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The Power of Play: Examining the Impact of a School Yard Playground on Attitudes Toward School and Peer Relationships Among Elementary School Students in Chennai, India

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Abstract

Introduction. School environments may impact elementary school students' attachment levels to school as well as their mental and emotional well-being. Yet investments in recess/play infrastructure lag commitments to academic resources, particularly in developing countries. The main objective was to examine the impact of installing playground equipment, in the school yard, on students' attitudes toward school, peers, and the capacity to play of elementary-school children in an underserved, inner-city school in Chennai, India. *Methods.* A previously validated school attachment questionnaire was modified and administered to 140 and 148 students in pre- and post-playground installation, respectively. *Results.* For 7 out of 13 survey questions, student attitudes about their own recreational time and their attitudes toward peers significantly improved after playground installation. *Conclusion.* These results highlight the need for investments in play spaces, and recreational equipment may be just as important as addressing academic needs, especially among underserved children.

Keywords

playgrounds, developmental psychology, mental health, children

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Key Practitioner Message

- Clinicians should implement a socio-cultural intake during patient examination, as environmental influences in early childhood have been shown to impact mental health and emotional well-being as well as the person's long-term growth development.
- Understanding the impact of recreational facilities on childhood school attachment and peer relationships is underrepresented within developmental psychology research. The findings of this study suggest an increase in funding for research focusing on the mental and social impacts of recreational play on children. Clinicians may be able to work closely with the school system to scientifically urge investments in play areas.

Introduction

School environments, both within and outside the classroom, have a tremendous impact on the cognitive, social and emotional well-being of children.[1] Active play, which includes unstructured, spontaneous physical activities and behavior in which children engage can greatly facilitate learning and development.[2] Although over 90% of children across the world attend school, many learning environments throughout the developing world are not conducive to learning.[3] Restricted funding has led to an exclusive focus on formal classroom-based education at the expense of playgrounds. In such situations, school yard playgrounds may be a beneficial and

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necessary intervention that meets the need for play among these students.

Substantial research has evaluated the positive impacts of playgrounds and associated physical activity on students' physical activity levels and health indices such as lower body mass indices (BMI).[2,4-6] Other studies have described the effect of green spaces and school yard greening on improving physical and socio-emotional health.[3] Through a prospective intervention study in the Netherlands, researchers found that the introduction of green areas significantly improved children's appreciation for the school yard and attentional restoration post-recess.[7] In a rural area of Austria, Kelz and colleagues also noted decreased levels of psychological stress following school yard renovation.[8] Dilbil and Basaran also conducted a study in the Izmit district of Turkey and found that after drawing colorful playgrounds within school yards, a significant difference was observed in terms of pre- and post-school attachment levels among students.[1] Although not an actual physical structure, such drawings enabled children to play traditional Turkish games and build camaraderie with peers.

Meanwhile, however, another group found mixed results in the amount of physical activity and time spent outdoors post-school yard renewal across 6 Danish schools.[9] When examining girls who were least active before school yard improvement, they found no significant increase in physical activity.[9] Of note, many of these studies were conducted in developed countries, which often are characterized by advantageous environments, perhaps more conducive to improvement after school yard change as compared to underdeveloped regions.

In the US, preliminary research, though limited, in neighborhood and underprivileged schools has been conducted. In Chicago, one study noted that school yard greenery promoted positive youth development and less bullying.[10] Anthamatten et al., found that renovation strategies in inner-city Denver did confer a significant increase in physical activity.[11] It could be that more consistent follow-ups are needed to show a change, especially since there are not existing models for play in such districts to begin with. In fact, in countries like India, urbanization has crowded free spaces leaving limited options for unstructured play areas among inner-city schools. In such situations, even small-scale school yard playgrounds, within the confines of a school building may be a beneficial and necessary intervention that meets the need for play among these students. Research documenting the impact of such play structures on the emotional well-being and school attachment among students, in developing countries, is scarce.

Our present study examined the impact of installing a school yard play structure on students' attitudes toward school, peer relationships, and capacity to play, using a modified school attachment questionnaire. The study was conducted in an underserved, inner-city elementary school in Chennai, India in a 4-story building.

Methods

Design

In this study, pre- and post-questionnaires were administered to students in grades 1 through 6, before and after installation of playground equipment on the school premises. The study period ranged from June 2019 to July 2022. While the original study was designed to be completed over 1 year, school shutdowns during the pandemic disrupted playground installation and the timing of post-playground questionnaires, and the post-survey was conducted 2 years post-installation.

Setting/Intervention

The study was conducted in the Hajee Essa Abba Sait Higher Secondary School located in Chennai, India. The school is a K-12 institution for low-income female students and provides free tuition. The study intervention consisted of playground equipment installed on the terrace (960 ft^2) of the school building. The installation took around 1 year, and the equipment included slides, ropes, seesaws, and ladders. In collaboration with the construction vendor, care was taken to ensure equipment was appropriate for the age range at the school. Funding (USD 7000) for playground equipment was provided by "One World from Science to Service," a non-profit organization that aims to enhance education among underserved populations across the globe by utilizing (Science, Technology, Engineering, Arts, and Math) STEAM principles. See Figure 1A and B for pre- and post-school yard appearances.

Sampling of Study Population

All students in elementary school, in grades 1 through 6, were considered eligible for the study. Each grade level/classroom in the school has about 20-25 students enrolled any given year; this fluctuated greatly throughout the study period, especially with the pandemic. At follow-up, the study population was at its peak in classroom attendance, with new enrollment. Students were informed that the study was completely optional and confidential, and they did not have to put their name or any identifying information on the questionnaire. They

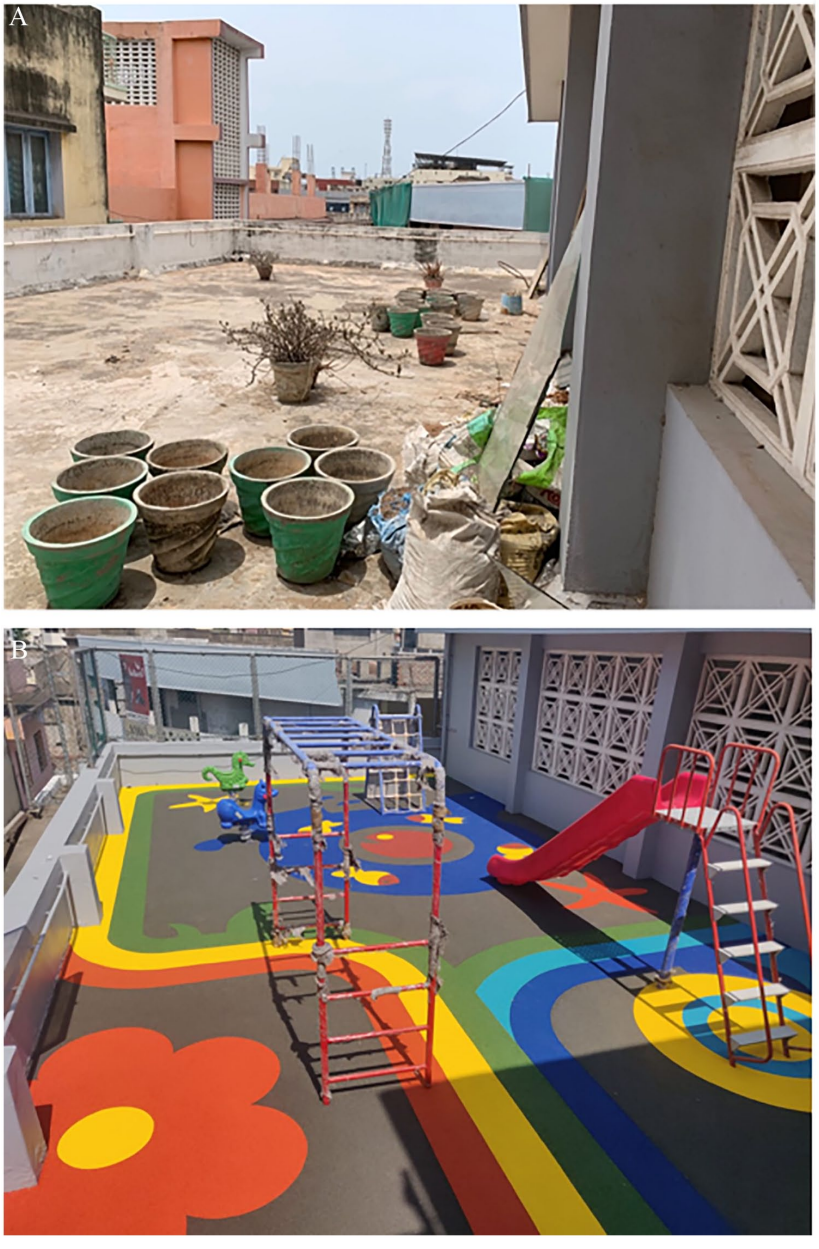

Figure 1. (A) Pre-playground installation. (B) Post-installation.

could choose to fill out any or all the items on the questionnaire. They could also turn it in without answering any of the questions. Participants were only excluded if they choose not to participate in the study.

Measurements and Data Collection

An impact survey was derived from the School Attachment Scale (SAS) and the questionnaire used in Dilbil and Basaran's research.[1,12] Dilbil and Basaran's playground questionnaire was approved by the Ministry of National Education (MNE). Moreover, pilot reliability and validity testing were conducted in primary and secondary school students with Cronbach alpha coefficients exceeding 0.8. Items were selected to reflect the setting in which our study was conducted, as well as to learn about the student's experiences during recess and leisure activities in the school yard. Surveys were administered during

the school day. Dilbil and Basaran's SAS was a 13-question survey, and the questionnaire was a separate 18-question sheet; we combined both measurement tools into a 13-question survey that was more manageable for students. As the native language was not English, the survey we used was adjusted (13 yes vs no questions compared to Dilbil & Basaran's scale). The personal information questionnaire included questions regarding the sex (even though all participants were female), age, and grade of the participant. No identifying information, such as names of students, was collected. Before playground installation, the initial attachment survey was administered to female students, aged 5 to 11 and in grades 1 to 6. The post-survey was later administered (samples were not paired) to the same grade and age ranges.

Statistical Analysis

The outcome was yes/no, and the proportion of "yes" (indicative of a positive attitude toward the school) answers for each question among the sample was determined for the pre- and post-test. Using a two-sample t-test (unpaired), the mean "yes" proportion across all questions between the pre- and post-samples was compared. Chi-square analyses were also used to compare pre- and post-yes proportions for each question on the survey.

Ethics

A detailed proposal, including the survey items, was submitted to the school's governing board of directors, and a written letter of approval (April 1st, 2019) from the school correspondent and headmistress was received (Supplemental Documentation) Passive consent was also received by participants' families, and after sending a letter home to all participants, no guardians rescinded their child from study inclusion. We agreed to share the data obtained in aggregate and with no personal identifying information. After a review of the study protocol and weighing the benefits of the study, which could help improve the school environment and climate, permission to conduct the study was granted. Study personnel acted per established school protocols and policies.

Results

The demographic distribution of students, by age and grade level, is shown in Table 1. A total of 140 students completed the pre-test questionnaire and 148 students completed the post-questionnaire. All participants were female and the age and grade distribution ranged from 5 to 11 (proportions (%): 3.34, 23.65, 16.21, 23.65, 21.62, 7.43, 4.05) and 1 to 6 (proportions (%): 22.97, 16.89, 18.92, 20.95, 18.24, 2.03), respectively.

Table 1. Demographic Distributions of Study Participants.

Student	N (pre)	%(pre)	N(post)	%(post)
Sex				
Female	140	NA	148	NA
Age				
5	22	15.7	5	3.34
6	6	4.28	35	23.65
7	27	19.29	24	16.21
8	25	17.86	35	23.65
9	39	27.86	32	21.62
10	16	11.43	11	7.43
11	5	3.57	6	4.05
Grade				
1	29	20.71	34	22.97
2	25	17.86	25	16.89
3	31	22.14	28	18.92
4	0	0.00	31	20.95
5	31	22.14	27	18.24
6	30	21.43	3	2.03

The mean in this table represents the average proportion of participants responding "yes" across the survey's 13 question.

Table 2. Pretest and Posttest Results for School Attachment Scale (*T*-Test).

Statistic	N	Mean	SD	*t*	*P*
School Attachment Scale					
Pretest	140	0.7819	0.2385	12	.0191
Posttest	148	0.96622	0.0329		

An overall attachment/impact score was derived and is shown in Table 2. After playground installation, there was a statistically significant difference in the attachment/impact score as evidenced by the proportion of students with a positive attachment between the pre- (0.78) and post-sample (0.96) ($t = 12$, $P = .019$).

Table 3 shows differences in pre- and post-questionnaires, by individual questions. Statistically significant differences are noted, and more students answered positively to the following questions: *Do you feel happy while playing games in your school?* ($P < .0001$); *Do you feel happy playing on the playground at your school?* ($P = .0007$); *Is it fun for you to play games at your school?* ($P < .0001$); *Does playing games motivate you to do better in school?* ($P < .0001$); *Do you have more friends when you play in the school yard?* ($P < .0001$); *Can you overcome shyness when playing in the schoolyard?* ($P < .001$); *Do you think that playing games with friends helps you work better with them in*

Table 3. Survey Question Pre- and Post-Results (Chi-Square).

Statistic	N	% (Yes)	Chi-squared	*P*
I am happy to be in this school.				
Pretest	140	89%	3.541	.0599
Posttest	148	95%		
I love my school.				
Pretest	140	97%	0.296	.5866
Posttest	148	98%		
I have many friends that I like in my classroom.				
Pretest	140	91%	0.391	.5318
Posttest	148	93%		
I have friends that I care about in my school.				
Pretest	140	98%	0.293	.5867
Posttest	148	97%		
I have friends who care for me in this school.				
Pretest	140	91%	0.684	.4081
Posttest	148	88%		
Do you feel happy while playing games in your school?				
Pretest	140	78%	31.77	**<.0001**
Posttest	148	99%		
Do you feel happy playing on the playground at your school?				
Pretest	140	90%	11.418	**.0007**
Posttest	148	99%		
Is it fun for you to play games at your school?				
Pretest	140	85%	19.527	**<.0001**
Posttest	148	99%		
Does playing games motivate you to do better in school?				
Pretest	140	88%	18.795	**<.0001**
Posttest	148	100%		
Do you feel good once you win a game?				
Pretest	140	94%	1.515	.2184
Posttest	148	97%		
Do you have more friends when you play in the schoolyard?				
Pretest	140	33%	120.91	**<.0001**
Posttest	148	95%		
Can you overcome shyness when playing in the schoolyard?				
Pretest	140	29%	154.363	**<.0001**
Posttest	148	99%		
Do you think that playing games with friends helps you work better with them in the classroom?				
Pretest	140	53%	79.881	**<.0001**
Posttest	148	98%		

Boldness indicates statistical signfiicance.

the classroom? ($P < .0001$). As per Chi-Square analyses, 7 out of 13 questions on the playground questionnaire student attitudes about their own recreational time and their attitudes toward peers significantly improved after playground installation.

Discussion

We evaluated the impact of installing a school playground on student perceptions, with respect to attachment to their school environment, play activities, and peers. Results demonstrated an overall significant increase in the proportion of students responding with a positive attitude regarding their school yard and recreational activities, as well as a trend to positive feelings about their school in general.

After installation of the playground equipment, students responded positively, in much higher numbers, to questions regarding their activities and interactions in the school yard, such as "Do you feel happy while playing games in your school?", "Do you have more friends when you play in the school yard?", "Can you overcome

shyness when playing in the school yard?". Our findings support the results obtained by Dilbil and Basaran, who found significant differences in enjoyment from school yard activities after playground drawings were added to the school yard.[1] At first glance, many of the significant questions relate to games, which aligns with the introduction of a space where there is more potential to engage in games. The first question about "feeling happy to be in this school", though nearly significant, demonstrates the preliminary impact of the play structure on student self-report of emotions. The other questions may not have been significant due to confounding variables relating to specific questions. For example, questions about friendship can be influenced by other factors outside of the presence of a playground, accounting for the consistency seen before and after. These findings underscore the importance of access to playgrounds for peer interactions and the development of social skills. Cooperation, division of labor, and mental planning are all psychological traits that are enhanced by games in early childhood.[13] Interactions on a playground can also build a strong sense of community and enhance social cohesion.[14]

Beyond questions related to actual time spent on the playground and interactions with peers, students also responded much more positively to how playing with friends positively impacts their overall academic experience. For example questions such as "Do you think that playing games with friends helps you work better with them in the classroom?", " Does playing games motivate you to do better in school?" had significantly more affirmative responses after playground installation compared to before the installation.

We also found that more students (96% vs. 89%, *P*-value .0599) responded positively to the question, "I am happy to be in this school", after installation of the playground. Research suggests that active play contributes to children's socialization, affects their studying skills in a positive manner, and increases levels of attachment to the school.[15] Positive attachment to school, in turn, can lead to improved relationships with their teachers and friends, higher levels of self-esteem, and generally feeling more content about their lives.[1] In contrast, research suggests that children lacking the feeling of attachment to school are not motivated to study.[16]

The Gap between Developed Versus Developing Countries

Some of this positive correlation can certainly be attributed to increased physical activity and its impact on enhanced learning, as well as helping young students stay focused for longer periods.[17,18] After school yard improvement, Brink and colleagues found an increase in activity levels and a decrease in sedentary behavior among Denver public school students.[19] Similarly, Hyndman and colleagues noted that the introduction of a playground intervention incurred a significant long-term effect (methods including a questionnaire) on children's physical activity in New Zealand. Moreover, Dijk-Wesselius et al., using the Likert scale, demonstrated a positive appreciation and likeness toward the school yard post-renovation.[7] This parallels the significant increase in school attachment ratings witnessed in this study, supporting the notion that recess spaces can directly translate to improved school perceptions and potentially better socio-emotional health, even in underdeveloped regions.

Despite these obvious benefits, time and space for play may be especially compromised for impoverished communities and students living in unsafe neighborhoods may not have the same options for unstructured play at home.[20,21] Moreover, according to the All-India School Education Survey, only 39% of government schools in the country and 48% of private schools had a playground within the campus. Findings from our study illustrate how important it is to rectify this gap and provide children access to play structures and equipment.

The positive correlation between playground activity and socio-behavioral outcomes has important policy implications for stakeholders in fields ranging from education to pediatric mental and physical health. It also lends support to prior literature in developmental psychology that stresses the importance of physical activity in the social and emotional development of children.[22] Future research should analyze this study's hypothesis on a larger scale in terms of sample size and schools included. Moreover, given our study assayed student perceptions, future work should investigate more objective measures of school improvement. In summary, though our results are preliminary, they highlight the scientific and political need to invest in school-environment research and create a budgeting stream for play spaces, particularly for schools in developing countries like India, even with limited space.

Strengths and Limitations

Our study has several strengths. Research in South Asia and in low-income schools is unrepresented within this field, as well as in the broader arena of school.[23] Most referenced studies even in this paper are based on school playgrounds in the Western Hemisphere. Our sample was entirely female students, another underrepresented area of research.[1] However, our study did have some limitations. Though the playground questionnaire was

derived from Dilbil and Basaran's, which was validated through statistical testing, we did not conduct any pilot testing ourselves before experimental execution. Therefore, without reference data, responses given by younger age groups, for example, (ex. 5) may be confounded by other factors given the binary nature of each question. In addition, due to circumstances beyond our control, the timing of the post-survey was later than initially desired because of the COVID-19 pandemic. This may have led to some overestimation of the positive outlook upon students returning to school. However, this was not the case for all questions regarding school climate which indicates that our findings specific to the playground installation remain largely valid. The survey we used was adjusted for simplicity for students (yes vs no compared to Dilbil & Basaran's scale), given the native language was not English. Lastly, due to the transient nature of the population (children of day laborers and hourly wage workers), we could not ensure an exact paired sample for pre- and post-questionnaires. For example, there may have been participants who were in the pre-study but did not complete the post-study (and vice versa) due to enrollment dropouts.

Conclusion

The findings of our study highlight the importance of installing playground equipment and play structures in schools, even in buildings with limited outdoor space. Such investments may lead not only to improved student-school perceptions but also better mental and emotional health. Future work should analyze the direct impact of playgrounds on mental and physical health measures, with experimental comparison to schools without play structures. These impacts must inform educational investments, particularly within developing countries and underprivileged communities around the globe.

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Author Contributions

Shan Lateef (data analysis, study administration, writing), Rhea Zahir (methodology development, statistical advice), Leena Sherdil (writing, study assistance), Dr. Carol McCleary (revision, review, final approval), and Dr. Tasnuva Shafin (revision, review, final approval).

Declaration of Conflicting Interests

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Ethical Information

Permission to conduct the study was granted by the school's principal and head administrators, in consultation with ethics school's governing board.

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Supplemental Material

Supplemental material for this article is available online.

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