the French ENFAMS Survey. *American Journal of Public Health*, *108*, 503–511.

Ertürk, H. G. (2010). Aile kuramları [Family theories]. In T. Güler (Ed.), *Anne baba eğitimi içinde* [In parents education] (pp.12–34). Ankara: Pegem Akademi.

Ekşi, A. (1990). *Çocuk genç ana babalar* [Children, young, parents]. İstanbul, Turkey: Bilgi Yayınları.

Eshleman, J. R., & Bulcroft, R. A. (2006). *The family*. ABD: Pearson Education Inc.

Fuertes, M., Beeghly, M., Santos, P. L., & Tronick, E. (2011). Predictors of infant positive, negative and self-direct coping during face to face still-face in a Portuguese preterm sample. *Análise Psicológica*, *4*, 553–565.

Fuertes, M., Lopes-dos-Santos, P., Beeghly, M., & Tronick, E. (2009). Infant coping and maternal interactive behavior predict attachment in a Portuguese sample of healthy preterm infants. *European Psychologist*, *14*, 320–331.

Guerra, N. G., Williamson, A. A., & Lucass-Molina, B. (2015). *Normal development: Infancy, childhood and adolescence*. Retrieved from http://iacapap.org/wp-content/uploads/A.2.-DEVELOPMENT-072012.pdf

Gunuc, S. (2015). Relationships and associations between video game and internet addictions: Is tolerance a symptom seen in all conditions. *Computer in Human Behavior*, *9*, 517–525.

Gunuc, S. (2017a). *Eğitimde teknoloji entegrasyonunun kuramsal temelleri* [Theoretical foundations of technology integration in education]. Ankara, Turkey: Anı yayıncılık.

Gunuc, S. (2017b). Peer influence in internet and digital game addicted adolescents: Is internet / digital game addiction contagious?*International Journal of High Risk Behaviors and Addiction*, *6*(2), 1–20.

Gunuc, S., & Atli, S. (2018). 18–24 aylık bebeklerde teknolojinin etkisine yönelik ebeveyn görüşleri [Parents' views on the impact of technology on 18 to 24-month old infants]. *Addicta: The Turkish Journal on Addictions*, *5*, 205–226. doi:10.15805/addicta.2017.4.2.0031

Gunuc, S., & Doğan, A. (2013). The relationships between Turkish adolescents' Internet addiction, their perceived social support and family activities, computers in human behavior. *Computers in Human Behavior*, *29*, 2197–2207.

Harms, T., & Clifford, R. M. (1989). *Family Day Care Ruling Scale*. New York, NY: Teachers College Press.

Harrison, P. L., & Boney, T. L. (2002). Best practices in the assessment of adaptive behavior. In A. Thomas, & J. Grimes (Eds.), *Best practices in school psychology IV*. Bethesda, MD: National Association of School Psychologists.

Harrison, P. L., & Oakland, T. (2015). *Adaptive behavior assessment* (3rd ed.). Torrance, CA: WPS.

Hart Research Associates. (1997). *Key findings from a nationwide survey among parents of zero-to three-year-olds* (Zero to three: National institute for infants, toddlers and families). Washington, DC: ZERO TO THREE and Peter D. Hart Research Associates.

Hart-Shegos, E. (1999). *Homelessness and its effects on children*. Retrieved from http://eric.ed.gov/?id = ED453321

Health and Human Services. (2013). *Teen media use part 1: Increasing on the move*. Retrieved from https://www.hhs.gov/ash/oah/adolescent-development/reproductive-health-and-teen-pregnancy/contraceptive-use/index.html

Holowitz, E. (2013). *The new face of adaptive learning*. https://www.edsurge.com/news/2013-02-19-the-new-face-of-adaptive-learning

Kandır, A., & Alpan, Y. (2008). Okul öncesi dönemde sosyal-duygusal gelişime anne-baba davranışlarının etkisi [The effects of parental behavior on the socio-emotional development in preschool]. *Sosyal Politika Çalışmaları* Dergisi/ Journal of Socıal Polıcy Studıes, *10*, 33–38.

Kanlıkılıçer, P. (2005). *Okul öncesi davranış* sorunları tarama ölçeği: geçerlilik / güvenilirlik çalışması [Preschool behavior questionnaire scale (PBQ): Validity and reliability study] (Unpublished master's thesis). Marmara University, Istanbul, Turkey.

Karayağız Muslu, G., & Bolışık, B. (2009). Çocuk ve gençlerde internet kullanımı [Internet usage among children and young people]. *TAF Preventive Medicine Bulletin*, *8*, 445–450.

Kaya, S. Ö., & Özkut, B. (2016). The influence of developing technology and mother's songs; lullabies. *International Journal of Human Sciences*, *13*, 778–786.

Kim, J., LaRose, R., & Peng, W. (2009). Loneliness as the cause and the effect of problematic Internet use: The relationship between Internet use and psychological well-being. *Cyberpsychology & Behavior*, *12*, 451–455.

Kırkıncıoğlu, M. (2003). *Çocuk beslenmesi* [Child feeding]. İstanbul, Turkey: YA-PA Yayınları.

Köksal Akyol, A. (2003). Anne-baba-çocuk ilişkisi [Parent-child relationship]. *Bilim Ve Akl*ın Aydınlığında Eğitim, *36*(14), 8–22.

Kowalski, R. M., & Limber, S. P. (2013). Psychological, physical, and academic correlates of cyberbullying and traditional bullying. *Journal of Adolescent Health*, *53*, 13–52.

Kraemer, K. L. (1991). *The information systems research challenge: Survey research methods* (Vol. 3). Boston, MA: Harvard University Press.

Kuss, D. J., & Griffiths, M. D. (2017). Social networking sites and addiction: Ten lessons learned. *International Journal of Environmental Research and Public Health*, *14*(3), Article 311.

Kuss, D. J., Harkin, L., Kanjo, E., & Billieux, J. (2018). Problematic smartphone use: Investigating contemporary experiences using a convergent design. *International Journal of Environmental Research and Public Health*, *15*(1), Article 142.

Larson, C. P. (2007). Poverty during pregnancy: Its effects on child health outcomes. *Pediatric Child Health*, *12*, 673–677.

Lazarus, R. S. (1999). *Stress and emotion: A new synthesis*. New York, NY: Springer.

Lenhart, A. (2015). *Teens, social media & technology overview*. Pew Research Center. https://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/

Lowe, F., & Lowe, B. (2015). *Bebeğinizin beyin eğitimi* [Brain training for your baby]. İstanbul, Turkey: Optimist Yayın.

Luckasson, R., Borthwick-Duffy, S., Buntix, W. H. E., Coulter, D. L., Craig, E. M., & Reeve, A. (2002). *Mental retardation: Definition, classification, and systems of supports*

(10th ed.). Washington, DC: American Association on Mental Retardation.

Ludlow, L. H., & Howard, E. (1990). The family map: A graphical representation of family systems theory. *Educational and Psychological Measurement*, *50*, 245–254.

Maccoby, E. (2002). Parenting effects: Issues and controversies. In J. G. Borkowski, L. S. Ramey, & M. Bristol-Power (Eds.), *Parenting and the child's world: Influences on academic, intellectual and social-emotional development* (pp. 35–46). Mahwah, NJ: Lawrence Erlbaum.

Madden-Derdich, D. A., & Leonard, A. S. (2000). Parental role identity and fathers' involvement in coparental interaction after divorce: Fathers' perspectives. *Family Relations*, *49*, 311–318.

Marotta, S. A. (2003). Integrative systemic approaches to attachment-related trauma. In P. Erdman, & T. Caffery (Eds.), *Attachment and family systems*: Conceptual, *empirical, and therapeutic relatedness* (pp. 225–240). New York, NY: Taylor & Francis.

Matas, L., Arend, R.A., & Sroufe, L.A. (1978). Continuity of Adaptation in the Second Year: The Relationship between Quality of Attachment and Later Competence. *Child Development*, 49: 547–556.

McGrew, K. S. (2012). *IAP applied psychometrics 101 brief report: What is the typical IQ and adaptive behavior correlation?* (Intelligent insights on intelligence theories and tests, Aka, Iq's Corner). Retrieved from http://www.iqscorner.com/2012/02/iap-applied-psychometrics-101-brief.html

Meltzoff, A. N. (2002). Imitation as a mechanism of social cognition: Origins of empathy, theory of mind, and the representation of action. In U. Goswami (Ed.), *Blackwell handbook of childhood cognitive development* (pp. 6–25). Hoboken, NJ: John Wiley & Sons.

Meltzoff, A. N. (2005). Imitation. In B. Hopkins (Ed.), *The Cambridge encyclopedia of child development* (p. 321). Cambridge, UK: Cambridge University Press.

Mervis, C. B., & Klein Tasman, B. P. (2000). Williams syndrome: Cognition, personality, and adaptive behavior. *Mental Retardation and Developmental Disabilities Research Reviews*, *6*, 148–158.

National Research Council. (2002). *Mental retardation: Determining eligibility for social security benefits* (Committee on Disability Determination for Mental Retardation, Division of Behavioral and Social Sciences and Education, D. J. Reschly, T. G. Meyers, & C. R. Hartel, Eds.). Washington, DC: National Academy Press.

Neary, M. (2002). *Curriculum studies in post-compulsory and adult education*. Cardiff, UK: Nelson Thornes.

Newman, L., Sivaratnam, C., & Komiti, A. (2015). Attachment and early brain development—Neuroprotective interventions in infant- caregiver therapy. *Translational Developmental Psychiatry, 3*, Article 28647. doi:10.3402/tdp.v3.28647

Oakley, L. (2004). *Cognitive Development*. New York, NY: Routledge.

Ofcom. (2014). *News consumption in the UK: Research report*. Retrieved from https://www.ofcom.org.uk/__data/assets/pdf_file/0029/69815/Ofcom-News-Report-2014-slides.pdf

Özeri, Z. N. (1994). Okul öncesi dönemde ahlak gelişimi ve eğitimi (annenin çocuk yetiştirme tutumlarının beş yaşçocuğunun adalet gelişimine etkisinin araştırılması) [Moral development and education in preschool period] (Unpublished master's thesis). Marmara University, Istanbul, Turkey.

Palacios, J., & Moreno, M. C. (1996). Parents' and adolescents' ideas on children: Origins and transmission of intracultural diversity. In S. Harkness, & C. M. Super (Eds.), *Parents' cultural belief systems: Their origins, expressions, and consequences* (pp. 254–269). New York, NY: Guilford Press.

Parfitt, Y., Pike, A., & Ayers, S. (2013). The impact of parents' mental health on parent-baby interaction: A prospective study. *Infant Behavior and Development*, *36*, 599–608. doi:10.1016/j.infbeh.2013.06.003

Park, C. J., & Hyun, J. (2014). Internet literacy vs. technology addiction: Relationship analysis with time perspectives of secondary school students. *Advanced Science and Technology Letters*, *59*, 23–26.

Parke, R. D. (2002). Fathers and families. In M. H. Bornstein (Ed.), Handbook of Parenting: Vol. 3. *Status and social conditions of parenting* (2nd ed., pp. 27–73). Mahwah, NJ: Lawrence Erlbaum.

Pies, R. (2009). Should DSM-V designate internet addiction a mental disorder? *Psychiatry*, *6*, 31–37.

Plowman, L. (2014). Researching young children's everyday uses of technology in the family home. *Interacting with Computers*, *27*, 136–146.

Radesky, J. S., Schumacher, J., & Zuckerman, B. (2015). Mobile and interactive media use by young children: The good, the bad, and the unknown. *Pediatrics*, *135*(1), 1–3. doi:10.1542/peds.2014-2251

Republıc of Turkey Ministry of National Education. (2013). *0–36 ay çocukları* için eğitim programı ile bütünleştirilmiş aile destek rehberi (EBADER) [Family support guide integrated with educational program for 0–36 month old children]. Ankara, Turkey: Yazar. Retreived from https://tegm.meb.gov.tr/dosya/okuloncesi/ooproram.pdf

Rezaeian, A., Niknejad Jalali, A., & Ashrafzadeh, F. (2013). An evidence based care package to improve motor skills of infants living in foster care according to integrative review approach. *Evidence Based Care Journal*, *3*, 73–87. doi: 10.22038/EBCJ.2013.1084

Rode, J. A. (2009). Digital parenting: Designing for children's safety. *Proceedings of British HCI*, *3*, 244–251.

Roos, H., Stein, N., Trabasso, T., Woody, E., & Ross, M. (2005). The quality of family relationships within and across generations: A social relation analysis. *International Journal of Behavioral Development*, *29*, 110–119.

Rothbaum, F., & Weisz, J. R. (1994). Parental caregiving and child externalizing behavior in nonclinical samples: A meta-analysis. *Psychological Bulletin*, *116*, 55–74.

Rubin, K. H., Burgess, K. B., Dwyer, K. M., & Hastings, P. D. (2003). Predicting preschoolers' externalizing behaviors from toddler temperament, conflict, and maternal negativity. *Developmental Psychology*, *39*, 164–176. doi: 10.1037/0012-1649.39.1.164

Sabatelli, R. M., & Bartle, S. (1995). Survey approaches to the assessment of family functioning: Conceptual, operational, and analytical issues. *Journal of Marriage and Family*, *52*, 1025–1039.

Sands, R., Goldberg-Glen, G. S., & Shin, H. (2009). The voices of grand children of grandparent caregivers: A strengths-resilience perspective. *Child Welfare*, *88*, 25–45.

Scarr, S. (1996). How people make their own environments: Implications for parents and policy makers. *Psychology, Public Policy, and Law*, *2*, 204–228.

Scattone, D., Raggio, D. J., & May, W. (2011). Comparison of the Vineland Adaptive Behaviour Scales, second edition, and The Bayley Scales of infant and toddler development, third edition. *Psychological Reports*, *109*, 626–634.

Schalock, R. L. (2000). Three decades of quality of life. *Focus on Autism and Other Developmental Disabilities*, *15*, 116–127.

Schatz, J., & Hamdan Allen, G. (1995). Effect of age IQ on behavior for children with autism. *Journal of Autism and Developmental Disorders*, *25*, 51–60.

Senemoğlu, N. (2012). *Gelişim Öğrenme ve Öğretim* [Development learning and teaching]. Ankara, Turkey: Pegem Akademi Yayıncılık.

Shelov, S. P., & Altman, T. R. (2015). *Bebek ve küçük çocuk bak*ımı 0–5 Yaş [Infant and small child care 0–5 years old]. Ankara, Turkey: IMGE Kitapevi.

Sparrow, S., Balla, D., & Cicchetti, D. (1984). *Vineland Adaptive Behavior Scales* (Interview ed., Survey form). Circle Pines, MN: American Guidance Service.

Stern, D. N. (2012). *Bebeğin kişilerarası* dünyası: Psikanaliz ve gelişimsel psikolojiden bir bakış [The interpersonal world of the infant: A view from psychoanalysis and developmental psychology]. İstanbul, Turkey: Psikoterapi Enstitüsü Eğitim Yayınları72.

Strasburger, V. C. Jordan, A. B., & Donnerstein, E. D (2010). Health effects of media on children and adolescents. *Pediatrics*, *125*(4).

Tassé, M. J., Schalock, R. L., Balboni, G., Bersani, H., Borthwick-Duffy, A. Ş., Spreat, S., & . . .Zhang, D. (2012). The construct of adaptive behavior: Its conceptualization, measurement, and use in the field of intellectual disability. *American Journal on Intellectual and Developmental Disabilities*, *117*, 291–303.

Tercan, H., & Dursun, S. Ş. (2015). *Bebeklik ve ilk çocukluk dönemi tipik (normal) gelişim gösteren çocukla*rın gelişimsel özellikleri [Developmental characteristics of children with typical (normal) development in infancy and first childhood]. Ankara, Turkey: Eğiten Kitap.

Thompson, J. R., McGrew, K. S., & Bruininks, R. H. (1999). Adaptive and maladaptive behavior: Functional and structural characteristics. In R. L. Schalock (Ed.), *Adaptive behaviour and its measurement*: Implications *for the field of mental retardation* (pp. 15–42). Washington, DC: American Association on Mental Retardation.

Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.

Trawick-Smith, J. (2013). *Erken çocukluk döneminde gelişim* [Early childhood development]. Ankara, Turkey: Nobel Akademik Yayıncılık.

Trehub, S. E. (2001). Musical predispositions in infancy. *Annals of the New York Academy of Sciences*, *930*, 1–16.

Wartella, E., Vandewater, E., & Rideout, V. (2005). Introduction: Electronic media use in the lives of infants, toddlers, and pre-schoolers. *American Behavioral Scientist*, *48*, 501–504. doi:10.1177/0002764204271511

White, F., Livesey, D., & Hayes, B. (2012). *Developmental psychology: From infancy to development*. Frenchs Forest, New South Wales: Pearson Australia.

Widaman, K. F, & McGrev, K. S. (1996). The structure of adaptive behavior. In J.W. Jacobson & J.S. Mulick (Eds). *In manual of diagnosis and professional practice in mental retardation* (pp. 97–110). Washington: American Psychological Association.

Williams, P. D., & Soetjiningsih Williams, A. R. (2000). Balinese mothers' developmental timetables for young children. *Western Journal of Nursing Research*, *22*, 717–735.

Witt, J. C., & Martens, B. K. (1984). Adaptive behavior: Tests and assessment issues. *School Psychology Review*, *13*, 478–484.

Wolf, M., Risley, T., & Mess, H. (1964). Application of operant conditioning procedures to the behaviour problems of an autistic child. *Behaviour Research and Therapy*, *1*, 305–312.

Zhao, X., Zhang, Q., Shan, Y., Zhang, H., & Guo, L. (2002). A study on the influence factors for social adaptive behavior of children. *Hua Xi Yi Ke Da Xue Xue Bao*, 33(2): 259–261.

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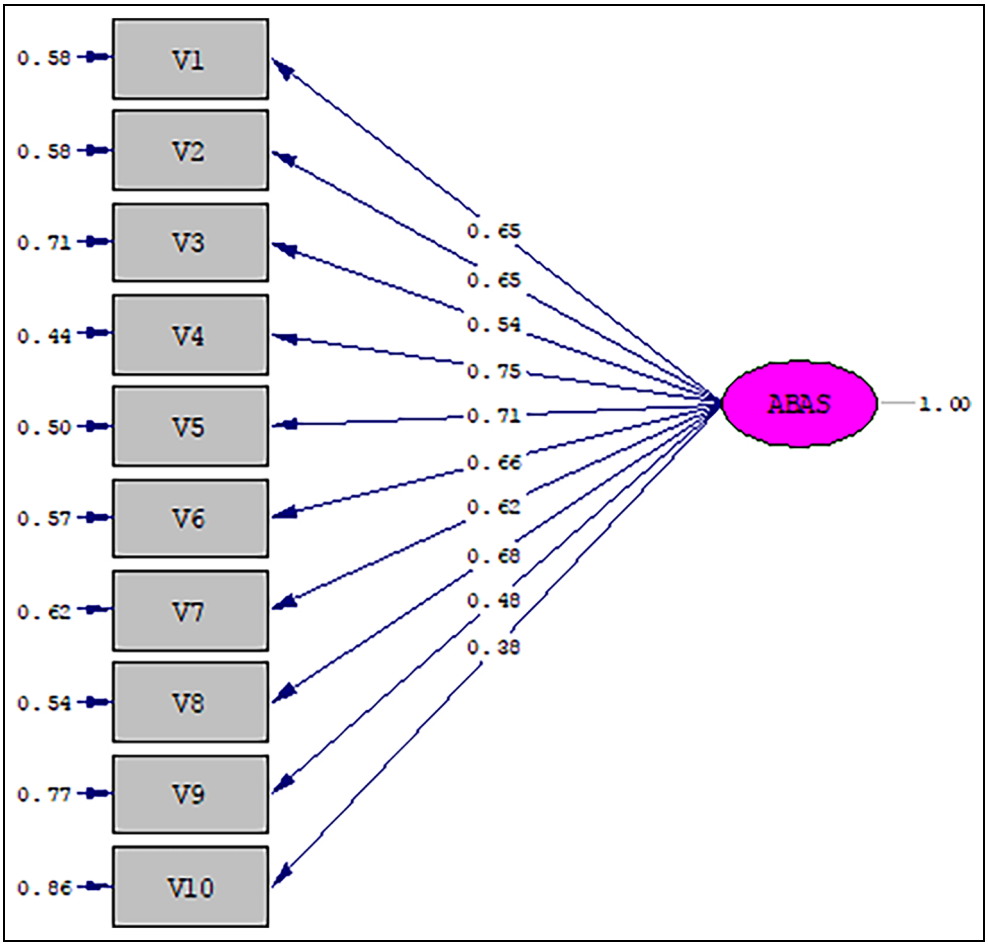
Appendix 1. Adaptive behaviors dimensions, descriptions, and examples.

Communication	Speech, language and listening skill needed for communication with other people (e.g. 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 behaviors in the community (e.g. 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 (e.g. 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 (e.g. 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 (e.g. 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 (e.g. 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 (e.g. 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 (e.g. 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 (e.g. 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 (e.g. basic skills such as sitting, standing, and walking). For example: "*Runs without falling*"



Appendix 2. Standardized path diagram.