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A Comparison of Mother-Child Interactions in Children with Visual Impairments and Typically Developing Children *

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Abstract

The purpose of this study was to compare the mother-child interactions of children with severe visual impairments (SVI), children with low vision (LV), and typically developing children (TD) with their mothers. Children with SVI (n = 20), children with LV (n = 11), and TD children (n = 20) whose ages were between 3 and 6 and their mothers were participated in the study. Mothers child interactions of the participants were video recorded and their interactions were analyzed using Maternal Behavior Rating Scale Turkish Form (MBRS) and Child Behavior Rating Scale Turkish Form (CBRS). Study findings showed that children with SVI had significantly higher scores than TD children in all subscales and items of the CBRS. The mothers of TD children had statistically significant differences in all subscales of the MBRS compared to mothers and children with LV and children with SVI. Findings of the study were discussed within the lights of the current literature conducted in the area of mother child interactions of children with SVI, children with LV, and TD children during early childhood period and suggestions for future research were provided.

Keywords

Children with severe visual impairments

Children with low vision

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Introduction

The mother-child interaction is the observable state of the relationship between a mother and her child (Pridham Lutz, Anderson, Riesch, & Becker, 2010). Pridham et al., (2010) emphasized that mother-child interaction includes all aspects of a relationship between a mother and her child, the behaviors made to attract each others' attention and the reactions given to these behaviors (2010). Some researchers emphasized that mother-child interaction is not unidirectional, and that this process is shaped as a result of the reciprocal interactions influencing each other's behavior (Barnard, 1997; Howe, 2006; Ceber Bakkaloğlu & Sucuoğlu, 2000). Overall, Mahoney and Wheedan (1999) emphasized that the interaction is a personal and reciprocal experience that each mother-child pair experience differently. The responsive and directive parenting interaction style is a significant factor that determines the quality of the reciprocal interactions in mother-child interaction. Being responsive can be defined as mothers' evaluation of the behavioral cues exhibited by their children and responding appropriately to these cues (Mahoney & Perales, 2005), whereas directiveness is the qualitative and quantitative levels

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of physical and verbal helps provided to guide the child to an activity during mother child interactions (Behl & Akers, 1996).

In several studies, researchers found that mothers of typically developing (TD) children mostly used verbal communication to initiate interactions with their children (Behl, Akers, Boyce, & Taylor, 1995). Van Ijzendoorn, Dijkstra, and Bus (1995) showed that during the mother-child interactions with TD children, children's personality traits, social skills, language and communication skills, as well as the mothers' responsive interactional styles were linked to each other. Furthermore, studies reported that children with special needs display less interactional behaviors compared to TD children, and consequently, these diferences were observed in mother-child interactions as well (Bailey et al., 1998). Comparisons of mother-child interaction styles suggest that mothers' responsive interactional style supports the overall development of children with special needs (Mahoney & Perales, 2005). More recent studies have reported that the mothers of children with special needs exhibited more directive interaction behaviors (Ceyhun, Özdemir, Töret, & Özkubat, 2015; Doğan et al., 2016; Mahoney, Boyce, Fewell, Announcer, & Wheedan, 1998; Mahoney & Powell, 1988; Oğuz & Sönmez, 2018; Töret, Özdemir, & Özkubat, 2015). Mahoney and Powell (1988) have investigated mother-child interactions of children with special needs and how their interactional styles differ from mother-child interactions of TD children and their mothers. Researchers showed that the parental behaviors were more directive and less responsive in mothers and children with special needs dyads. Mahoney, Kim, and Lin (2007) examined the quality of the interactions between children with special needs and their parents and found that the developmental improvements observed for these children were more substantial due to increased responsiveness in parent-child interactions.

There are a limited number of studies conducted on parent-child interactions of children with visual impairments and their mothers in Turkey. One of the few studies, Kesiktaş (2012) studied the interactions between children with visual impairments and their mothers and reported that mothers' awareness of their children's developmental characteristics and interactional behaviors increased as a results of the intervention that the researcher provided, and the development of mothers' interactional skills positively affected the development of children with visual impairments. In Turkey, there are limited number of parent-child interaction studies conducted with parents and children with special needs. For example, Gürel Selimoğlu and Özdemir (2018) reported that when the responsiveness of mothers were increased through an early intervention study, so did the developmental improvements were observed in children with autism spectrum disorders (ASD) as well. Gürel Selimoğlu and Özdemir suggested that the development of existing skills of mothers of children with ASD, enhanced the development of children with ASD as did Kesiktaş. Furthermore, researchers reported that the positive gains in children's development resulted with the increased levels of maternal satisfaction (Gürel Selimoğlu & Özdemir, 2018).

Literature showed that severe visual impairments (SVI) have been one of the significant variables affecting the quality of the mother-child interactions (Chen, 1999). In fact, it is noteworthy that due to the recognition of the significant effects of the sense of vision on mother-child interactions, the studies that emphasize the sense of vision have been increasing in the international scholarly publications (Chen, 1999). Visual impairments may cause a mother-child pair to fail to interpret the reciprocal interactional clues they display, and may lead both mothers and children to display limitations in mutual interactions (Fazzi, Signorini, Bova, Ondei, & Bianchi, 2005). Children with SVI gain verbal language in similar ways to their peers, but due to their visual impairments, they have limitations in their ability to direct their attention to visual stimuli (Kirk, Gallagher, & Anastasiow, 2000). Recchia (1998) examined how children with SVI associate social referencing with their mother's behaviors in addressing situations in which they met people for the first time. Researcher reported that mothers' responsiveness skills and children's social referencing behavior were directly related to each other.

Vasta, Haith, and Miller (1992) showed that the interactions between mothers and children with SVI may differ from mothers and children with TD. Studies have shown that as opposed to children

with TD, children with SVI turn their ears to the people that they pay attention during daily interactions and since this might be misinterpreted by people as a signal of being uninterested, mutual interactions might be negatively affected from the body language of children with visual impairments (Ferrell, 1996; Fazzi, 2002). These researchers also found that mothers of children with SVI had difficulty reading the interactional signals of their children due to the children's visual impairments. However, McAllister and Gray (2007) posited that children with SVI experience limitations in their body movements due to lack of visual attention, and therefore, they may need more support from their parents. Uyar (2016) also reported that children with multiple disabilities with visual impairments in Turkey used different types of gestures with different functions, and the styles and frequency of these gestures differed among mothers and children who participated in the study. At the end of the study, Uyar suggested that there may be a relationship between using communicational gestures, and the quality of the interactions among four parent-child pairs participated in the study.

Some researchers reported in the literature that mothers of children with SVI displayed difficulties in noticing the interactional signals of their children with SVI and were less responsive (interactive), and more directive (Baird, Mayfield, & Baker, 1997) in their interactional styles. Behl et al. (1995) compared the interactional styles of the mothers of children with SVI and the mothers of TD children. While matching participating children chronologically and developmentally, the researchers revealed that mothers of children with SVI helped their children more in general and used more controlling strategies during their interactions and also emphasized that the mothers of TD children mostly used verbal reprimands to initiate interactions with their children. In their longitudinal study, Kekelis and Andersen (1984) examined the language inputs directed by parents to two children with SVI who were between 16 to 33 months old and factors supporting the language development in children with SVI. The researchers suggested that the parents of the children with SVI in general provided high levels of language input to their children, but used very little descriptive words. In another study, Moore and McConachie (1994) examined language inputs provided to children with SVI aged between 16 to 18 months and found that the parents of children with SVI displayed less descriptive sentences but more directive behaviors.

Kekelis and Andersen (1984) compared the language inputs directed to children with SVI and TD children between the ages of 16 and 22 months, and researchers indicated that the parents of children with SVI initiated interactions more often than the parents of TD children. With particular emphasis on the directiveness of the parents of children with SVI, Behl and Akers (1996) examined the interactions of mothers and children with SVI, and children with mild developmental disabilities, and found that mothers of children with SVI were more directive than mothers of children with mild developmental disabilities. In addition, Perez Pereira and Conti Ramsden (1999) stated that instead of using gazes and well-known gestures such as showing and pointing objects, the mothers of children with visual impairments tried to communicate with their children using their body movements to initiate joint attention. On the other hand, when the interactional behaviors of children with visual impairments and TD children and their mothers were examined; mothers of children with visual impairments were more helpful to their children and used more controlling strategies than mothers of TD children. The findings of this study indicated that mothers play a dominant role during early interactions with their children with visual impairments, and mothers of children with visual impairments develop different strategies to interact with their children and use these strategies when trying to communicate with their children at an early age (Hughes, Dote Kwan, & Dolendo, 1999). Similarly, Preisler (1991) found that when babies with SVI have been approached by their mothers, those babies react with increasing hand, body or lip movements, as well as behaviors such as making sounds and laughing.

Directiveness of the parents during play interactions has been explored in prior studies by Troster and Brambring (1994), and play behaviors of 4-72 month-old infants and young children with SVI were compared to those TD peers, reporting that parents of children with SVI displayed more

directive interactional behaviors towards their children than the parents of TD children during play and had more physical interactions, which could be attributed to the children's visual impairments. On the other hand, Kekelis and Prinz (1996) found no evidence that mothers of children with SVI used more directions than the mothers of TD children while examining the verbal interactions of mothers and TD children and mothers and children with SVI. Baird et al. (1997) reported that children with SVI and their mothers were less physically active and responsive than mothers and TD children pairs. Perez Pereira and Conti Ramsden (1999) examined the interactional behaviors of mothers and their TD children, children with SVI and LV (low vision) and reported that there was no difference between the behaviors of mothers of children with SVI and mothers of children with LV (low vision) during their interactions with their children in regard to the directiveness of their interactional behaviors. In another study Perez Pereira and Conti Ramsden (2001) examined the frequency and types of directive behaviors of mothers of children with SVI and mothers of TD children two years later. The researchers found that both mothers of children with SVI and mothers of children with LV used more directions than those of mothers of TD children

Researchers showed that specific child behaviors that motivate mothers during mother-child interactions are the behaviors including eye contact, facial expressions, and gestures such as pointing that children display mostly using their vision (Turner, 2000). Literature shows that the mothers of children with visual impairments expect their children to behave in a way just as typically developing children (Loots, Devise, & Sermijn, 2003). But when children with visual impairments behave differently, their mothers may experience disappointment (Loots et al., 2003). Thus, studies in general suggest that mothers of children with SVI exhibit more directive behaviors towards their children (Hughes et al., 1999). There is an increasing empirical evidence which supports that responsive parental interaction styles leads to positive developmental outcomes in children with special needs (Mahoney, 2008; Mahoney & Perales, 2005; Gürel Selimoğlu & Özdemir, 2018). There are no studies conducted to examine responsive interactional styles of mothers of children with visual impairments in Turkey, although the interactions between mothers and children with SVI and those with TD children has been examined in many studies. In addition, the studies conducted in the broader international literature have compared the interactions between mothers and children with visual impairments and TD children, but there are no studies examining the effects of visual loss degree with children with LV, SVI, and TD. In addition, when children's visual impairments levels have been controlled, an analysis of the mother child interactions in children with visual impairments and their mothers will yield better knowledge on the potential risks due to lack of learning experiences. Therefore, this study compared the mother child interactions in children with visual impairments and their mothers and typically developing children and their mothers. Thus, interactional styles of mothers and children with low vision (LV), children with SVI and typically developing children (TD) were examined in the study.

1. Do the Child Behavior Rating Scale (CBRS) interaction scores of children with SVI, LV and TD differ from each other in the context of mother-child interactions?

2. Do Maternal Behavior Rating Scale (MBRS) interaction scores of mothers of children with SVI, LV, and TD differ from each other in the context of the parent-child interactions?

3. Do the interactional behaviors of mothers of children with SVI, LV, and TD predict their children's interaction behaviors in the context of parent-child interaction?

Method

Participants

In this study, the interactional styles of mothers and their children with SVI, LV, and TD children were examined using a comparative descriptive research model and a total of 51 mothers and children were participated in the study. Participating groups were: 20 TD children and their mothers, 11 children with LV and their mothers, and 20 children with SVI and their mothers between the ages of 2-6 years. All participating children with visual impairments (VI) attended to Special Education and Rehabilitation Centers in the city of Bursa and Special Education and Rehabilitation Centers and Counseling and Research Centers (RAM) and Schools for the Blind Children in Ankara. The families of TD children in the study were the ones who returned the study calls made from Gazi University, Learning Development Education Research Center (OGEM) and social media calls. The inclusion criteria for all children included: 1. child between 2-6 years of age, 2. child has no developmental disabilities, and 3. child able to stay in play for at least 5 minutes with the caregivers. In addition, two additional study participation criteria required for children with visual impairments were: 4. child has a documented visual impairments diagnosed by a clinician from a university or government hospital, and 5. child has no additional disability. Participation in the study was completely voluntary for all mothers who joined the study. The characteristics of the participants were shown in Table 1.

Table 1. Characteristics of the Participating Children

	TD Children (n=20)		**LV Children (n=11)**		**SVI Children (n=20)**	
	f	**%**	**f**	**%**	**f**	**%**
Gender						
• Female	10	50	4	36.4	9	45
• Male	10	50	7	63.6	11	55
School Attendance						
• Day-care	11	55	3	27.3	12	60
• Pre-school	9	45	6	54.5	8	40
• Primary school	-	-	2	18.2	-	-
Ages						
• 2 and 4	9	45	2	18.2	8	40
• 5 and 6	11	55	9	81.8	15	60

TD: Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

The participants included children with SVI group, 9 girls and 11 boys; children with LV group, 4 girls and 7 boys; TD children group, 10 girls and 10 boys. Table 2 provides the characteristics of the mothers attended in the study.

Table 2. Characteristics of the Participating Mothers

	TD Children Mothers (n=20)		**LV Children Mothers (n=11)**		**SVI Children Mothers (n=20)**	
	f	**%**	**f**	**%**	**f**	**%**
Mothers' Educational Status						
• Primary Education	4	20	7	63.6	11	55
• High School	8	40	4	36.4	7	35
• University	8	40	-	-	2	10

Table 2. Continued

	TD Children Mothers (n=20)		LV Children Mothers (n=11)		SVI Children Mothers (n=20)	
	f	**%**	**f**	**%**	**f**	**%**
Mothers' Job Status						
• Housewife	13	65	11	100	17	85
• Working Mother	7	35	-	-	3	15

TD: Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

From the 20 mothers in the SVI group, 11 mothers had primary school degree; 7 of them had high school degree and 2 of them received university degree, whereas from the 11 mothers in the LV group, 7 had primary school degree, and 4 of them had high school degree. As for the mothers of TD children, 4 had primary school degree, 8 had high school degree, whereas 8 of them had university degree.

Data Collection Tools

Maternal Behavior Rating Scale Turkish Form (MBRS-TV) and Child Behavior Rating Scale Turkish Form (CBRS-TV) were used to collect data.

Maternal Behavior Rating Scale (MBRS): Maternal Behavior Rating Scale (MBRS) is a scale developed by Mahoney (2008) and it has been used for assessing the interactional behaviors of mothers of children with special needs. The scale consists of a total of 12 items with 3 sub-scales, responsiveness, affect, and directiveness (Diken, Topbaş, & Diken, 2009). The internal and construct validity of the Turkish Form was investigated, and item analyses were also conducted. The internal validity was verified by the experts as the translated scale were used in other studies. The construct validity was analyzed by using exploratory factor analysis and the scale was finalized. When the results of the MBRS-TV item analyses were examined, it was seen that for all items in the sub-factors, item-total correlations ranged between .37 and .86; and t-test results were significant ($p < .001$). Each item on the scale was evaluated using a 5-point Likert-type rating scale ranging from 1 to 5 (1 = low, 5 = high). The video recordings of the mother-child interactions used in the scoring were encoded by two different coders. A score of 1 to 5 indicates that the quality of interactions is high for the items in the scale, whereas 3 points for the items of "being achievement-oriented, directiveness and interaction pase" in the MBRS-TV emphasize that the quality is high. During the data collection procedure, mothers were instructed as "Play the same way, as you play with your child." using developmentally appropriate toys for the children, and mother child pairs were video recorded for 15 minutes. The internal reliability coefficients of the sub-scales were investigated using Cronbach's Alpha and the coefficients were .86, .87, .70 respectively (Diken et al., 2009).

Child Behavior Rating Scale-(CBRS): The Child Behavior Rating Scale (CBRS) has been developed by Mahoney and Wheedan (1999) and used to assess the interactional behaviors of children. The scale consists of seven items and 2 two sub-scales, attention and initiation (Diken et al., 2009). The internal and construct validity was examined, and item analyses were also performed. The internal validity was verified by the experts as the translated scales were used in other studies. The construct validity was analyzed by using exploratory factor analysis and the scale was finalized. When the results of the CBRS-TV item analyses were examined, it was seen that for all items in the sub-scales, item-total correlations ranged between .52 and .89; and the item-total correlations were higher than expected. When the results of the CBRS-TV items were analyzed, t-test results were significant ($p < .001$). Each item on the scale was evaluated using a 5-point Likert-type rating scale ranging from 1 to 5 (1 = low, 5 = high). The video recordings of the mother-child interactions used in the scoring of the scale were encoded by two different coders. For most items in the scale, a score of 1 to 5 indicates that the quality of interactions is high. During the data collection procedure, mothers were instructed as "Play the same way as you

play with your child." using developmentally appropriate toys for the children, and mother-child pairs were video recorded for 15 minutes. The internal reliability coefficients of the sub-scales were evaluated using Cronbach's Alpha and the coefficients were found to be .79 and .91 (Diken et al., 2009).

Data Collection

For the data collection of the study, we recorded 15-minutes videos for the interactional behaviors of the participating mothers with their children in their natural free play environments, homes or special education centers and/or special education schools. As appropriate to some mothers' requests, video recordings were taken in their homes. For mothers who did not prefer their homes, an environment close to at home environment was created within the educational institution where the child regularly attend (the room was quiet, carpeted, and a good lighting were provided for the video recordings). The toys used in the free play sessions were kept on the carpeted floor. A video camera was placed in the room and the recordings started before a mother began to play with her child. A total of 51 play sessions were recorded in order to watch and code the interactions between the participating children and their mothers. During the mother-child interactions, video recordings were taken by the first researcher for a 15 minutes period without intervening the play of a mother and child pair. The researchers paid attention to any variables (such as noise etc.,) that may distract the participants' attention and overall play quality.

In this study a predetermined standard set of toys was used for all study groups. Play literature were referenced in the selection of developmentally appropriate toys (Lifter, Ellis, Cannon, & Anderson, 2005; Frey & Kaiser (2011). The toys in the toy set were based on the play tools used in developmentally appropriate play literature. Selected toys included: Picture books, kitchen play toys (including plastic cups, plates, a teapot, and spoons), a comb, a mirror, a toy doll, a cradle, a ball, a set of cars, three pieces train set, 9 pieces jigsaw, a livestock, a telephone, and an intercom. The toy set was selected based on the children's age, developmental levels and their interactional levels. The first researcher went to the study room, set the room for study procedure on the specified days, and hours, and reviewed the environmental factors that may affect the study and prepared the toy set on the floor. A single session was held for each child and mother-child pair who participated in the study. During the data collection procedure, the researcher did not intervene in mother-child play in any way. Before the video recordings, mothers were instructed to play the same way as they play with their child at home.

Data Coding and Inter-observer Reliability

In order to code the research data and ensure inter-encoder reliability, the video recordings were coded by two independent coders using the two measurement instruments, the MBRS and the CBRS. In order to code the study data and verify the reliability between the coders, the video recordings have been coded by using the Turkish versions of the MBRS and the CBRS by the two graduate level coders. After providing at least 80% of confidence level between the coders in the MBRS and in the CBRS training, the first researcher and the other coder watched the video recordings and scored in the same scale. The first coder began encoding the entire recordings when 80% of the codes were cooperated. The second coder encoded 25% of the randomly selected records. Inter-observer reliability between the coders was calculated using a *Consensus/Consensus + Diconsensus x 100* formula (Iftar Tekin & Iftar Kırcaali, 2006). Results showed that the reliability between the coders for the MBRS was 96% and 91% for the CBRS as well. Study data was coded using the CBRS-the MBRS scales. The children's interactional behaviors were coded using the CBRS whereas the mothers' interactional behaviors were coded using the MBRS.

The analysis was performed after all data obtained in the study was coded. Cronbach's alpha was used to determine the reliability of the CBRS and the MBRS instruments. Accordingly, the reliability of each sub-scale of the MBRS tool was 0.85, 0.79, 0.61 and the reliability of each subtitle of the CBRS tool was 0.92, 0.84, respectively.

Data Analysis

The aim of this study was to investigate the relationship between the interactional styles of Turkish mothers and their children with SVI, children with LV, and TD children. The study data was assessed using statistical analysis procedures. Non-parametric tests were used to investigate the separate problems that the study posits since the number of people in the sample was less than 20 and normal distribution was unlikely to be observed. In addition, the effect size (η2) was calculated to reveal the statistical significances across the groups. The effect size is 0.2 interpreted as having a small, medium and wide effect per the values of 0.5 and 0.8 (Green, Salkind, & Akey, 1997). The α value was 0.05 in all statistical analyzes. To investigate the first and the second research questions, frequency analysis was utilized to assess the developmental status, and a Kruskal Wallis test was used to compare the differences among the study groups. To investigate the third research question, the children with SVI, children with LV, and TD children were each considered as a separate group, and in each group according to some demographic variables such as gender and age of the child, and the mother's education level, and the differentiation in the interaction styles of the mothers, and children were investigated. In order to that, an ANOVA, a Mann Whitney U test, and a Kruskal Wallis tests were used. The ANOVA test results displayed that the scores in the sub-scales of the MBRS and the CBRS did not show that children in all three groups (children with SVI, LV, and TD children) distributed normally. In addition, the children were divided into two groups in regard to their gender, and age groups ranging from 3-4 and 5-6. For the third study question, the predictive effects of the mothers' interactional behaviors on the child's initiation of the interactions, and the child's attention was examined using a multiple linear regression analysis.

Results

Interactional Styles of the Mothers of Children with SVI, children with LV and TD Children in the CBRS

The differentiation status of the mothers of children with SVI, children with LV, and TD children, and their scores in the CBRS were examined. Based on the CBRS results, the children's scores and differentiation status were analyzed using the ANOVA (One Way Analysis of Variance) and the Kruskal Wallis tests. As a result of the analysis made by the Shapiro-Wilk normality test, attention and initiation subscales did not show significant differences in any group (SVI, LV, and TD), i.e. normal distribution ($p > 0.05$). Therefore, the ANOVA was used in the attention and initiation subscales and the Kruskal Wallis test was used in others. Table 3 displays the arithmetic means and standard deviations of the scores of the children in each group for each item in the sub-scales.

Tablo 3. Descriptive Statistics of the Children in the CBRS Sub-scales Based on the Study Groups

Visual Level CBRS-TV	**TD Children (n=20)**		**LV Children (n=11)**		**SVI Children (n=20)**	
	x̄	**SD**	**x̄**	**SD**	**x̄**	**SD**
Attention to activity	3.85	0.67	3.64	0.81	2.35	0.88
Persistence	3.65	0.88	3.73	0.90	2.50	1.00
Involvement	3.60	0.68	3.36	0.50	2.20	1.00
Cooperation	3.95	0.83	4.09	0.70	2.80	1.20
Attention	3.76	0.56	3.70	0.59	2.46	0.93
Initiate activities	3.45	0.83	3.09	0.94	1.95	0.83
Joint Attention	3.90	1.07	3.64	0.92	1.95	0.94
Affect	3.55	0.89	3.45	0.69	2.40	1.05
Initiation	3.63	0.67	3.39	0.70	2.10	0.81

* $p<0.05$ **TD:** Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

Concerning the attention subscale, the TD children had the highest means in the cooperation item ($\bar{x}$=3.95), and the lowest in the involvement item ($\bar{x}$=3.60) (Table 3). The children with LV had the highest average in the cooperation item ($\bar{x}$=4.09) and the lowest average in the involvement item ($\bar{x}$=3.36). The average for the children with SVI was the highest in the cooperation item ($\bar{x}$=2.80) and the least in the involvement item ($\bar{x}$=2.20). In the initiation subscale, the average of the TD children was the highest in the joint attention item ($\bar{x}$=3.90) and the least in the initiate activities item ($\bar{x}$=3.45). The average of children with LV was the highest in the joint attention item ($\bar{x}$=3.64) and the lowest in the initiate activities item ($\bar{x}$=3.09). While the average of the children with SVI was the highest in the affect item ($\bar{x}$=2.40), it was equal and the least in the initiate activities and joint attention items ($\bar{x}$=1.95). Table 4 presents the ANOVA results which determine whether there is a significant difference among the groups in terms of the factors and item averages of the CBRS instruments.

Table 4. ANOVA Test Results on the CBRS Based on the Study Groups

	Source of Variance	**SS**	**df**	**MS**	**F**	**p.**	**η^2**	**Significant Difference**
Attention	Between groups	19.924	2	9.962	18.519	.000*	.44	SVI<TD
	Within groups	25.821	48	.538				SVI<LV
	Total	45.745	50					
Initiation	Between groups	25.910	2	12.955	23.954	.000*	.50	SVI<TD
	Within groups	25.960	48	.541				SVI<LV
	Total	51.869	50					

* p<0.05 **TD:** Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

According to the ANOVA test results in Table 4, there was a statistically significant difference between the mean scores in the attention subscale of the CBRS instrument for the TD children, children with SVI, and children with LV (F (2-48) = 18.52; p = .00). According to the Tukey multiple comparison test, this difference was found to be between children with SVI and both children with LV, and TD children (p <0.05). In the initiation subscale, there was a statistically significant difference between the mean scores of children with SVI, and the mean scores of children with LV, and TD children (F (2-48) = 23.95; p = .00). The Tukey multiple comparison test suggests the lower scores of children with SVI led to this difference (p <0.05).

Kruskal Wallis test was used to examine the differences between the items in the attention and initiation subscales for the students in each group (Table 5). Since the scores of at least one group did not show a normal distribution, the Kruskal Wallis test, the nonparametric equivalent of the ANOVA, was used to analyze these items. The source of the difference was examined by applying the Bonferroni corrections to the Mann Whitney U-test.

Table 5. Results of Kruskal Wallis Test in the CBRS Based on the Study Groups

	Vision Levels	**n**	**$\bar{x}$ rank**	**df**	**χ^2**	**p**	**η^2**	**Significant Difference**
Attention	TD	20	34.63	2	22.856	.000*	.46	SVI<TD
	LV	11	31.73					SVI<LV
	SVI	20	14.23					
Persistence	TD	20	31.85	2	14.423	.001*	.29	SVI<TD
	LV	11	32.45					SVI<LV
	SVI	20	16.60					
Involvement	TD	20	34.05	2	19.490	.000*	.39	SVI<TD
	LV	11	30.73					SVI<LV
	SVI	20	15.35					

Table 5. Continued

	Vision Levels	n	$\bar{x}_{rank}$	df	χ^2	p	η^2	Significant Difference
Cooperation	TD	20	31.08	2	13.199	.001*	.26	SVI<TD
	LV	11	33.00					SVI<LV
	SVI	20	17.08					
Initiation	TD	20	34.98	2	21.309	.000*	.43	SVI<TD
	LV	11	29.77					SVI<LV
	SVI	20	14.95					
Joint Attention	TD	20	34.80	2	23.495	.000*	.47	SVI<TD
	LV	11	32.18					SVI<LV
	SVI	20	13.80					
Affect	TD	20	32.78	2	14.719	.001*	.29	SVI<TD
	LV	11	30.59					SVI<LV
	SVI	20	16.70					

* p<0.05 **TD:** Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

Table 5 displays the results indicating significant differences among the groups in the attention and initiation subscales. These differences appear to be observed due to the lower scores of children with SVI ($p < 0.05$).

Interactional Styles of Mothers of Children with SVI, children with LV and TD Children in the MBRS

The interactional levels of the mothers and their children with SVI, children with LV, and TD children in the MBRS-TV test were investigated. In this respect, the MBRS scores of the mothers were used and the differences in scores were analyzed using the ANOVA and the Kruskal Wallis test. The Shapiro-Wilk normality test indicated that there was no significant differences in sensitivity-responsivity item for each group (SVI, LV and TD), for example, the results showed a normal distribution ($p > 0.05$). Therefore, the ANOVA was used for the sensitivity-responsivity factor and the Kruskal Wallis test was used for other factors and items. Table 6 shows the arithmetic means and standard deviations of the scores of the mothers in each group.

Table 6. Descriptive Statistics of the MBRS-TV Sub-scales Based on the Study Groups

Development Status MBRS-TV	TD children mothers (n=20)		LV children mothers (n=11)		SVI children mothers (n=20)		
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	η^2
Sensitivity	3.95	0.83	3.18	1.33	3.75	0.85	.07
Responsivity	3.65	0.59	2.82	0.87	3.15	0.67	.18
Effectiveness	3.60	0.68	2.91	1.04	3.05	0.60	.16
Inventiveness	2.85	0.81	2.55	1.04	2.55	0.60	.04
Responsiveness	3.51	0.60	2.86	0.98	3.12	0.48	.14
Acceptance	3.10	0.72	2.91	0.54	2.90	0.55	.04
Enjoyment	3.20	0.62	2.91	0.54	3.05	0.51	.04
Expressiveness	1.95	0.76	1.73	0.65	2.05	0.60	.03
Warmth	2.75	1.07	1.91	0.94	2.85	0.99	.12
Praise	3.55	0.60	2.82	0.60	3.30	0.57	.20
Affect	2.91	0.61	2.45	0.54	2.83	0.41	.11

Table 6. Continued

Development Status MBRS-TV	TD children mothers (n=20)		LV children mothers (n=11)		SVI children mothers (n=20)		
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	η^2
Achievement	3.20	0.70	2.64	1.12	3.30	0.86	.09
Directiveness	3.35	0.67	3.36	0.81	3.95	0.69	.15
Pace	2.80	0.70	2.45	0.82	2.75	0.97	.04
Directiveness	3.12	0.50	2.82	0.60	3.33	0.68	.09

* p<0.05 **TD:** Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

In the responsiveness subscale, the mean score of the mothers of TD children was the highest for sensitivity ($\bar{x}$=3.95) and the lowest for the inventiveness ($\bar{x}$=2.85); the mean score of the mothers of children with LV was the highest for sensitivity ($\bar{x}$=3.18), and the lowest for inventiveness ($\bar{x}$=2.55). The mean score of the mothers with SVI was the highest for sensitivity ($\bar{x}$=3.75) and the lowest for inventiveness ($\bar{x}$=2.55). In affect subscale, the mean score of the mothers of TD children was the highest for praise ($\bar{x}$=3.55), and the lowest for expressiveness ($\bar{x}$=1.95). The mean score of mothers of children with LV was the highest for acceptance and enjoyment ($\bar{x}$=2.91), and the lowest for expressiveness use ($\bar{x}$=1.73). The mean score of the mothers of children with SVI was the highest for praise ($\bar{x}$=3.30), and the lowest for expressiveness ($\bar{x}$=2.05).

In the directiveness subscale, the mean score of the mothers of TD children was the highest for directiveness ($\bar{x}$=3.35), and the lowest for pace ($\bar{x}$=2.80). The mean score of the mothers of children with LV was the highest in directiveness ($\bar{x}$=3.36), while it was the lowest in the pace ($\bar{x}$=2.45). The mean score of the mothers of children with SVI was the highest for directiveness ($\bar{x}$=3.95), and the lowest for pace ($\bar{x}$=2.75). Table 7 shows the ANOVA test results for the differences of the mothers responsiveness subscale associated with their children's visual loss levels (children with SVI and children with LV).

Table 7. ANOVA Test Results in Responsiveness Based on the Study Groups

	Source of Variance	KT.	Sd.	KO.	F	p.	η^2	Significant Difference
Responsiveness	Between groups	3.289	2	1.644	3.773	.030*	.14	LV<TD
	Within groups	20.917	48	.436				
	Total	24.206	50					

* p<0.05

There was a statistically significant difference between the mean scores of the mothers and children with SVI, children with LV, and TD children for responsiveness subscale (F (2-48) = 3.77; p = .03). A Tukey multiple comparison test indicated a statistically significant difference between the mothers of children with LV and mothers of TD children (p <0.05). A Kruskal Wallis test results performed to determine the differences between the subscales and items for the subscale of MBRS associated with visual impairments levels were shown in Table 8.

Table 8. Results of the Kruskal Wallis Test on the MBRS Subscales and Items Based on the Study Groups

	Vision Levels	**n**	$\bar{x}_{rank}$	**Sd.**	χ^2	**p**	η^2	**Significant Difference**
Affect	TD	20	30.40	2	5.515	.063	.11	
	LV	11	17.41					
	SVI	20	26.33					
Achievement Orientation\ Directiveness	TD	20	25.70	2	4.483	.106	.09	
	LV	11	18.68					
	SVI	20	30.33					
Sensitivity	TD	20	29.25	2	3.560	.169	.07	
	LV	11	19.27					
	SVI	20	26.45					
Responsivity	TD	20	32.70	2	8.913	.012*	.18	
	LV	11	18.64					TD>LV
	SVI	20	23.35					
Effectiveness	TD	20	32.75	2	8.252	.016*	.16	
	LV	11	20.45					TD>LV
	SVI	20	22.30					
Inventiveness	TD	20	29.15	2	1.801	.406	.04	
	LV	11	23.18					
	SVI	20	24.40					
Acceptance	TD	20	29.08	2	2.101	.350	.04	
	LV	11	24.14					
	SVI	20	23.95					
Enjoyment	TD	20	28.70	2	2.060	.357	.04	
	LV	11	22.32					
	SVI	20	25.33					
Expressiveness	TD	20	26.10	2	1.651	.438	.03	
	LV	11	21.77					
	SVI	20	28.23					
Warmth	TD	20	28.03	2	6.021	.049*	.12	
	LV	11	16.73					No
	SVI	20	29.08					
Praise	TD	20	31.98	2	9.879	.007*	.20	
	LV	11	16.59					TD>LV
	SVI	20	25.20					
Achievement	TD	20	27.40	2	4.335	.114	.09	
	LV	11	18.27					
	SVI	20	28.85					
Directiveness	TD	20	22.03	2	7.264	.026*	.15	
	LV	11	21.55					No
	SVI	20	32.43					
Pace	TD	20	27.40	2	1.798	.407	.04	
	LV	11	21.14					
	SVI	20	27.28					

*p<0.05 **TD:** Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

The results showed that the responsiveness ($\chi 2$ (2) = 8.91; p = 0.012) and effectiveness ($\chi 2$ (2) = 8.25; p = 0.016) items have significant statistical differences among three mothers' groups. There was a significant difference between the mothers of the children in the group. As a result of the paired comparisons with the Mann Whitney U test, the Bonferroni corrections were applied. The analysis indicated that in both dimensions, the mothers of children with LV and the mothers of TD children appeared to cause this difference (p <0.05). In terms of the sensitivity and creativity items, there were no statistically significant differences among the groups. There were also no significant differences among the groups in terms of expressiveness and achievement. However, there was a significant difference in affect subscale among the groups for warmth item and expressiveness item. On the other hand, the differences for warmth item was between the mothers of children with SVI and mothers of children with LV; for expressiveness, the difference was between the mothers of children with LV and mothers of TD children. In addition, there was a significant difference among the groups in terms of directiveness in the directiveness subscale. This difference was caused by the mothers of TD children and mothers of children with LV (p <0.02). The other items did not differ among the groups.

Predicting the Interactions of Mothers of children with SVI, children with LV and TD Children; Children's Attention and Interaction Initiation

Children with SVI, children with LV, and TD children were paired with their mothers and considered as a group. We tried to predict children's attention and initiation subscales based on their mothers' responsiveness, affect and directiveness. In this context, a multiple linear regression analysis was conducted in which the attention or the initiation subscales were dependent and maternal interaction styles were independent variables. Table 9 displays the effects of maternal interaction styles of children with SVI, children with LV, and TD children on children' attention subscale.

Table 9. Results of Progressive Multiple Linear Regression Analysis Showing the Effects of Mothers' Interactional Behaviors in Children's Attention Behaviors

	Mother Related Variables	**β Parameter***	**Std. Error**	**Std. β Parameter**	**R**	**R^2**	**t***
TD	Responsiveness	0.43	0.20	0.46	0,46	0,21	2,21*
	Constant	2.25	0.70				3,24*
LV	Responsiveness	0.48	0.12	0.80	0,78	0,64	3,95*
	Constant	2,34	0.36				6,41*
SVI	Achievement\Directiveness	-0.55	0.29	-0.41	0,41	0,17	-0,89
	Constant	4.31	0.99				4,33*

* p<0.05 **TD:** Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

First, we examined if mothers' responsiveness, affect, and directiveness interaction styles significantly predict children's attention. The results of stepwise multiple linear regression analysis shown in Table 9 indicated that the only variable with a significant effect is the mother's responsiveness (F (1-18) = 4.87; p = .04) using the variable selection method for TD children. This explained 21% of the variance in attention subscale scores of TD children. For children with LV, only the mother's responsiveness had a significant effect on attention (F (1-9) = 15.6; p = .00). This explained 64% of the variance for children with LV. For children with SVI, the mother's directiveness had the most effect on a child's attention; however, this was not a statistically significant finding ($F_{(1\text{-}18)}$=3.58; p = .08). This result explained 17% of the variance for children with SVI. The results of the stepwise multiple linear regression analysis for the maternal interactional styles on children's initiation using the variable selection method were shown in Table 10.

Table 10. Results of Progressive Multiple Linear Regression Analysis Showing the Effects of Mothers' Interaction Behaviors in Children's Initiation Behaviors

	Mother Related Variables	β Parameter*	Std. Error	Std. β Parameter	R	R^2	t*
TD	Responsiveness	0.48	0.86	0.42	0.42	0.18	1.99
	Constant	1.95	0.24				2.28*
LV	Affect	0.85	0.25	0.65	0.88	0.77	3.39*
	Achievement\Directiveness	-1.11	0.22	-0.96			-5.00*
	Constant	4.45	0,65				6.85*
SVI	Responsiveness	0.47	0.38	0.28	0.28	0.08	1.24
	Constant	0.63	1.20				0.53*

* p<0.05 **TD:** Typically developing children, **LV**: Low vision, **SVI:** Severe visual impairments

The results indicated that the highest predictive maternal behavior on children's initiation was responsiveness; however, it did not have a significant effect size on initiation ($F_{(1\text{-}18)}$= 3.96; p = .06). For children with LV, mother affect and directiveness had a significant effect on children's initiation behavior ($F_{(2\text{-}8)}$= 13.2; p = .00). For children with SVI, there was no maternal behavior that was predictive of a child's initiation behavior. The most predictive maternal interaction style for initiation was responsiveness ($F_{(1\text{-}18)}$=1.53; p = .23).

Discussion and Conclusion

The purpose of this study was to compare the mother-child interactional styles of three groups, children with SVI, children with LV and TD children with their mothers. First study question explored the interactional styles of children with SVI, children with LV, and TD children with their mothers. Attention and initiation subscales of the CBRS suggested a statistically significant differences among the interactional behaviors of children with SVI, children with LV, and TD children; the greatest impact was found between the TD children and children with SVI. Other similar studies indicated that children with SVI exhibited significant limitations in initiation in interactions and responding to interactional bids of their mothers. Similarly, Recchia (1987) emphasized that children with SVI displayed limited attention to toys around them while playing with their mothers and exhibited attentional difficulties while directing their attention to activities. McGaha and Farran also (2001) suggested that children with SVI prefer to play alone and attempt to fewer play initiations when compared to TD children.

Second question of the study examined the interactional styles of mothers with their children with SVI, children with LV, and TD children. Study findings showed that there was a statistically significant differences among the mean scores of mothers of children with SVI, children with LV, and TD children only in responsivity subscale of the MBRS, the greatest difference in the findings was observed between the mothers of children with LV and mothers of TD children. Baird et al. (1997) emphasized that mothers of children with SVI displayed difficulties in reading the interactional signals of their children, and were less responsive, yet more directive during their interactions. The researchers also showed that the mothers of children with SVI were less active and less interactive than mothers of TD children. Perez Pereira and Conti Ramsden (1999) in one of their studies found that mothers of children with SVI exhibited more descriptive verbal directions than mothers of TD children. Researchers also stated that the mothers of children with SVI repeated their instructions more frequently than mothers of children with LV, and mothers of TD children. Mahoney & Perales (2005) emphasized that the responsive interactions between mothers and their children is a continuous and interactive process. Mahoney et al. (2007) also suggested that parents who were responsively interacting with their children

made it easier for children to initiate joint attention and display exploratory behaviors. The findings of the current study showed that parents of children with LV in responsivity subscale of the MBRS exhibited not only fewer effective behaviors in maintaining interactions with their children, but fewer creative behaviors that could sustain their children's attention in play activities as well.

Findings from this study showed that there were statistically different findings among study groups in warmth and expressiveness items across the mothers of children with LV and mothers of TD children. These findings showed that the mothers of TD children were warmer and emotionally more expressive than the mothers of children with LV. However, another finding derived from this study was that the mothers of children with SVI were warmer than mothers of children with LV, and their scores were statistically significantly higher than the mothers of children with SVI. Based on the researcher's observations, potential reasons for such findings were that the mothers of children with SVI used more physical contacts with their children with SVI. The findings on the warmth subscale indicated that the mothers of children with LV had lower scores on all subscales and variables. In addition, mothers of children with LV received the lowest scores in all variables although there were no statistically significant differences. Significant differences in warmth and expressiveness items were found only across the mothers of children with LV and the mothers of TD children. Bailey and Wolery (1992) emphasized the importance of joyfulness of parent-child interactions, and explained that if parents become bored during play interactions with their children without enjoying mutually, than their children will also be likely to end up the activity.

In summary, it should be taken into consideration that the mothers of children with SVI and the mothers of children with LV are at risk for warmth and expressiveness. When the importance of learning experiences acquired through parental interactions and the lack of visual inputs of children with visual impairments is considered, it appears that the parents' warmth and emotionally expressive interaction styles should be supported. The mothers of children with SVI also differed significantly from the mothers of children with LV and the mothers of TD children in the MBRS directiveness subscale. The findings of this study suggest that the mothers of children with SVI showed higher levels of directive interactions than the mothers of other participating groups. Based on the observations of the researchers, it can be stated that the mothers of children with SVI exhibited more directive interactions in order to ensure their children's active participation in play, which may be due to the lack of visual clues available for their children. Behl and Akers (1996) supports the findings of this study in that the mothers of the children with visual impairments were more likely to lead their children to play and to make more physical contacts. They also argued that the mothers' behaviors should not only be attributed to the visual impairments of their children but also to their desire to make their child participate in play.

Perez Pereira and Conti Ramsden (1999) showed that the mothers of children with SVI, began to initiate joint attention with their body movements and tried to communicate with their children with such behaviors, instead of displaying alternating gazes or showing and pointing gestures and mimics. These findings provide important clues to the complex structure of the interactions between children with SVI and their mothers. Similar studies explaining the mothers' directive interactions regarding the children with SVI's and TD children's attention, and play skills, showed that the mothers of children with SVI exhibited more directive behaviors than the mothers of TD children (Behl & Akers, 1996; Campbell, 2003; Mahoney & Powell, 1988).

Finally, we examined mothers' interactions to predict Attention and Initiation factors of the children with SVI, LV, and TD children. In Attention sub-scale of the MBRS, the sensitivity and responsivity of the mothers of children with LV and TD children had a significant effect on their children's attention. In addition, we observed that responsivity levels of the mothers of children with LV had more effect on children's attention than the mothers of TD children. We found that directiveness of the mothers of children with LV had negative effects on initiation of their children, and that the mothers' expressivity had positive effects on children's initiation. Mahoney et al. (2007) found in their research study that the mothers' responsivity not only helped children to improve basic interactions, but also mediated the children's effective use of these interactions. In addition, Bornstein, Hendricks, Haynes, and Painter (2007) emphasized that while mothers are sensitive and responsive to their children, and that the extend of the relationship of mother-child pair characteristics to each other is an important factor in parent-child interactions. In addition, it is well known that mothers' responsive behaviors towards their children have positive impacts on children's overall development. Therefore, mothers' responsivity is an important factor in children's interactional behaviors.

In this study, the mother-child interactions between children with SVI, children with LV, and TD children and their respective mothers were examined. On the other hand, there are a limited number of studies examining the interactions between children and their parents and how they differ according to their visual impairments levels. Therefore, in this study, we examined and compared the interactions between mothers of children with SVI and children with LV, and TD children between the ages of 2-6. Based on the observations of the researchers, it should be noted that the parents of children with SVI generally used more verbal reinforcements, exhibited more directive behaviors, and, at the same time showed more intense effort during their interactions with their children. While collecting the current study data, the mothers of children with SVI exhibited more guiding behaviors towards their children in order to ensure their children's active participation in the play, which may be due to the lack of visual clues available to their children. In addition, the mothers of children with SVI frequently used physical contact with their children and were warmer to their children.

There are a limited number of studies on mother-child interactions of children with SVI implemented in early childhood period. In this study, we found that the children with SVI display some limitations in attention and initiation behaviors during their interactions with their mothers. McAllister and Gray (2007) suggested that the children with SVI may experience some limitations in their body movements due to lack of visual attention and therefore may need more parental support. In addition, children of mothers who exhibited more responsive behaviors wanted to be informed about the stimulus around them, whereas children of mothers who did not display responsive behaviors in general did not appear to have any expectations about the stimulus around them.

Research literature in general, suggest that directive parental interaction style is not related to warm interaction style of mothers. However, the findings from the current study showed that the mothers of children with SVI exhibited both warmth and directive interaction style with their children. These findings may indicate that parents of children with visual impairments can be more dominant in directing their children's attention to objects or activities during play due to the limited visual inputs available to their children. The researchers think that these findings may be specific to mothers and children with visual impairments. Longitudinal or cross-sectional further studies with larger groups of participants are needed to clearly reveal which parenting style is associated with positive developmental outcomes in children with SVI. The findings from this study showed that SVI in children leads mothers to display more directive interactional style. However, in this study, the limited number

of children with LV and the fact that the number of children with LV was not equal to the number of children with SVI require a careful interpretation of the current study findings.

Suggestions

Suggestions for Future Studies

In this study, mother-child interactions were compared in three groups of mothers; children with SVI, children with LV, and TD children. The limitations and the findings of this study have some suggestions for future studies. Further research may focus on the parents from various regions of Turkey and with different socio-economic status, and educational levels. This may provide an opportunity a better data set and a larger data set. In this study, there were a total of 51 mother-child pairs from Ankara and Bursa provinces of Turkey. In addition, the number of participants in mothers of children with SVI, children with LV, and TD children were not equal to each other due to the fact that visual impairments have seen rarely in children. In addition in this study, only mother-child interaction data was collected; however, the participation of both parents including fathers may help to better understanding of the interactional styles of parents. In addition in future studies, different from the current study, a longitudinal examination of the parent-child interactional styles that may be linked to better developmental outcomes in children with SVI may provide a better understanding of the effects of different interactional styles of parents on the development of children with visual impairments. In this regard, whether responsive, but also directive interactional style provides more positive developmental outcomes in children with visual impairments may be assessed more clearly.

Finally, as per the findings of this study, it is important to support the responsive interactional styles of parents who have children with SVI, and to make them more sensitive to the social cues exhibited by their children, because children with SVI may display limited attention and initiating behaviors during their interactions. Furthermore, intervention studies on the interactions of children with SVI, and their mothers will increase the quality of mother-child interactions, and will contribute positively to the interactional skills of children with SVI and their mothers.

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