

Mediational Behaviours of Preschoolers Teaching Their Younger Siblings

Pnina S. Klein^{*1}, Shlomit Zarur and Ruth Feldman

Bar Ilan University, Ramat-Gan, Israel

There is very little research on the process of teaching in sibling interaction. The current study was designed to explore teaching behaviours of preschoolers and their effects on their toddler siblings. Participants were 40 dyads of 5-yr-olds and their 3-yr-old siblings from a middle class urban community in Israel. The children were divided into four equal groups based on gender and age of the siblings in each dyad. The children were visited at home and invited to play with two puzzles and two Lego games. Their play interaction with their siblings was videotaped. The observations were analysed using the observing mediational interaction (OMI) scale, assessing the frequency and style of the following behaviours: Focussing, Affecting, Encouraging, Expanding, and Regulating Behaviour. The younger siblings' success in playing the games was evaluated using a 5-point scale. The frequency of teaching behaviours in sibling interaction was found to be related to the younger siblings' success on the games. Affecting and Encouraging were significantly related to the younger siblings' level of success on the games. The teaching behaviours of older siblings were characterized by relatively high frequencies of Regulation of Behavior and Encouraging, moderate frequencies of Affecting and low frequencies of Expanding. Boys were found to receive more teaching behaviours than girls. Older brothers and sisters showed higher frequencies of teaching behaviour in interactions with their younger brothers than with their younger sisters. Copyright © 2003 John Wiley & Sons, Ltd.

EFFECTS ON THEIR TODDLER SIBLINGS

The important role played by older siblings in caring for their younger siblings as well as their role as socialization agents has been well reported (Azmitia and Hesser, 1993; Weisner, 1989; Vagner, Schubert and Schubert, 1985, Whiting and Edwards, 1988). Few studies have focused on the effects of sibling interaction on

¹Supported by the I.B. Harris Program, Infants Toddlers and Families in Israel and the Machado Chair for Cognitive Modifiability, Baker Center, Bar-Ilan University.

*Correspondence to: School of Education, Bar Ilan University, 52900 Ramat-Gan, Israel.

their cognitive development (Cicirelli, 1973, 1974, 1976; Azmitia and Hesser, 1993, Dunn, 1995, Dunn and Herrera, 1997). At the ages of 6–7, siblings have been found to function efficiently as teachers, especially in structured situations (Cicirelli, 1973, 1974; Weisner, 1989). Teaching behaviours in sibling interactions are also found in interactions of 5–6-yr-olds with their younger siblings. They are reported as trying to focus the attention of their siblings and as capable of modifying their own instructions in line with their siblings' responses (Dunn, 1983). It has been reported that the basic pattern of sibling interaction is established at an early age and remains fairly stable (Dunn *et al.* 1994). The complexity and richness of sibling interactions may be related to the fact that their relationships are both symmetrical, involving siblings as equal partners, and asymmetrical (Abramowitch *et al.* 1986) involving high frequencies of active imitations on the part of the older siblings coupled with imitation and compliance of the younger siblings. The combination of symmetrical and asymmetrical relations may be especially beneficial for teaching/learning situations.

The assumption that older siblings play a special role in teaching their younger brothers or sisters is supported by the finding that younger children ask more questions and request more assistance from their siblings and benefit more from their sibling's teaching as compared to the teaching of children who are not their siblings (Azmitia and Hesser, 1993). Furthermore, despite the fact that mothers have been viewed as a child's first and most important teacher, at the age of 4, younger siblings talk more to older siblings than to their mother (Brown and Dunn, 1992). The current study attempts to clarify the type of teaching behaviours used in siblings' teaching interactions and their effectiveness.

It has been reported that typical models of interpersonal relations between siblings are based on children's interactions with their parents (Dunn and Kendrick, 1982a,b). Parental mediating behaviours with infants and toddlers, including Focusing, Affecting, Expanding, Encouraging, and Regulating Behaviour (Feuerstein *et al.* 1979, 1980) were empirically defined and found to be meaningfully and significantly related to young children's cognitive performance at a later age (Klein *et al.* 1987b; Klein and Alony, 1993; Klein, 1996; Tzuriel, 1999). These basic teaching behaviours were found across several cultures and diverse living conditions (in Ethiopia, Sri Lanka, Zimbabwe, US and Israel; Klein, 1996). However, they were never examined in interactions between siblings. Since siblings frequently engage in dyadic teaching–learning situations with their brothers or sisters (Cicirelli, 1973, 1974, Weisner, 1989, Dunn, 1983) and since they use their parents teaching behaviours as models (Dunn and Kendrick a,b, 1982a,b), the basic research question in this study was, Do siblings' teaching interactions contain the basic criteria of mediational behaviours found effective in parent–child teaching interactions?

More specifically, the two types of parental teaching behaviours which were found most predictive of children's cognitive performance were Expansion (i.e. expanding the child's understanding of an immediate object, action or situation by provision of associations, contrasts, analogies, explanations, etc.) and Encouragement, particularly Encouragement with explanation, that is, Encouragement followed by an explanation or demonstration regarding the behaviour that led to success (Klein and Alony, 1993). Both Expansion and Encouragement with explanation were not expected to be found in sibling interactions when the older sibling is about 5 yr old. At this age, children are still not operational thinkers. Typically, they are not expected to expand situations beyond the immediate experience perceived through their senses or point out causes of their

sibling's success. Thus, it was hypothesized that: (1) Preschoolers' play interactions with their younger siblings will include teaching behaviour such as Focusing, Affecting, Encouraging and Regulation of Behavior. (2) Preschoolers' play interactions with their younger siblings will not include Expansion and Encouragement with explanation. 3) The frequency of siblings' teaching behaviour will improve performance of younger siblings in play situations. In addition, gender based differential treatment of young children in Israel, particularly higher achievement expectations from boys as compared to girls (Collard, 1968), led to hypothesis 4: Gender differences will be found in mediation provided by older siblings to younger ones. Boys will receive more mediation than girls.

Negative reinforcers, i.e. verbal and non-verbal negative, competitive and teasing behaviours of older siblings, have been found to have a positive effect on the behavior and development of younger siblings, challenging and inviting them to engage in competitive behaviours (Bavly, 1978; Dricurs, 1981; Levy, 1991). Thus, negative reinforcers were also assessed in the current study as part of the siblings' teaching behaviours in addition to mediational behaviours.

METHOD

Participants were 40 pairs of siblings from kindergarten classes of a middle class urban community in Israel. Kindergarten teachers were asked to list all children (5–6-year-olds) who had siblings between 2 and 3 years old. The parents of these children were contacted and invited to participate in the study; 92% agreed. The subjects were divided into four groups based on gender and age of the siblings in each dyad, as follows: Group 1, older sisters and younger brothers; Group 2, older sisters and younger sisters; Group 3, older brothers and younger sisters; and Group 4, older brothers and younger brothers. There were 10 dyads in each group. The average age of all the younger siblings was 3 years and 9 months ($SD = 11.5$ months). The mean age of the older siblings was 5 years and 10 months ($SD = 12.7$ months). Sixty percent of the older siblings were first born.

Average years of schooling was 13.4 ($SD = 2.0$) for mothers and 13.2 ($SD = 1.6$) for fathers. All the fathers and 72.5% of the mothers were employed (65% of them, full-time) at the time of the study. Most parents fell within the 30–35-age range. No differences were found between the four groups with regard to parents' education, employment status or age.

The children were visited at their homes. The older siblings were presented with four games and told that they were to teach their younger siblings how to play with these games. No further instructions, and no specific demonstrations of how to teach the siblings, were given. The games included two lotto games and two puzzles. One lotto required matching individual picture cards with the same pictures on other cards (including a choice of six pictures). This game will be referred to as the simple lotto. The other lotto (the complex lotto) involved identification based on classification rather than visual matching (for example, a picture of an apple had to be matched with a picture of another fruit). The simple puzzle included eight pieces, each representing a complete object. The complex puzzle included 16 pieces of a more complex picture. The younger sibling was then invited into the room to play with his/her sibling. All interactions were videotaped. The average time of siblings' interaction was 30 min ($S.D. = 6.2$). Twenty seven minutes of the interaction were coded. nine minutes at the beginning, middle and end of each play session.

The observations were analysed using the Observing Mediational Interaction (OMI) scale (Klein and Alony, 1993; Klein, 1996; Tzuriel, 1999). The behaviours coded were primarily initiated by the older sibling, taking into consideration (i.e., responding to) the requests or wishes of the younger sibling. The observation focused on the frequency of appearance of each criterion of teaching behavior. Definitions of the criteria of mediation and examples relating to sibling teaching behaviours, are presented in Table 1. Inter-rater reliability ranged between 0.86 and 0.92 for each of the observation variables. The younger siblings' success in playing the games was evaluated using a 5-point scale as follows:

- (0). Unable to carry out any of the tasks required in the game.
- (1). Does one or two steps correctly (matches 1–2 pictures or puts 2–3 puzzle pieces in place).
- (2). Does about half of the tasks correctly.
- (3). Completes almost all of the tasks correctly.
- (4). Completes all tasks correctly.

Inter-rater reliability for this scale was 0.89. The rating of siblings' success was calculated separately for each task, a combined score for success was calculated based on all four ratings. Kronbach for this measure was 0.86.

RESULTS

A two-way analysis of co-variance (ANCOVA), with gender of the siblings as one independent variable and the frequency of their teaching behavior (above and below the mean), as a second independent variable, was carried out. The age of the younger siblings was used as a covariate and their success on the games as a dependent variable. Table 2 presents a summary of the frequencies of teaching behaviours in the four groups.

In line with hypothesis 1, teaching behaviours of siblings were characterized by relatively high frequencies of Regulation of Behavior ($M = 22.35$, $S.D. = 12.4$) and Encouraging ($M = 21.9$, $S.D. = 12.2$), and moderate frequencies of Affecting ($M = 6.6$, $S.D. = 7.2$). Older siblings did not engage in behaviours representing preplanning of the play situation to suit the needs of their younger siblings, e.g. sorting out the cards, planning to start with 'easier' items first, covering or removing potentially confusing objects from the immediate environment or adjusting their own seating position to that of their siblings. In most of the observed interactions, the older siblings plunged directly into the task with their younger siblings. In line with hypothesis 2, only low frequencies of Expanding were found in siblings' play interactions ($M = 0.8$, $S.D. = 2.1$).

In support of hypothesis 3, it was found that the frequency of teaching behaviours in children's interaction with their younger siblings was found to be significantly related to the younger siblings' success on the target games, $F(1,31) = 7.90$, $p < 0.01$. As can be seen in Table 4, the latter was significant on both of the complex games but not on the simple ones. The mean level of success of younger siblings receiving a high frequency of teaching behaviours (above the mean for the group) from their older siblings was 2.7, ($S.D. = 1$) as compared to 2.0, ($S.D. = 1.5$) for siblings receiving fewer teaching behaviours (see Table 3). Of all of siblings' teaching behaviours observed in the current study, only Affecting, ($r = 0.34$, $p < 0.05$) and Encouraging ($r = 0.31$, $p < 0.05$), significantly correlated with the younger siblings' level of success on the games. As predicted in hypothesis 4, older brothers showed higher frequencies of teaching behavior in interactions with their younger brothers than with their younger sisters (see Table 2). Boys

Table 1. Definitions and examples of basic criteria of mediation in siblings' intervention

Definition of criteria	Examples
<p>Focusing (intentionality and reciprocity) Any act or sequence of acts that appears to be directed toward affecting a child's perception or behaviour. These behaviours are considered reciprocal when the child responds vocally, verbally or non-verbally.</p>	<p>Selecting, exaggerating, accentuating, scheduling, grouping, sequencing, or pacing stimuli. Talking or handing a toy to a child is seen as intentionality and reciprocity only when it is apparent that the teacher's behaviour is intentional and not accidental, and when there is an observable response from the child that he or she saw or heard the intentional behaviour. Examples of intentionality might include making a visible effort to change one's behaviour and the environment by bringing an object to the child, covering or otherwise eliminating distracting objects, intensifying or exaggerating responses or stimuli. Observing the child and continuing to adjust the stimulus until he or she focuses on it;</p>
<p>Affecting (exciting) Behaviour that expresses verbal or non-verbal excitement, appreciation, or affect, in relation to objects, animals, concepts or values.</p>	<p>These behaviours may include facial gestures or paralinguistic expressions (e.g. a sigh or scream of surprise), verbal expressions of affect, classification or labelling, and expressions of valuation of the younger or older sibling's experience (e.g. 'Look at this beautiful flower', or 'This boat is special, it belongs to the king. . .').</p>
<p>Expanding (transcendence) Behaviour directed toward the expansion of a child's cognitive awareness, beyond what is necessary to satisfy the immediate need that triggered the interaction.</p>	<p>Talking to a child about the qualities of the building blocks is beyond what is necessary to assure using them to build a castle. Transcendence may be provided through expressions implying inductive and deductive reasoning, spontaneous comparisons, clarification of spatial and temporal orientation, noting strategies for short- and long-term memory or search and recall memory activities.</p>
<p>Encouraging (mediated feelings of competence) Any verbal or non-verbal behaviour that expresses satisfaction with a child's behaviour and that identifies a specific component or components of the child's behaviour that contributes to the experience of success.</p>	<p>Such identification can be achieved, for example, by careful timing of a verbal or gesture expression of satisfaction, through repetition of a desired behaviour, or through verbal and non-verbal expression (i.e. saying 'good', 'wonderful', 'great', 'yes', or clapping hands and smiling when the child successfully completes a task or part of it).</p>
<p>Regulating (mediated regulation of behaviour) Behaviours that model, demonstrate, and/or verbally suggest to the child regulation of behaviour in relation to the specific requirements of a task, or to any other cognitive process required prior to overt action.</p>	<p>Behaviour is regulated on a mediation basis by the process of matching the task requirements with the child's capacities and interests, as well as through organizing and sequencing steps leading toward success. For example, 'Slowly, you are almost done. Let's add this part carefully so you do not move the all other parts'. 'Slowly! Not so hard! It is delicate, do it gently', or 'First, turn all the pieces over, then search for the right piece'. Mediated regulation of behaviour may be related to the processes of perception (e.g. systematic exploration), to the process of elaboration (e.g. planning behaviour), or to the process of expressive behaviour (e.g. reducing egocentric expressions and regulating intensity and speed of behaviour).</p>

Table 2. Frequencies of teaching behaviours in boys and girls interactions with their younger siblings

Teaching behaviours	Older sister Younger brother		Older sister Younger sister		Older brother Younger sister		Older brother Younger brother		F(3,36)
	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
Focusing	3.4	2.3	2.8	2.0	2.2	2.9	1.8	1.3	1.03
Affecting	5.9	5.5	5.5	4.3	3.4	4.2	11.7	10.8	2.72*
Expanding	1.7	3.7	0.4	0.7	0.2	0.4	1.9	0.9	1.0
Regulating	24.7	13.1	22.0	10.3	16.0	9.8	25.0	14.6	1.2
Encouraging	9.9	13.0	8.1	8.9	4.3	4.5	10.2	6.5	0.9
Negative reinforcers	5.8	3.7	4.0	4.2	2.2	2.6	2.8	3.14	1.96

* $P < 0.05$.

Table 3. Young children's rate of success on games played with high and low mediating older siblings

Level of mediation		Older sibling boy		Older Sibling girl	
		<i>Younger sibling</i>		<i>Younger sibling</i>	
		Boy	Girl	Boy	Girl
High mediation	M	2.8	2.8	2.6	2.7
	S.D.	1.0	1.0	0.8	1.2
Low mediation	M	1.8	2.1	2.2	2.2
	S.D.	1.8	1.4	1.2	1.6

were found to receive more teaching behaviours ($M = 47.6$, $S.D. = 28.5$), than girls ($M = 32.5$, $SD = 9.6$), $F(1, 38) = 7.95$, $p < 0.01$, especially with regard to Affecting, $F(3, 36) = 2.72$, $p < 0.05$. The age of the older siblings was significantly related to the frequency of mediation they provided, $r = 0.32$, $p < 0.05$. Furthermore, the age of the older brother was correlated with the younger sibling's success on the games, $r = 0.44$, $p < 0.001$. These findings suggest that children who are 6-year-olds use more teaching behaviours than 5-year-olds possibly resulting in more efficient performance of the younger siblings.

In addition, it should be noted that based on MANOVAs for birth order (1st, 2nd, and 3rd) by Gender, carried out for each of the mediational behaviours assessed, no significant differences were found between the 1st, 2nd and 3rd born child with regard to the amount of mediation they provided to their younger siblings. A significant correlation was found between the frequency of children's behaviours defined as Negative Feedback (i.e. verbal statements such as 'stupid', 'silly', 'no, no, no,' etc.) and their younger siblings' success on the games, $r = 0.31$, $p < 0.05$.

DISCUSSION

Siblings' teaching behaviours were found in the current study to include some of the basic criteria of parental mediation behaviours which were previously found to affect children's cognitive performance (Feuerstein et al., 1979, 1980; Klein, et al., 1987; Klein, 1991, Klein and Alony, 1993; Klein, 1996). It was expected that

mediation behaviours characteristic of parental styles would be found in siblings' teaching interactions with their younger brothers or sisters, since, typical models of interpersonal relations between siblings are based on the children's interactions with their parents (Dunn and Kendrick 1982 a,b). Mediation behaviours, like Vygotsky's concept of scaffolding include attempts to match one's behavior to the child's needs, abilities and interests. Scaffolding refers to a teaching style that matches the amount of assistance provided by the adult, in a learning situation suited to the child's needs (McNaughton and Leyland, 1990). The theory of mediation attempts to clarify the basic necessary components in a teaching interaction, including matching or scaffolding as one of the components of this interaction (Feuerstein *et al.*, 1979).

The most frequent mediational behaviours observed in siblings' teaching interactions were Regulation of Behavior, i.e. instructing verbally, or modelling the desired behavior, non-verbally. These were followed sporadically by Encouraging behaviours such as saying 'very good', 'good for you', 'yes', etc.

Two types of adult-child mediation behaviours previously found most predictive of children's cognitive development, included: 1. Expansion, particularly Expansion in the form of demand (e.g. "Where did we see this flower?", "Where does a bird live?") and 2. Encouragement, especially when followed by explanations or demonstrations clarifying what led to success (Klein and Alony, 1993; Klein, 1996). These two types of behavior were rarely found in the repertoire of siblings' teaching, confirming the second hypothesis of the current study. These findings suggest that the siblings were focusing on helping their younger brother or sister carry out the desired task and not on long-term objectives, such as preparing them for better transfer of what was learned. Possible explanations for these findings may be related to the older siblings' (5–6-year-olds) relative difficulty in coping with abstract reasoning, including metacognitive understanding, which may be required for mediation of Expansion. In addition, both Regulation of behavior and Encouraging, frequently found in siblings' teaching interactions, are probably easier to observe and imitate within the context of parental mediation behavior, as compared to Expansion which is more abstract and removed from the immediate objective of any observed interaction.

The latter explanation is further supported by the finding that siblings provided more mediation on the complex games than the simple ones. They seem to vary their mediation in line with their perception of what is required by the task, and may not see the need to provide Expansion since, by definition, it is not required for completion of the target games.

Both Affecting and provision of negative reinforcers (i.e. competitive and teasing statements) predicted siblings' level of success on the tasks better than all other teaching behaviours observed in the current study. The efficacy of these behaviours is supported by Dunn and Kendrick (1982a,b) who view both positive and negative feedback, including expressions of positive feelings and antagonism as behaviours communicating symmetrical relations in siblings' interactions, signifying mutual understanding and common interests.

The findings of the current study supported the hypothesis regarding the positive relations between mediational behaviours in siblings' teaching interactions and the rate of success of their younger brothers and sisters on the target games. The frequency of mediation behaviours in a teaching situation was found to be related to better cognitive performance of young children (Tzuriel, 1999, Klein & Alony, 1992, Klein *et al.*, 1987; Klein, 1996). These teaching behaviours involved adults (i.e. parents, teachers or caregivers). The current study leads to

Table 4. Pearson correlations between the frequency of siblings teaching behaviours and the average success rate of the younger siblings on the target games

	Focusing	Affecting	Expanding	Regulating	Encouraging	Total Mediation	Negative Reinforcers
Simple lotto	0.09	0.14	0.01	0.06	0.27*	0.08	0.04
Complex lotto	0.14	0.01	0.03	0.14	0.33*	0.27*	0.33*
Simple puzzle	0.13	0.09	0.18	0.14	0.10	0.01	0.09
Complex puzzle	0.26*	0.30	0.27*	0.21	0.23*	0.28*	0.30*
Average success	0.15	0.34*	0.2	0.15	0.31*	0.27*	0.31*

* $p < 0.05$.

the conclusion that mediation behaviours of preschool children also have positive effects on the performance of their younger siblings. In addition, it appears, based on the current findings, that 5-year-olds mediate differentially with regard to the level of task complexity (see Table 4). The latter finding coincides with findings reported by Cooper and St. John (1990), that older siblings adjusted their teaching strategies to the demands of the task and to their siblings' abilities. The current findings also coincide with those of Koester and Johnson (1984), that older siblings teaching their younger siblings provide much positive feedback and explanations. The findings, however, suggest that these explanations may actually not be beneficial to the younger child, perhaps because Expansion requires higher levels of cognitive performance and reasoning not typically found in preschool children.

Significant differences in the frequencies of siblings' teaching behaviours were found in relation to gender. Boys seemed to receive more mediation than girls from both older brothers and sisters. This finding may be related to differential and higher achievement expectations for boys over girls in Jewish culture (Callard, 1968). The findings of the current study confirm the effectiveness of siblings' teaching behavior. However, since sibling's mediation behavior hardly includes Expansion, which is one of the most effective teaching behaviours, it may be concluded that children who learn from their siblings for many hours daily may end up lacking these experiences, found exclusively in adult-teaching behavior.

REFERENCES

- Abramovitch R, Corter C, Lando, B. 1979. Sibling interaction in the home. *Child Development*. **50**(4): 997–1003.
- Abamovitch R, Corter C, Pepler, DJ, Stanhope L. 1986. Sibling and peer interaction: A final follow-up and a comparison. *Child Development* **57**: 217–229.
- Azmitia M., & Hesser, J. (1993). Why siblings are important agents of cognitive development: A comparison of siblings and peers. *Child Development*. **64**(2): 430–444.
- Bavly A. 1978. It Happens in the Best of Families. Zmora, Bitan Modan: Tel-Aviv (in Hebrew).

- Brown JR, Dunn, J. 1992. Talk with your mother or your sibling? Developmental changes in early family conversations about feelings. *Child Development* **63**: 336–349.
- Callard CA. 1968. Achievement motive of four-year-olds and maternal achievement expectancies. *Journal of Experimental Education*, **36** (4): 14–23.
- Cicirelli VG. 1973. Effects of sibling structure and interaction on children's categorization style. *Developmental Psychology* **9**(1): 132–139.
- Cicirelli VG. 1974. Relationship of sibling structure and interaction to younger siblings' conceptual style. *Journal of Genetic Psychology* **125**(1): 37–50.
- Cicirelli VG. 1976. Mother-child and sibling-sibling interactions on a problem-solving task. *Child Development*, **47** (3): 588–598.
- Cooper CR St. John, L. (1990). Children helping children in the family: Developmental perspectives on sibling relationship. In *Children Helping Children*. Foot H.C, Morgan MJ, Shute RH (eds), Wiley: New York; 259–273.
- Dricurs R. (1981). *Coping with Problem Behaviours of Children*. Sifriat Hapoalim: Tel Aviv (in Hebrew).
- Dunn J. 1983. Sibling relationships in early childhood. *Child Development*, **54** (4): 787–811.
- Dunn J. 1995. Children as psychologists: The later correlates of individual differences in understanding of emotions and other minds. *Cognition and Emotion*, **9** (2–3): 187–201.
- Dunn J. Herrera C. 1997. Early experiences with family conflict: Implications for arguments with a close friend. *Developmental Psychology* **33**(5): 869–881.
- Dunn J. Kendrick C. 1982a. The speech of two- and three-year-olds to infant siblings: 'Baby talk' and the context of communication. *Journal of Child Language*. **9**(3): 579–595.
- Dunn J. Kendrick C. 1982b. *Sibling: Love, Envy and Understanding*. Harvard University Press: Cambridge, MA
- Dunn J. Slowkowski C. Beardsall L. 1994. Sibling relationships from the preschool period through middle childhood and early adolescence. *Developmental Psychology* **30**: 315–324.
- Feuerstein R. Rand Y. Hoffman MB. 1979. *The Dynamic Assessment of Retarded Performers: The Learning Potential Assessment Device—Theory, Instruments and techniques*. University Park Press: Baltimore.
- Feuerstein R. Rand Y, Hoffman, MB., Miller, R. 1980. *Instrumental enrichment: An intervention program for cognitive modifiability*. University Park Press: Baltimore.
- Garner PW. Jones DC. Palmer DJ. 1994. Social cognitive correlates of preschool children's sibling caregiving behavior. *Developmental Psychology* **30**: 905–911.
- Hundeide K. 1996. Facilitating cultural mediation: Indonesia. In *Early Intervention: Cross cultural experiences with a Mediational Approach*, Klein P (ed.). Garland: New York.
- Kaye K. Fogel A. 1980. The temporal structure of face-to-face communication between mothers and infants. *Developmental Psychology* **16**(5): 454–464.
- Klein PS. 1984. Behavior of Israeli mothers toward infants in relation to infants' perceived temperament. *Child Development*, **55**: 1212–1218.
- Klein PS. 1991. Improving the quality of parental interaction with very-low-birth-weight children: A longitudinal study using a mediated learning experience model. *Infant Mental Health*. **12**: 321–337.
- Klein PS. 1996. *Early intervention: Cross cultural experiences with a Mediational approach*. Garland: New York.
- Klein PS. Alony S. 1993. Immediate and sustained effects of maternal mediation behaviours in infancy. *Journal of Early Intervention*. **17**(2): 177–193.
- Klein PS. Weider S. Greenspan SL. 1987. A theoretical overview and empirical study of mediated learning experience: Prediction of preschool performance from mother-infant interaction patterns. *Infant Mental Health Journal*. **8**(2): 110–129.
- Koester LS. Johnson JE 1984. Children's instructional strategies: A comparison of sibling and peer tutoring. *Acta Paedologica*. **1**: 223–232.
- Levy M. 1991. *Quality Parenting*. Reuven Mas Pub: Tel Aviv 143–170, (in Hebrew).
- Martin M, O. Mullis IVS, Beaton AE, Gonzalez EJ, Smith TA. Kelly DL. 1997. Science achievement in the primary school years. IEA's Third *international Mathematics and Science Study (TIMSS)*. TIMSS International Study Center, Boston College, Campion Hall, Chestnut Hill, MA, USA.
- McNaughton S, Leyland J. 1990. The shifting focus of maternal tutoring across different difficulty levels on a problem solving task. *British Journal of Development Psychology*, **8**: 147–155.

- Pepler DJ, Abramovitch R, Corter C. 1981. Sibling interaction in the home: A longitudinal study. *Child Development*, **52**: 1344–1347.
- Tzurriel D. 1999. Parent–child mediated learning interactions as determinants of cognitive modifiability: Recent research and future directions. *Genetics, Social and General Psychology Monographs* **125**(2): 109–156.
- Tzurriel D, Weiss S. 1998. Cognitive modifiability as a function of mother-child mediated learning strategies, mothers' acceptance–rejection and children's personality. *Early Development and Parenting* **7**: 79–99.
- Vagner ME, Schubert HJ, Schubert DS. 1985. Family size effects: A review. *Journal of Genetic Psychology* **146**(1): 65–78.
- Weisner TS. 1989. Comparing sibling relationships across cultures. In *Sibling interaction cultures: Theoretical and methodological issues*. Springer: PW. Zukow (Ed.), New York; 11–25.
- Whiting BB, Edwards CP. 1988. *Children of Different Worlds: The Formation of Social Behavior*. Harvard University Press: Cambridge, MA.