Social Information Processing in Preschool Children: Relations to Social Interaction

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The Social Information Processing Process Model consists of organizing the social adaptation and behavior of children in line with their responses to the social situations they encounter with their peers in their daily lives. The Social Information Processing Model affects children's ability to interact with their peers, their level of interaction, and provides information about the structure of interaction. In this direction, it was aimed to examine the relationship between social information processing and social interaction skills of 60-72 month-old children. The study was designed in relational screening model. The study group of the research consisted of 250 children, between 60 - 72 months, with normal development in the fall semester of the 2020-2021 academic year. The Social Information Processing Interview–Preschool Version and Children's Interaction Rating Scale were used as data collection tools in the study. The data were collected by reading stories with children, asking questions about the story and observation. Since no normal distribution was observed in the analysis of the data, Spearman's Rank-Order Correlation Test was used. As a result of the study, there was a statistically significant and positive relationship between "interpretation, response diversification, response decision", which were sub-dimensions of Social Information Processing Interview and "cooperation, self-control, assertiveness", sub-dimensions of the Interaction Rating Scale for Children. This situation can be evaluated as children who make positive comments in social situations they encounter, who create positive reactions and react positively, are more cooperative in the context of social interaction, have a strong sense of self-control, and their assertiveness skills are high.

Introduction

Nowadays, it is important for children to be individuals who can cope with the problems they face in a positive way and have high abilities to interact with their

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environment. There is a mechanism responsible for the processing of new social information at the basis of the social situations children encounter in their daily lives. In addition, it affects children's ability to interact with their peers, their level of interaction, and provides information about the structure of interaction. This mechanism is called the Social Information Processing Model (Crick & Dodge, 1994).

Social information processing is a model that organizes social cohesion and behaviors consisting of a series of steps that are composed of reactions to situations that children experience with other individuals (Garner & Lemerise, 2007). Social information processing consists of six steps. The six steps are (1) encoding of social cues, (2) interpretation of these cues, (3) clarification of goals, (4) response construction, (5) response decision, and (6) the behavioral enactment of a response. When individuals interact with others, they encode and interpret the social cues they receive from their environment with various stimuli (first and second step). Using the cues they interpret, they develop solutions to the situations they encounter (third step) and look for the reactions and behaviors they will perform from their long-term memory (fourth step). Finally, individuals decide on their reaction (fifth step), put their reactions into action, and evaluate the behaviors they take into action (sixth step). These steps are in a cyclical process (Crick & Dodge, 1994; Dodge, 1986; Ziv & Elizarov, 2020). let us take two children whose play was spoiled by their peers as an example. While one of the children does not get angry or react in a disturbing way to this situation, the other child may perceive this situation negatively and show aggressive behavior. We can say that the negative reactions given show that there is incompatibility and malfunction in the social information processing processes.

In the Social Information Processing Model, it is stated that children's reactions to social situations they encounter are related to social skills (Dodge, 2006). Accordingly, it is possible to find studies examining the relationship between social information processing and social skills (Runions & Keating, 2007; Ziv, 2013; Ziv & Sorongon, 2011). Social skills are expressed as individuals' ability to behave positively in social situations and to interact positively with their environment (McGinnis, 2016). In other words, social skills include the skills of having social cooperative behaviors, adapting, coping with problems positively and social interaction (Merrell, 2003; Özbey & Köyceğiz, 2020). Based on this information, it can be thought that social interaction is a fundamental part of children's social skills.

Social interaction is a skill that includes basic behaviors such as initiating and maintaining communication and responding positively to the attempts of children to communicate and interact (Mahoney & MacDonald, 2007). Social interaction is a mutual and dynamic relationship process based on individuals' understanding of social behaviors, their enjoyment and sharing (Quill, 1995).

Cooperation, assertiveness, and self-control skills play a key role in children's social interaction skills, because these skills provide information about children's interaction skills by explaining their positive social behavior towards their peers, suppressing negative responses in the face of their negativities, and expressing themselves in a positive way. In the current study, social interaction skills were examined within the scope of cooperation, self-control, and assertiveness dimensions. Cooperative social interaction behaviors include helping each other, sharing, working together, and supporting a friend in a task and an event encountered (Anme et al., 2014). Self-control is the ability of individuals to lead a life in harmony with their environment (Mehta, 2010) and to control themselves by suppressing negative reactions and behaviors (Oaten & Cheng, 2006; Tangney et al., 2004). Assertiveness

includes children's entrepreneurial behavior and self-expression skills (Vagos & Pereira, 2010). In an individual who has acquired the assertiveness skill, timid and aggressive behaviors are controlled by keeping them in balance (Voltan, 1980). It is stated in studies that attitudes and behaviors of individuals have an important place in social interactions (Fıchter, 2009; Glaeser & Scheinkman, 1999). Considering that these behaviors, within the scope of social interaction, play an important role in the type of reactions children give to the situations they encounter (such as positive/negative or good/bad/neutral-intentioned reactions), social interaction skills are considered to be effective on social information processing (Ziv & Elizarov, 2020).

In line with the information given, it is important to determine the relationship between children's social information processing levels and social interaction levels. Since the fifth and sixth steps of the social information processing model are the visible part of the behavior, it is thought to be effective on children's interaction skills. In the Social Information Processing Model, it is suggested that the responses of children to the situations they encounter are important processes that determine the interaction between children. Social interaction consists of children's interpretation of situations between other children, their evaluation of the situation they interpret, and their positive or negative responses. Children's positive-negative reactions also affect peer acceptance. With children with high peer acceptance, their peers communicate more to them (Crick & Dodge, 1994; Gifford-Smith & Rabiner, 2004). For example, when a child responds negatively to a situation with peers, it can be interpreted as someone who should not be communicated with, and has threatening behaviors (Burks et al., 1999). In this case, it can cause children to avoid and interact negatively with their peers who respond negatively. Rah and Parke (2008) suggest that together with the evaluation of children's social information processing, the interaction between children should be determined through observation. In this context, it is thought that there may be a relationship between the interaction between children and the Social Information Processing Model. With the studies conducted, it is seen that there are studies that examine the relationship between children's social information processing and social skills (Ziv, 2013), problem behaviors (Helmsen et al., 2012; Runions & Keating, 2007), mother-child relations (Ziv et al., 2016), exposure to violence and problem behaviors (Ziv, 2012), attachment (Raikes et al., 2013), and executive control (Johnson et al., 2020). However, to the authors' knowledge, there are no studies evaluating the relationship of children with social interaction skills, which has a significant place within the scope of social information processing levels. It is thought that the positive or negative responses of children to the social situations they encounter with their peers will in turn affect the interaction within their peers. It can be said that children who respond negatively to a situation will not want to interact with their peers, or that children who respond positively will be willing to interact with their peers. At the same time, it is thought that their positive interactions with their cooperative behaviors and self-control and assertiveness skills that control their negative behaviors to positively solve their social situations together, will affect their social information processing positively. It is evaluated that there may be a relationship between the Social Information Processing Model, which examines the responses of children to social situations, and the social interactions of children. Therefore, considering the importance of determining the relationship between children's social information processing and social interactions, this study aimed to determine the social information processing and interaction skills levels of 60-72 month-old children and the relationship between them.

In line with the determined purpose, the following questions were sought in the study:

(1) What are the social information processing and interaction skills levels of 60-72 month-old children?

(2) Is there a relationship between 60-72 month-old children's social information processing and interaction skills?

Method

Research Model

The research was designed with the relational screening model, one of the quantitative research designs. Relational screening model shows the existence and degree of the relationship between two or more variables without any intervention; it is also a type of descriptive research in which it is determined whether the variables affect each other (Büyüköztürk et al., 2016; Tekbıyık, 2019). Research methods aim to observe two or more variables and to reveal whether there is a certain relationship between them are in the category of relational research methods (Akbay, 2019). This study was in a relational survey model that examines the relationship between children's social information-processing and interaction skills.

Study Group

The study group of the research consisted of 250 children with normal development of 60-72 months who attended kindergarten and nursery schools under the Directorate of National Education of the Afyonkarahisar province in the fall semester of the 2020-2021 academic year. In line with the validity and reliability study of the data collection tools used in the study for 60-72 months old children, 60-72 months old children were included in the study group.

Table 1. Demographics of children included in the study.

Demographics		N		%	
Gender of children	Girl	137		54,8	
	Boy	113		45,2	
Total		250		100	
Children level	First child	54		21,6	
	Second child	99		39,6	
	Third child	85		34	
	Fourth child	12		4,8	
Total		250		100	
Education Level		Mothers		Fathers	
		N	%	N	%
	Second	82	32,8	60	24
	High	80	32	83	33,2
	University	87	34,8	107	42,8
Total		250	100	250	100

When the socio-demographic characteristics of the children were examined, it was determined that 54,8 % of them were girls and 45,2 % of them were boys; 21,6 % were first-born children, 39,6 % were the second, 34 % were the third and 4,8% were the last child. In addition, 32,8 % of the mothers were secondary school, 32 % were high school and 34,8 % were university graduates, while 24 % of the fathers were secondary school, 33,2 % were high school and 42,8 % were university graduates (Table 1).

Data Collection Tools
Personal information form.
It includes age, gender, education status of parents, number of siblings and was prepared by the researchers.

The Social Information Processing Interview–Preschool Version (SIPI-P)
The test was developed by Ziv and Sorongon (2011) and adapted into Turkish by Şenol and Metin (2019) to learn about children's social information-processing processes. SIPI-P is based on a storybook consisting of four stories. The first and third stories are about a child who is disturbed by a peer. The second and the fourth story are about a child who attempts to participate in the game of two playing peers. There are separate forms of the test for boys and girls. These forms include parallel pictures and the same stories. The stories are read to the children by the researcher in a silent environment and the answers given by the children to the questions about the story are written on the answer form.
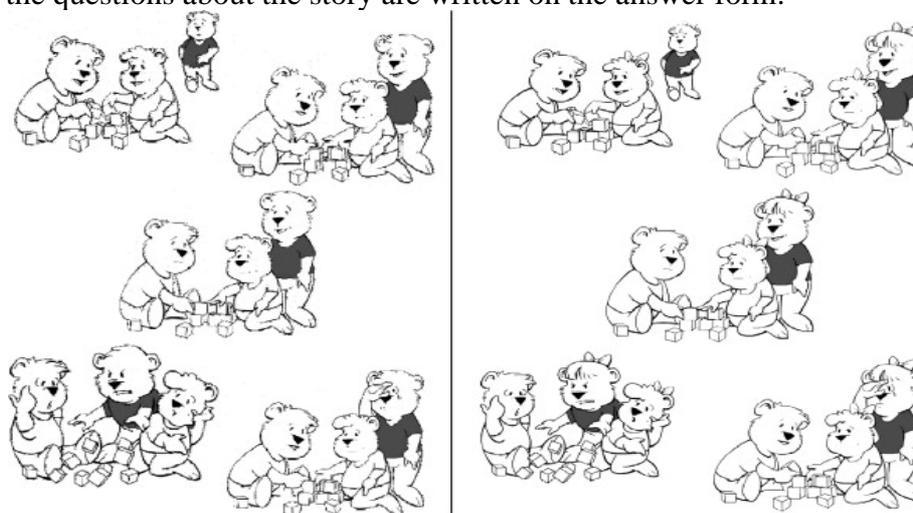

Fig. 1. Peer entry example: story 1 – nonhostile rejection (boys' version on the left, girls' version on the right) (Ziv & Sorongon, 2011)

In the original measure, each picture appears on a separate page. Order of pictures: (1) top left; (2) top right; (3) middle; (4) bottom left; (5) bottom right. See Table 2 for text accompanying the pictures (Ziv & Sorongon, 2011).

Table 2. Text and questions accompanying stimuli presented in Fig. 1 (Ziv & Sorongon, 2011)

Picture	Text
1	In this story, these children are playing with blocks
	POINT TO CHILD CLOSER TO MICHAEL. This child says, "These blocks are fun!"
	POINT TO CHILD FARTHEST FROM MICHAEL. This child says, "Yes. You know, Michael also wanted to play with me in the block area"
	POINT TO MICHAEL. Michael is watching the other children playing
2	POINT TO MICHAEL. Michael walks up to the other children and asks them, "Can I play with you?"
	POINT TO CHILD FARTHEST FROM MICHAEL. This child says, "Sorry. The teacher said only two can play in the block area"
	E2. POINT TO THE OTHER CHILDREN AND SAY: do you think the other children who did not let Michael play are mean or not mean?
	E3. Pretend that you ask your friends if you can play with them and they say that only two can play in the block area. What would you do?
	IF CHILD DOES NOT RESPOND, SAY: what would you do if it happened to you?
3	Now, let me show you some different things that Michael could do
	POINT TO MICHAEL. Michael could say, "Then can I play next?"
	E4. Is this a good thing or a bad thing for Michael to say?

	E5. If you did that, do you think the other children would like you?
	E6. Do you think the other children would let you play if you did that?
	Now, I will show you something else that Michael could do.
4	POINT TO MICHAEL. Michael could kick apart the blocks and say to the other children, "If I can't play, then you can't play either"
	E4. Is this a good thing or a bad thing for Michael to say?
	E5. If you did that, do you think the other children would like you?
	E6. Do you think the other children would let you play if you did that?
	Now, I will show you something else that Michael could do.
5	POINT TO MICHAEL. Michael could cry and say, "It's not fair"
	E4. Is this a good thing or a bad thing for Michael to say?
	E5. If you did that, do you think the other children would like you?
	E6. Do you think the other children would let you play if you did that?

Three sub-dimensions of SIPI-P are used in this study. It is stated that these scores have an important place in predicting the social behavior of children. The three sub-dimensions are: interpretation of cues, response construction, and response decision. Interpreting cues sub-dimension reveals *benign intent* of children. The high scores the children received, representing the absence of a hostile attribution bias, show that they do not have a hostile intention. The range for this score is between 0-4.

In the *positive response construction* score sub-dimension, children are asked an open-ended question. Answers given by the children are coded as Sufficient (1 point), Inadequate / Introverted, and Aggressive / Aggressive (0 point) and Other-Don't Know: (-1 point). The range for this score is between 0-8. Increasing scores show children's *positive response construction*.

The response decision sub-dimension determines the positive response score. Children are presented with types of responses to the social situation in the story, and they are asked to evaluate these responses. The scores that children get from this section are between 0-36. High scores in this sub-dimension indicate that children evaluate social situations positively.

SIPI-P's internal consistency reliability is .76 for the interpretation of cues, .78 for the response construction and .87 for the response decision (Ziv & Sorongon, 2011). The internal consistency reliability calculated in current study were .75, .77 and .76, respectively.

Interaction Rating Scale between Children-IRSC

IRSC evaluates children's social interaction skills in the classroom within the scope of their cooperation, self-control and assertiveness skills. It was developed by Anme et al. (2014) and adapted into Turkish by Şenol and Metin (2018). IRSC enables the evaluation of children's interaction skills through observation. Observations are applied in playtime periods, in unstructured group activities. Children are observed one by one, and the observation period lasts until at least five minutes and maximum activities are completed. Observations in the study were made between 30-40 minutes of play time.

IRSC consists of "Behavioral Evaluation (43 items)" and "Impression Evaluation (3 items)" sections. The behavior evaluation section consists of sub-dimensions of cooperation, self-control and assertiveness. During the observation process, if the children showed the specified behavior, they were coded as "yes (1 point)", if not, "no (0 point)". High scores of children in sub-dimensions show that their social interaction skills are higher. The internal consistency coefficient of the IRSC was reported as .87 (Anme et al., 2014). The internal consistency reliability was .90 for the Cooperation, .73 for the Self-control, and .92 for the Assertiveness.

Since associations will be made according to the reactions of the children in the social

information-processing process in current study, the "Behavior Evaluation" section was used.

Data Collection

The data were collected by reading stories and observing children attending pre-school education in the fall semester of the 2020-2021 academic year. It took two months to collect the data. Before the data collection process began, the researcher introduced himself by participating in the children's activities so that the children became accustomed to the researcher.

The data on SIPI-P were collected by reading the stories in the story book with pictures and asking questions to the children. The answers given by the children were written on the answer form. The data were collected through individual interviews. Administration of the test took approximately 20-25 minutes for each child. Since the content of the stories and images attracted the attention of children, there were no problems in collecting data.

The data on IRSC were collected by observing the children one by one in playtime periods in the classroom environment. The researcher observed the children by direct observation from outside without participating in the children's playtime. Children were observed during the playtime between 08:30 and 09:30 am. The observations lasted approximately 30-40 minutes for each child.

Ethical Report

Before the data collection process, approval was obtained from Afyon Kocatepe University Social and Human Sciences Scientific Research and Publication Ethics Committee (Document numbered 2020/237). Parents' approval was obtained upon discussing with the principals of the kindergartens where the studies were implemented. The children whose parents gave their consent were informed about the application, and the children who volunteered, were included in the study.

Analysis of data

Demographic information, percentage and frequency, and continuous data were presented as mean, standard deviation, median, maximum and minimum. Normal distribution characteristics of continuous data were evaluated by Kolmogorov Smirnov test and it was observed that they did not conform to normal distribution. Spearman's Rank-Order Correlation Test was used to evaluate the relationship between scales. Spearman's correlation determines the strength and direction of the monotonic relationship between your two variables (Radhakrishnan & Vignesh, 2017). Significance level was accepted as p <.05.

Results

In this section, descriptive analyses that children received from SIPI-P and IRSC and the relationship between SIPI-P and IRSC of children are included.

Table 3. The mean scores of the children in SIPI-P and IRSC

		N	Mean	Median	Sd	Min.	Max.
SIPI-P	Interpretation of cues	250	2,25	2,00	,852	0	4
	Response construction	250	3,42	4,00	1,149	0	7
	Response decision	250	28,62	29,00	4,794	15	37
IRSC	Cooperation	250	14,39	16,00	4,653	2	18
	Self-control	250	7,10	8,00	2,090	1	9
	Assertiveness	250	10,47	12,00	3,955	0	22

It is seen that the mean scores of the children from SIPI-P are " Interpretation of cues = 2.25 ± 0.852, Response construction = 3.42 ± 1.149, and Response decision = 28.62". It is stated that the higher scores of children in SIPI-P have a more positive level than the sub-dimensions of benign attribution, positive response construction and positive response decision of social information processing steps. Studies conducted with preschool children in which the same measuring tool was used reached similar results (Ziv, 2013; Ziv & Sorongon, 2011).

It is seen that the scores the children got from the IRSC are "Cooperation = 14.82 ± 4.653, Self-control = 7.10 ± 2.090 and Assertiveness = 10.47 ± 3.955". The scores obtained from the IRSC show a higher level of interaction. Similar results were obtained in studies using the same measurement tool (Anme et al., 2013, 2014).

When the average scores obtained were examined, it was seen that the mean scores obtained from SIPI-P are lower than the maximum score that can be obtained in the interpretation of cues and response construction sub-dimensions and the mean scores obtained from the IRSC sub-dimension of assertiveness. It is thought that the development of assertiveness skills for preschool children to choose the positive response among them by diversifying their responses after interpreting the social situations they encounter first, and to keep their negative behaviors in balance, is low.

Table 4. Relationship between social information processing and social interaction

		Interpretation of cues	Response construction	Response decision	Cooperation	Self-control	Assertiveness
Interpretation of cues	r	1,000					
Response construction	r	,129*	1,000				
Response decision	r	,384*	,291*	1,000			
Cooperation	r	,162*	,152*	,329*	1,000		
Self-control	r	,216*	,095	,333*	,683*	1,000	
Assertiveness	r	,218*	,142*	,394*	,635*	,509*	1,000

*p<0.05

When Table 4 is examined, there was a statistically significant positive correlation between the interpretation of cues sub-dimension and cooperation, self-control and assertiveness, response construction sub-dimension and cooperation and assertiveness, response decision sub-dimension and cooperation, and self-control and assertiveness. The following observations were made between response construction, cooperation, and assertiveness (r

=,635), interpretation of cues and cooperation (r =,162), self-control and assertiveness (r =,509), and response decision sub-dimension and cooperation (r =,329), self-control and assertiveness (r =,509). There was no significant relationship between response construction and self-control.

Discussion

Social interaction helps children to connect with the society they live in. Children's social interaction styles and levels determine and affect their behaviors and responses to the situations they experience (Henrich et al., 2001; Keller et al., 2004). This situation is explained in Crick and Dodge's (1994) Social Information Processing Model: the relationships and interactions that children establish with their environment in early periods affect the reactions given in social situations that are at the basis of social information processing. In Ecological System Theory, Bronfenbrenner emphasizes that the ecological relationships that children establish with people around them influence their behavior (Bronfenbrenner, 1979; Espelage & Swearer, 2003). Peers are located in the microsystems nearest to the child. Therefore, it is possible to say that the social interactions of children are related to their reactions in the social information-processing process.

In the current study, the relationship between children's social information-processing processes and social interaction skills was examined. As a result of the study, there was a relationship between "interpretation, response diversification, response decision", which are sub-dimensions of SIPI-P, and "cooperation, self-control, assertiveness", sub-dimensions of IRSC. This result can be evaluated as children who make benign attributions in social situations they encounter, and who create positive responses and respond positively, are more cooperative in the context of social interaction, have stronger self-control, and their assertiveness skills are high. It provides information about the behavior patterns of children during social interaction and their social competencies. It has been determined that children with high social competence have high cooperation, assertiveness, and self-control skills (Kemple et al., 2019). Another source providing information on social competence is the social information processing model. In the social information processing model, the positive responses of children in social situations reveal positive social interaction (Kamper-DeMarco et al., 2020). To the authors' knowledge, there are no studies examining social information-processing processes and social interaction. For this reason, children's social interactions were examined and interpreted within the scope of cooperation, assertiveness, and self-control skills, which are among the sub-dimensions of the IRSC that are effective on social interaction.

Children interact collaboratively in order to share with their peers in their social environment; thus, they develop positive behaviors (Ciairano et al., 2007; Tomasello & Carpenter, 2007). It is possible for children to respond positively in social situations they encounter by showing cooperative behaviors (Caporaso & Marcovitch, 2021). In the studies conducted, children in the age group 5-6 share socially, understand that their peers need to show positive social behavior by engaging in collaborative social interaction in order to successfully complete a job / study, and exhibit positive social behavior (Schmidt et al., 2016) and it was concluded that they shaped their behavior by interpreting their peers' views (Sher et al., 2014). However, it is seen that children's collaborative behaviors are an important determinant of their social interactions and there is a relationship between the collaborative social interaction they show with their peers and determining their social behavior (Atabey, 2018; Huyder & Nilsen, 2012; Huyder, Nilsen, & Bacso, 2017). It can be said that the studies conducted support the result

obtained from th current study. In addition, this result can be explained as children who have collaborative interactions, and make benign attribution in social situations, evaluate positive responses and also decide on positive responses.

The ability to control children's behavior is expressed as self-control. Children avoid negative behaviors by controlling their reactions in situations they encounter while interacting with their peers (Oaten & Cheng, 2006). If children cannot control their responses and suppress negative aggressive behaviors, negativity occurs in their social information processing and they cannot decide on positive behavior (Denham & Bassett, 2020). Research has shown that self-regulation has an important place in decision making, controlling aggressive behavior, and positive perception (Fischer et al., 2007; Schmeichel et al., 2003). The research argues that individuals who do not have effective self-control skills cannot perform their social information processing in a balanced way; therefore, they have difficulty in deciding on effective and positive behavior in social situations (Fischer et al., 2008). Denham and Bassett (2020) concluded in their study that there is a relationship between children's self-control skills and social information processing. The result found in the current study also supports the relationship between self-regulation and interpretation and response decision. It can be said that self-control controls the responses of individuals in social situations, and that children with positive social competence and positive responses have a high level of self-control.

Assertiveness is the most effective way for children to express themselves while interacting with others. It is emphasized that the assertiveness skills of individuals are related to their social information processing skills (Vagos & Pereira, 2010; Vagos & Pereira, 2016). In a study conducted with preschool children with aggressive behavior, it is stated that as aggression behavior increases, social competence and assertiveness skills within the scope of social information processing decrease (Teague, 2006). In studies conducted with adolescent children, it is stated that children with high assertiveness skills have more positive coping styles with the social situations they encounter (Franco & Bazon, 2017; Mesa et al., 2013; Sarkova et al., 2013; Vagos & Pereira, 2019). In another study examining the studies on assertiveness, it is stated that high or low level of assertiveness is associated with aggression (Postolatii, 2017). It is seen that the studies conducted support the results obtained from current study. It was observed that children with high assertiveness skills react more positively in social situations they encounter.

There appears to be other research that supports the results obtained from the study. However, it is seen that these studies do not examine interaction skills by considering all the self-regulation, assertiveness, and cooperative behaviors as in the current study. In addition, it is seen in the studies that the relationship with the social information processing is not evaluated taking into account all the cooperation, assertiveness, and self-regulation skills as in the current study. Therefore, the results obtained from the current study are considered to be unique and important.

Conclusion

In the study, a relationship was found between children's social interaction skills and social information processing. This situation can be evaluated as children who make benign attributions, create positive responses, and respond positively in social situations they encounter, are more cooperative in the context of social interaction, have stronger self-control, and their assertiveness skills are high. It can be emphasized that cooperation,

assertiveness, and self-control skills have an important place in the development of children's social information processing.

Limitations and Recommendations

The study is limited to children aged 60-72 months. In future studies, it may be suggested to compare the social information processing and social interaction skills of children of different age groups and to conduct longitudinal studies examining the development of social information processing and social interaction skills. The study results are limited to the application of the SIPI-P to children through face-to-face interviews and observation of the IRSC. In this direction, data can be strengthened by measuring the positive-negative reaction decision in children's social information processing through observation. Results can be expanded by considering the opinions of teachers about children's interaction skills. Another limitation of the study is that it is designed descriptively. Intervention programs can be prepared to improve children's social information processing and interaction skills, and their effectiveness on children can be measured. Children's social interaction skills and social information processing may differ according to the socio-cultural characteristics they experience. This situation was not taken into account in the study. In further studies, the relationship between social information processing and social interaction skills of children at lower and higher socio-economic and cultural levels can be examined.

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