

Exploring the Role of Play-based Engagement on Screen Time, Attention, Empathy, and Social Skills among Preschool Children

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Abstract: Play refers to a group of voluntary activities that foster enjoyment, recreation, and contribute to children's development. Screen time is the amount of time individuals spend with devices such as televisions, smartphones, and computers. This study aimed to determine the impact of play engagement on screen time, attention, social skills, and empathy among preschoolers. For this purpose, 25 children, their mothers, and 7 teachers were recruited for a play-based intervention. After baseline measurement, the children engaged in play sessions for 20 days, followed by the post-intervention measurement phase. The data obtained was statistically analyzed. Findings from the Wilcoxon Signed Rank test revealed significant differences in baseline and post-treatment measures related to screen time, attention, social interaction, social cooperation, social independence, emotional contagion, attention to others' feelings, and prosocial actions. Spearman's correlation coefficient revealed a significant negative correlation between screen time and attention, and significant positive correlations among social cooperation, social interaction, social independence, and attention to others' feelings. Thematic analysis of video clippings and direct observations of the children produced themes such as cooperation with others, helping behavior, new adaptive behaviors, exploration, interaction with the environment, and empathetic gestures. Overall, the findings indicate the positive impacts of the play-based intervention on social skills and empathy in young children.

Keywords: play, screen time, attention, social skills, empathy

Play can be described as a series of voluntary, enjoyable activities that offer a sense of recreation while providing opportunities for exploration and experimentation with different environments or roles. It is characterized by physical movement, the use of imagination, and social interaction. In terms of cognitive development, play is effective in increasing attention span among children (Ruff & Lawson, 1990). Games like dart and ball-sports require players to concentrate on aiming at specific targets, thereby improving the ability to focus. Even play therapy sessions help increase sustained attention among children (Farzadfard et al., 2015). The social benefits of play are wide-ranging. Piaget (1962) identified a type of play known as pretend or fantasy play, which involves imaginary people or situations and operates at a symbolic level. It emerges near the end of the sensorimotor stage (2 years), increases during the preschool years, and then gradually declines as children grow older. Children display more positive emotions when their playmates engage in pretend play (Jaggy et al., 2020; Rao & Gibson 2021; Richard et al., 2021). Vygotsky (1933) suggested that pretend play involves children imitating the actions and behaviors of others. Therefore, play can also be

assumed to provide opportunities for emotional contagion. This refers to an automatic process that helps to understand others' emotions by unconsciously mimicking their facial expressions and behaviours. It is effective in developing empathy among children (Ho et al., 2023).

Some neurological studies have revealed particular brain regions associated with social processing and empathy, which get activated when children play with their social partners, suggesting that pretend play is effective in fostering empathic reasoning (Brown et al., 2017). Play promotes opportunities for children to become more cooperative and leads to better emotional regulation and self-regulating skills that are practised with peers (Mohan et al., 2022; Foley, 2017; Ashiabi, 2007; Galyer & Evans, 2001; Kalkusch et al., 2022). Play also fosters more emotional understanding by providing opportunities for children to maintain appropriate reactions to other behaviors. This further promotes social cooperation and interaction among children (Jaggy et al., 2023).

The effects of diminished play-based activities became a concern during the pandemic lockdown. The

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decision to close public spaces, including schools, parks, and play centers, reduced traditional recreational activities among children. Being at home created more opportunities for screen time as activities moved into virtual worlds (Toombs et al., 2022). This was a worrisome development because excessive use of screen time is an independent risk factor for reduced psychological well-being, which may be related to emotional reactivity, aggression, and externalizing behaviors (Parekh & Dalwai, 2021; Singh & Balhara, 2021). Greater screen time at a certain age may be associated with reduced quality of play and lower levels of emotional understanding at a later age, affecting parent-child interactions. (Muppalla et al., 2023; Domingues-Montanari, 2017; Nathanson & Beyens, 2018; Oswald et al., 2020). Although online platforms offered a lifeline for children to maintain different types of social engagement, they could not replace in-person interactions. Thus, the pandemic posed a threat not only to children's physical health but also to their quality of friendships, creative thinking, exploration, and learning through shared experiences (Chaturvedi et al., 2021; Montanari, 2017). In the aftermath of the pandemic, children continued to remain preoccupied with smartphones, television, and video games. There was an increase in social media usage, and the threat of being exposed to age-inappropriate content was constant. Many children found it difficult to adapt to post-pandemic life, which involved more face-to-face interactions. As making new friends and participating in group play felt unfamiliar to children, they experienced limited opportunities to learn through shared experiences, develop interpersonal bonds, and enhance their creative thinking. Though the pandemic has passed, screens have become a regular feature of children's lives. The current study aims to determine whether engagement in play activities is helpful for reducing screen time usage, increasing attention, and fostering social skills and empathy among preschool children.

Method

Objectives

1. To determine whether there are any differences in screen time, attention, social interaction, social cooperation, social independence, emotional contagion, attention to others' feelings, and prosocial actions between baseline measures and measures taken after engagement in play sessions for 20 days among preschool children.
2. To determine the nature of the relationships among screen time, attention, social interaction, social cooperation, social independence, emotional contagion, attention to others' feelings, and prosocial actions at the baseline level among preschool children.
3. To determine the nature of relationships among screen time, attention, social interaction, social cooperation, social independence, emotional contagion, attention to others' feelings, and prosocial actions after engaging in active play sessions among preschool children.

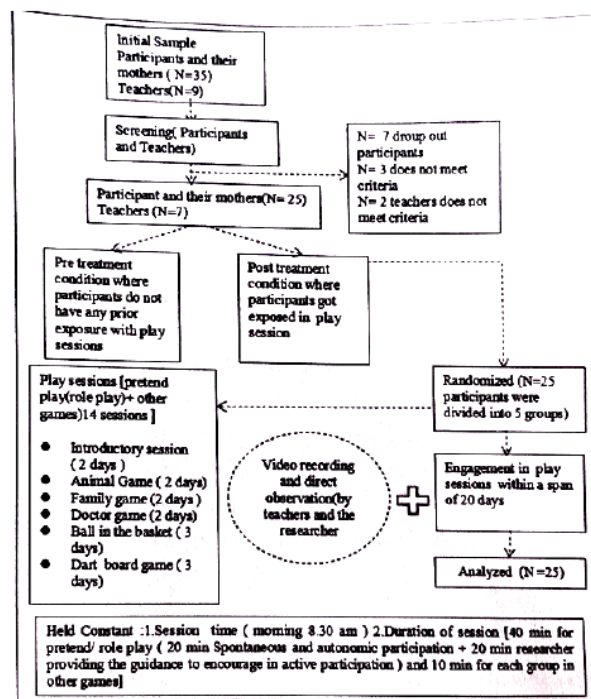
Sample

The research was conducted in a kindergarten school located in a suburban area of Ranaghat, Nadia, West Bengal, India. Thirty-five preschool students with average intelligence ($M_{IQ} = 101.56$) and average social adaptive functioning ($M_{SQ} = 100.64$) from families with middle socioeconomic status ($Mincome = 15,860$) were selected from nursery and lower kindergarten (L.K.G.) classes using purposive sampling. The initial sample involved children aged 3-6 years ($M_{age} = 4.7$), along with their biological mothers and 9 teachers from that school. For each child, consent to participate in the study was obtained from the mothers. The teachers who were recruited for the study had no psychological disorders according to the General Health Questionnaire. Consent was taken from each teacher to participate in the study and engage with the children during the play sessions. The data were collected from November 2023 through May 2024. A random sampling technique was used to divide the total number of participants into 5 groups, while during the play sessions, each participant was randomly chosen for role play.

Plan for the Study

Figure 1

Research procedure



Tool used for Screening

Developmental Screening Test (DST). This scale, designed to measure development across four key domains: motor skills (gross/fine), adaptive behavior, language, and personal-social behavior, was developed by J. Bharat Raj (1977). The inter-scorer reliability was found to be as high as 0.928. Test-retest reliability was found to be 0.98. The validity study indicated that $r=0.75$.

Vineland Social Maturity Scale (VSMS). The scale, which measures an individual's social competence, adaptive behavior, and personal independence, was developed by Edgar Arnold Doll in 1975, adapted for the Indian setting by A.J. Malin (1971), and later modified by Bharat Raj (1992). Reliability was found to be approximately 0.80 to 0.85.

Kuppuswamy Socioeconomic Status Scale. This is a widely used scale, first proposed in 1976 for the urban population to assess socioeconomic status. The dynamic nature of the scale may increase the degree of validity of any updated version of the scale.

General Health Questionnaire-28 (GHQ-28). The scale was developed by Goldberg and Hillier (1979) to detect potential mental health disorders and emotional distress. The test-retest reliability, split-half reliability, and Cronbach's alpha reliability values were found to be 0.70, 0.93, and 0.90, respectively, and validity was found in the sensitivity and specificity ranges, which were 44% to 100% and 73% to 94%, respectively.

Pre and post-intervention assessment tools

Seven in Seven Screen Exposure Questionnaire. This questionnaire was developed by Yalcin et al., (2021) and is a diagnostic tool designed to evaluate problematic screen media use in preschool children. The reliability of the questionnaire with Cronbach's alpha was found to be 0.49.

Preschool and Kindergarten Behaviour Scale (PKBS).

The scale that evaluates the social skills and problem behaviors of children was developed by Kenneth W. Merrell (1994). The internal consistency reliability of the questionnaire was found to be 0.94 to 0.97, and a high correlation was found in construct validity.

EmQue Scale. This scale measuring empathy in children was developed by Rieffe et al., (2010). The Cronbach's Alphas of two domains of this scale (attention to others' feelings and prosocial actions) were found to meet a minimum of .70, but the Emotion contagion domain had lower but still acceptable psychometric properties.

Digit Span Forward Test. This test is used to assess auditory rehearsal and temporary storage capacity in working memory and is used as an effective tool for measuring the attention of individuals (Reynolds, 1997). While the overall Digit Span subscale shows high internal reliability (around 0.93), individual components can show lower reliability in some samples.

Video recordings. In addition to measuring the variables using the above mentioned tools, children's play sessions were video-recorded. Video recordings are effective in assessing complex behaviors and relationships between behaviors (Haidet et al., 2009). A smartphone was used as a video recording medium for this study.

Procedure

For this study, the variables that were controlled for the pre-school children were age ($M_{age} = 4.7$), socioeconomic status (middle SES), intelligence (average level), and social adaptive functioning (average level). Before starting the study, formal approval was obtained from the school authorities. Subsequently, consent was obtained from the teachers and the mothers of the participants. To assess the intelligence and social quotient of the children, the Developmental Screening Test and Vineland Social Maturity Scale were administered individually. Teachers completed the General Health Questionnaire-28 to determine the presence of any psychological disorders. After the screening, 7 teachers and 27 children-mother dyads were selected for the study, 2 of whom discontinued. Finally, 7 teachers and 25 children-mother dyads participated in the research.

For the purposes of data collection, the Preschool and Kindergarten Behavior Scale and Empathy Questionnaire (EmQue) were translated into the Bengali vernacular, following the standard method of translation. These scales were administered to the mothers of the participants. The Seven in Seven Screen Time Measure Inventory and Digit Span Forward Test were used to measure the screen time usage and attention of the participants. To introduce different play activities to the participants, sessions were planned in consultation with a play therapist. Children then engaged in the planned activities over a period of 20 days. Video recordings of the play sessions were made for subsequent analysis. Teachers were requested to regularly observe the participants' behavior during these sessions. After the completion of all the sessions, a post-measure was conducted using the Digit Span Forward Test and the Seven in Seven Screen Time Measure Inventory to assess any significant changes in attention and screen time usage among the participants. Mothers completed a post-measure of the Preschool and Kindergarten Behavior Scale and the EmQue scale. Feedback forms were also gathered from both mothers and their respective teachers.

Ethical Considerations

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Institutional Human Ethics Committee of West Bengal State University, India. The participants provided informed consent wherein they were told about anonymity, confidentiality, and academic purposes of the data collection,

Data analysis

For the present study, the sample size was small. A Shapiro-Wilk test was conducted to analyze the normality of the data. The results indicated that the distribution of the majority of the scores departed significantly from normality. Hence, non-parametric tests, specifically the Wilcoxon signed-rank test and Spearman's correlation coefficient, were conducted for subsequent statistical analysis. Video recordings and feedback (from parents and teachers) were analyzed thematically. The analysis was conducted manually using open, focus, and axial coding, and it was rated by three researchers.

Results

Table 1

Mean and standard deviation of variables at baseline and post treatment

Variables	Mean (Pre) <i>n</i> =25	SD (Pre) <i>n</i> =25	Mean (Post) <i>n</i> =25	SD (Post) <i>n</i> =25
Screen Time	77.32	0.85	77.00	11.04
Social Cooperation	24.44	77.76	26.92	6.18
Social Interaction	22.24	6.70	24.40	5.93
Social Independence	23.56	4.62	25.88	4.57
Emotional Contagion	3.40	1.55	4.20	1.60
Attention to Others feelings	7.24	2.43	8.36	2.37
Prosocial Action	7.08	2.15	8.36	1.86
Attention Span	5.12	1.30	5.48	1.15

Table 2

Wilcoxon Sign Rank Test results between baseline and post treatment measure

Variables	<i>z</i> <i>n</i> =25	<i>p</i> <i>n</i> =25
Screen Time	-2.309	.021
Social Cooperation	-2.623	.009
Social Interaction	-3.317	.001
Social Independence	-3.936	.001
Emotional Contagion	-2.452	.014
Attention to Others feelings	-2.456	.014
Prosocial Action	-3.180	.001
Attention Span	-2.000	.046

As seen in Table 2, significant differences were found before and after the play sessions in the scores for screen time, social cooperation, social interaction, social independence, emotional contagion, attention to others' feelings, prosocial actions, and attention span.

Table 3

Spearman's rank order correlation results for the baseline measures

Variables	1	2	3	4	5	6	7	8
Screen Time	—							
Social Cooperation	.395	—						
Social Interaction	-.148	.791**	—					
Social Independence	.064	.817**	.658**	—				
Emotional Contagion	-.194	.027	.180	-.024	—			
Attention to Others feelings	.061	.463*	.354	.345	.297	—		
Prosocial Action	.056	.453	.320	.162	-.033	-.088	—	
Attention	-.441*	-.179	-.064	-.011	-.344	-.351	-.181	—

Table 3, shows the relationships between the variables of the pre-intervention measures.

Table 4

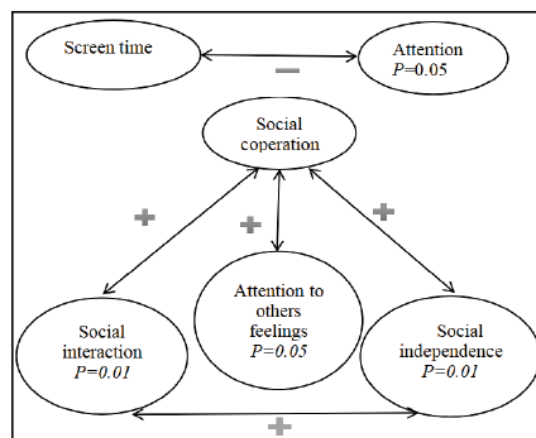
Spearman's rank order correlation results of post-treatment measures

Variables	1	2	3	4	5	6	7	8
Screen Time	—							
SocialCooperation	-.092	—						
SocialInteraction	-.091	-.835**	—					
SocialIndependence	-.081	.794**	.767**	—				
EmotionalContagion	.155	-.201	.022	-.262	—			
Attention to Others feelings	-.093	.434*	.479*	.386	.242	—		
Prosocial Action	-.153	.035	.076	.182	.371	1.00	—	
Attention	-.432*	.018	.066	.023	.035	-.091	-.059	—

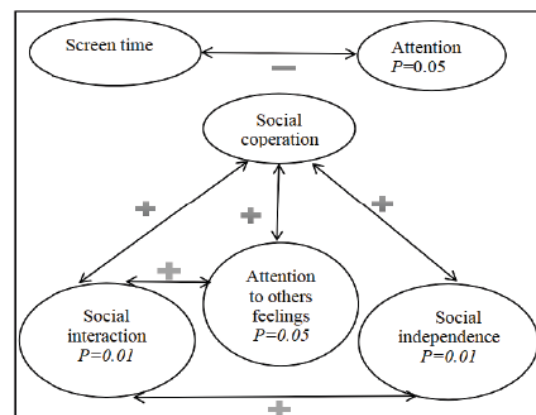
As seen in Table 4, similar outcomes were found for post-intervention measures, in terms of the relationships between variables.

Figure 2

Schematic representation of the correlation values in the baseline treatment measure

**Figure 3**

Schematic representation of the correlation values in post treatment measurements



Qualitative Results

In the present study, qualitative measures were used mainly to obtain a detailed understanding of the changes among participants after engagement in play sessions. The findings from video recordings were analysed in terms of themes: cooperation with others, helping behavior, new adaptive behavior, exploring and interacting with the environment, and expressing empathy. Findings suggested that significant changes were visible among the participants during the play sessions. Most children were found to be helpful, comforting, and interacting with each other, especially during role play. Specific examples of their behaviors included helping friends maintain the lines, discussing the roles given to them, sharing their water bottles with friends, and expressing comforting gestures to a wounded friend during role play. Cooperative interactions were observed, for instance, one child said to another, *"You blow the balloons, I am going to decorate the room, and you please make some food"* (Participant 5). Direct observation by the researcher and the teachers revealed that children who participated in the play sessions started expressing more cooperative attitudes toward other children, especially in classroom settings. As one teacher explained, *"Recently, I have witnessed that they are trying to share pencils, scales, etc among themselves, which I did not notice before. Seeing them, the other children got encouraged to do these things too"* (Teacher 1). Similar results were found from the feedback. Mothers described the impact of the intervention, saying that after engagement in play activities, children were not fighting with their siblings as they did before over toys and other personal belongings. As one mother said about her son- *"Basically, he used to get jealous of other children... even with his brother; but currently, he does not do that either. He started to play along with his brother and even share his toys with him"* (Mother 10). Another mother said about her child, *"After participating in play activities, I found that he started liking to play with other children, even started to follow rules, and started helping me a little in the household."* (Mother 7). A teacher reported, *"Recently, I have noticed that they no longer bother each other as before, when one of them started crying, others started to comfort them"* (Teacher 3). It was reported that attention spans had improved, as one teacher mentioned, *"Earlier, students did not pay much attention in the class, but after the intervention they became more attentive during class, and over time they started following*

instructions more carefully and started responding more readily when asked." (Teacher 3).

Discussion

After the pandemic, children have shown a high tendency to spend their leisure time with smartphones, television, and other gadgets. Spending time with screens pulls children away from real-life contexts. This can reduce their ability to grasp the nuances of face-to-face communication or interpret nonverbal cues and gestures. Moreover, higher screen time usage among children is associated with more behavioral problems, poorer vocabulary, and delays in other areas of development (McArthur et al., 2022). The purpose of this study was to determine the role of play in reducing screen time and fostering social skills and empathy among preschool children. This play-based intervention was designed based on previous literature that suggests the positive role of play in helping children explore and experience the world around them and construct their social position within the world (Awopetu & Ossom, 2018). Play is one of the most effective media that can be offered to children to experiment with new ideas or concepts.

Results indicated a significant decrease in screen time usage at post-treatment measures. The feedback from parents revealed that engagement in play helped children explore their surroundings. They were spending less time with video games and other media and engaging themselves in play activities. In addition, there was a significant increase in attention span between the baseline and post treatment measures. Attention was found to be negatively correlated with screen time usage.

The significant increase found in social cooperation scores after the intervention suggests that play can help children become less inclined towards competing with each other and more focused on cooperating. Previous studies support such findings, suggesting that group games are an important factor in children's cooperation skills (Sohrabi, 2021). The increase in social interaction between the baseline and post treatment measures indicates that play sessions were effective in promoting social engagement. Moreover, the positive correlation found between social interaction and social cooperation suggests that as children interact more with each other, it fosters harmony between them. The increase noted in social independence between the baseline and post

treatment measures shows the helpful role of play in strengthening children's abilities to form bonds with others without much parental support or supervision. This ability, in turn, was positively correlated with social cooperation and social interaction. These findings appear to go hand-in-hand with the increases observed in emotional contagion and attention to others' feelings, after the intervention. Social interaction and social cooperation were positively correlated with attention to others' feelings, suggesting that working in a group setting becomes truly effective in fostering empathy because, as long as they want to play together, children need to be interactive and cooperative. Such changes gradually allow them to develop an understanding of how other people may feel and react in different situations. The increase seen in pro-social actions suggests that play can reduce self-centeredness and foster helping behavior and reciprocal communication (Ulutas & Aksoy, 2009).

Qualitative analysis revealed a transformation in participants' behavior from disruptive actions (such as pushing or nagging) to more positive interactions, including smiling, following instructions, and sharing toys. During the play sessions, children were encouraged to share their ideas. Most children eagerly awaited their turn to contribute to the discussions. Cooperative gestures were observed (during role play) through actions such as shopping, cooking, dish washing, helping each other to decorate rooms, and even calling a doctor in an emergency. Such activities promote an understanding of social roles while encouraging children's creativity and imagination. In the current study, play activities helped children develop new adaptive skills, as some participants acted as role models for other group members. During the sessions, the children watched each other's behavior and tried to imitate each other and be helpful (if one was cleaning the floor, the other participants wanted to help him or her). Engagement in play activities helped children make decisions, solve problems, and take care of each other. They also observed the reactions of children around them, which fostered awareness of others' emotions and the ability to empathize. Video recordings indicated that during *doctors game*, when one child (in the role of a patient) started crying, other children came to comfort him. One child said to him, "*I know it hurts a lot, please don't cry. Look, I am putting medicine on it.*" (Participant 4). Additionally, certain behaviors, such as asking for suggestions from the researcher as well as from each other,

gradually helped them adapt social skills essential for daily living. The play sessions offered opportunities to children to ask questions, explore their feelings, and interact more voluntarily with each other. According to previous literature, children's social skills learning occurs through their everyday play because it provides great opportunities for interaction, cooperation, and conflict management among themselves (Hinkley et al., 2018). Participants who were engaged in certain behaviors, such as talking, smiling, and looking at each other, and exploring the toys among themselves, were most likely to participate and interact with each other. They engaged in making suggestions about the corresponding roles given to each child. According to the teachers, such changes in behaviour extended to real-life settings.

Limitations and Implications

The study consisted of a small sample, and the generalization of findings is not possible. Gender differences were not considered in the study. Moreover, a cross-sectional perspective has been offered here. Future studies may investigate the long-term effects of play. In today's world, owing to advanced technology and social changes, children have become more confined to virtual worlds, and their physical, social, and mental development has been severely hampered. Promoting play-based interaction among children helps create inclusive and supportive learning environments, and if they can be encouraged to participate in physical play, especially in schools or homes, it will become extremely beneficial for their overall development. Play-based interventions can also be used as an early preventive strategy with children experiencing behavioral problems. Furthermore, community centers can organize play-based learning programs and outdoor activities, which can help in children's overall development.

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