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Social behavior of preschool children in relation to physical spatial definition

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Abstract

Previous Western-based studies had revealed that preschool children exhibited more positive play/social behaviors within well-defined spaces. This paper investigated 5 types of play/social behaviors among 494 Malaysian preschool children, aged 5–6 years, of both genders, in 20 classrooms categorized into well defined, moderately defined, and poorly defined. The methodology involved personal natural unobtrusive observations, video recordings, behavioral mapping, and interviews. The findings revealed results similar to those of the previous Western-based studies. The implications of the findings were discussed in relation to the design of future preschool classrooms.

Keywords: Developmental psychology, preschool children, social behvior, classroom design.

1. Introduction

The importance of early childcare and education had been recognized both locally and in more developed nations. Locally, according to Raja Harun, et al. (2005), preschool education is critical and forms the basis for ensuring the success of an individual. In the West, Weinstein and David (2005) concurred that formal preschools contribute to cognitive development among Western children, which leads to greater intellectual competence and cognitive maturity. However, unlike the case of Malaysia, the more developed nations have given equal emphasis to both the physical and nonphysical environments of preschools. For example, Morrow (2007) stressed that the importance in pre-schools should not only concentrate on lesson planning but also on the spatial arrangements or physical environment, which are of equal importance. In fact, Moore (2008) concurred that it is already well known that the quality of preschools and the like is related to the quality of the designed physical environment.

Indeed, it is well established in the literature that the physical environment influences human behavior. Compared to adults, children are known to be more sensitive in their perception of the physical environment; hence, it has a greater effect on the way they conduct themselves (eg., Ozcan, 2006). Often, research findings reported were

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Western-based. Those pertaining to the influence of the physical environment upon preschool children's play/social behavior are no exception—in particular, studies about the influence of spatial definitions upon those children. Those studies had revealed that preschool children exhibited more positive play/social behaviors when the spaces are well defined. Are the behaviors of preschool children universal? That is, similar results would be the expected when experiments are conducted upon non-Western preschool children. Or are there cultural differences, wherein preschool children would behave differently.

This paper is an outcome of an ongoing research project that investigated the relationship between the physical environment of Malaysian preschool classrooms and the preschool children's play/social behavior. It aimed to investigate the influence of the spatial definitions of classrooms upon the children's social/play behavior. The main objective was to determine whether the social behavior of preschool children is universal in relation to the physical definition of spaces. That is, they are expected to exhibit more positive play/social behaviors when the spaces are well defined, similar to previous Western-based findings. The strategy of the research design was case studies upon existing preschool classrooms, while the methodology for data collection involved natural unobtrusive observation, video recordings, behavioral mapping and structured interviews.

2. Literature Review

The influences of the indoor physical environment upon Western children's behaviors are well documented in the literature. They dealt with matters such as spatial definitions, space requirements pertaining to crowding and privacy, implications of the spatial volume and wall color, spatial perception, playroom arrangement, children's competency, and development.

Some of the previous studies pertaining to spatial definitions of classrooms in relation to children's play behavior are those by Moore, et al. (1994), Zimmons (1997) and Moore (2008). These studies were based on quasi-experiments upon Western pre-school children. Both studies found significant differences between areas within the classroom spatially designed to support pro-social interaction (cooperative play, social conversation) as compared to areas within the classroom not designed to support pro-social interaction. Their results indicated that when furnishings in the classroom environment created more spatial definition, children responded with positive behaviors such as more cooperative play and social conversation in spatially defined areas.

On the issue of space requirements and crowding, Kantrowitz and Evans (2004) found that the ratio of children to the number of activity areas in the classroom positively correlated with off-task time. There was also a marginal, negative correlation to engagement in constructive play. Ahrentzen and Evans (1984) reported that students in classrooms with amenities for private study actually reported lower levels of privacy than students without such classroom amenities. This unexpected finding may be due to limited access to those amenities even when students were present in the classroom. Children preferred to be in secluded study areas or corners when they wanted to be alone.

In relation to the implications of the spatial volume and wall color, Read, et al. (1999), for example, found that differentiation in ceiling height or wall color was related to higher levels of cooperative behavior among preschool children. On the issue of space perception, Stankovic and Stojic (2007) reported that if some space is constructed and equipped in the right way, the development of a child's increased abilities is supported, and this allowed the child's capacities to be confirmed by the child.

Pertaining to playroom arrangement, Legendre (1999) found that the type of furniture arrangement did not change the joint use of play areas and the social interactions for the peers whose relationships were weak. In contrast, for children showing an emerging relationship, the playroom arrangement affected the quantity and the quality of their social interactions.

Implications of the physical environment on children's competency and development have also been studied. For example, Maxwell (1996) developed a rating scale to assess the physical environment's role in the children's development of cognitive and social competency. He found that the physical environment is related to measures of competency. Mashburn (2008) examined associations between the quality of social and physical environments in preschools and children's development of academic, language, and literacy skills, and the extent to which preschool quality moderated the associations between child risk and development. He found that high-quality social environments were positively associated with children's academic and literacy skills at the end of preschool. He also reported that although the quality of the physical environment was not associated with children's outcomes at the end of preschool, higher quality physical environments moderated the negative associations between income and academic development and between non-White race/ethnicity and literacy development.

3. Research Design

Amongst the suggestions for different strategies proposed by Yin (1994), the strategy chosen for the research design was case studies upon existing preschool classrooms located in both urban and non-urban areas. Data

collected for the methodology involved personal observations and video recordings, behavioral mapping, and structured interviews. The personal observations involved natural unobtrusive observations and video recordings of the preschool children's behavior during their break time. The behavioral mapping involved charting the preschool children's behavior in a pre-drawn classroom layout. The structured interviews involved professional interior designers in the categorization of the various classroom layouts in relation to the spatial definitions. The methodology emulated previous studies done by Zimmons (1997) and Moore (2008). However, the present study was distinctive in that while both the previous studies were based on quasi-experiments on Western children in one area, the present study was based on Eastern children in the natural settings of preschools in Malaysia at both urban and non-urban locations. The methodology involved two phases, the pilot study and main study phases.

3.1. Pilot Study

The pilot study was more of a familiarization exercise for the researcher prior to conducting the main study. This involved four classrooms in two preschools randomly selected, representing both a new annex building (Figures 1.1 and 1.2) and renovated existing classrooms (Figures 2.1 and 2.2), with one located in the urban area and the other, in a non-urban area. The study served to obtain baseline information before the actual study began, allowed the researcher to understand the preschool environment in more detail, provided an opportunity to address and possibly control any unforeseen elements that could impact the study, and pretested the instruments that measured the room temperature, noise, and lighting levels.

3.1.1 Procedure

Prior to the study, permission from the Selangor Education Department, Ministry of Education (MOE), was obtained to conduct the survey in the respective public preschools. Appointments were then made with the headmaster and teachers on the first day. The methodology for the data collection was then explained. The layout of the classroom was drawn on the second day; it showed the spatial organization, furniture layout, position of mechanical ventilation (ceiling fan), artificial lighting, and the position of doors and windows and other architectural features. Photographic documentation captured the ambience of the interior, which included the types of furnishings and finishes. The time spent was also used to get acquainted with the children. The main observation of the children's behavior was done on the third day. Arrival 90 minutes before the observation period ensured that ample time was available for setting up the video camera and the recording of the room temperature, lighting, and noise level. Observations were recorded at 30-second intervals for the total duration of the free-play period.

3.2. Main Study

Prior to the main study, a few adjustments were made to the observation process:
a) Observation of the spatial behavior needed to be extended to 15 minutes instead of 10 minutes. This is because of the time-sampling method adopted, which is split into 3 intervals of 5 minutes each.
b) Behavioral mapping of the children had to be included in order to identify the spatial choice and location in the classroom during 'free play' time (Sanoff, 1995; Morrow, 2001).

The social behaviors of the children were observed on the basis of the categorization shown in Table l. Overall, data collection took a period of 12 weeks each for the preschools located in the urban and non-urban areas. They involved the observation of 494 children's behaviors, aged 5–6 years, of proportionately equal genders, in 20 classrooms, from the 10 preschools located in both urban and non-urban areas.

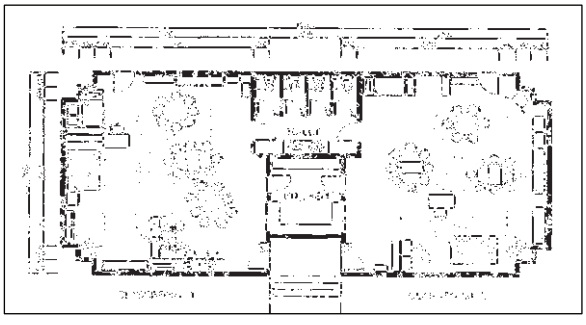


Figure 1.1 Example of the layout of the floor plan of the new preschool building (annex building) with two classrooms

Figure 1.2 Front view of new preschool building (annex building) with two classrooms

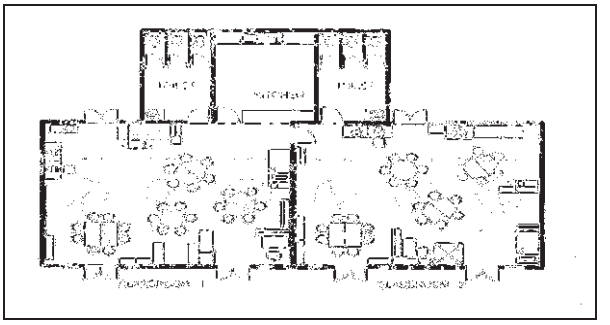


Figure 2.1 Example of the layout of the floor plan of the renovated public preschool classroom

Figure 2.2 Front view of the renovated public preschool classroom

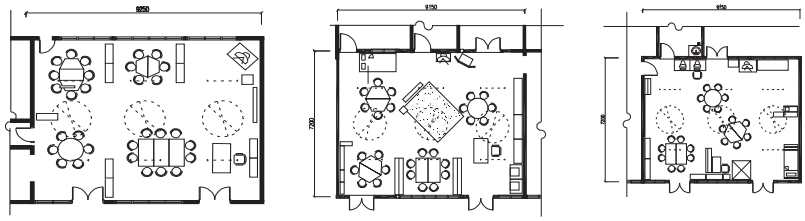
Table 1. Categories of children's play/social behaviors

Children's Play/Social Behavior	Characteristics
1) Appropriate Behaviors	Social Conversation, Cooperative Play, Friendly Touch, Unilateral Bid, Teacher-Child, Solitary Play, Parallel Play, Onlooker, Transition, Unoccupied
2) Non-appropriate Behaviors	Argue, Rough Play, Object Possessiveness, Aggression, and Victim of Aggression
3) Interactive Behaviors	Social Conversation, Cooperative Play, Friendly Touch, Unilateral Bid, Teacher-Child, Argue, Rough Play, Object Possessiveness, Aggression, Victim of Aggression
4) Non-interactive Behaviors	Solitary Play, Parallel Play, Onlooker, Transition, Unoccupied
5) Neutral Behaviors	Onlooker, Transition, Unoccupied

4. Summary of Main Findings

Prior to the analysis of the data collected, expert opinions among 37 professional interior architects were sought to categorize the classrooms involved in terms of the three types of spatial definitions in relation to the activity setting as follows: well defined, moderately defined, and poorly defined. Well-defined spaces are areas limited to only one activity, clear from circulation space and other activities, and with at least partial acoustic and visual separation. Poorly defined spaces involved areas where spatial definition is low, with inappropriate space for the group size, and work surfaces unsuitable for the particular activity. Moderately defined spaces are areas with

characters between those two extremes. The samples were categorized by the interior architects as shown in Figure 3.



i) Well defined ii) Moderately defined iii) Poorly defined

Figure 3. Examples of spatial definition for the categorization of classrooms

4.1. Distribution of categorized classrooms

Overall, a majority of 70% of the classrooms in both urban and non-urban locations were categorized as moderately defined, while 20% were categorized as poorly defined in the urban location, with a similar proportion being categorized as well-defined in the non-urban location (Table 2).

Table 2. Distribution of Categorized Classrooms according to Areas

Classroom Spatial Definition	Overall (%)	Urban (%)	Non-urban (%)	Similar	Different
	N = 20	**n = 10**	**n = 10**		
Moderately Defined	70	70	70	√	
Well Defined	15	10	**20**		√
Poorly Defined	15	**20**	10		√

4.2. Social Behaviors

a) The majority of all the five types of behaviors and gender interactions were observed in moderately defined classrooms in urban and non-urban locations, as shown in Table 3.

b) A comparison between the well-defined and poorly defined classrooms showed much more

i) Appropriate behaviors occurred in well-defined classrooms in both urban (25%) and non-urban (31%) locations;

ii) Non-appropriate behaviors occurred in poorly defined classrooms in both urban (25%) and non-urban (16%) locations;

iii) Interactive behaviors occurred in well-defined classrooms in both urban (23%) and non-urban (32%) locations,

iv) Appropriate interactive behaviors occurred in well-defined classrooms in both urban (22%) and non-urban (38%) locations;

v) Non-interactive behaviors occurred in poorly defined classrooms in non-urban (15%) locations, while no difference was observed in urban locations;

vi) Gender interactions occurred in well-defined classrooms in urban locations (16%) and in poorly defined classrooms in non-urban (29%) locations;

iv) Teacher-child interactions occurred in well-defined classrooms in both urban (76%) and non-urban (63%) locations.

c) The result of MANOVA indicated that there was a significant difference in the number of occurrences of all types of behavior between the poorly defined, moderately defined, and well-defined classrooms in both urban and non-urban locations.

d) A series of separate univariate ANOVA tests performed determined which one(s) of the five dependent variables yielded a statistically significant result when examined under independent variables. The analysis showed significant results for the appropriate, interactive, and non-interactive behaviors in the classrooms in both urban and non-urban locations.

5. Discussion

The present study, although similar to and distinct from earlier studies by Moore, et al. (1994), Zimmons (1997), and Moore (2008), was based on natural settings of preschools for Malaysian (Eastern) children in two different locations—urban and non-urban. The main objective was to determine whether different types of physical spatial definition of preschool classrooms influenced the children's play behavior. Since the influence of the physical environment upon human behavior had been well documented in the literature, this paper posited that the exhibition of more appropriate behaviors by the children was the outcome of a better space.

On the basis of expert opinions, the classrooms involved in this study were categorized into three types of spatial definitions in relation to the activity setting, namely, well defined, moderately defined, and poorly defined. Therefore, the better quality of space among these three categories of spatial definition could be determined by the frequencies of more appropriate behaviors exhibited in them by the children.

On the basis of the data collected, the majority (70%) of the classrooms in both urban and non-urban locations were of the moderately defined category. Since the majority of occurrences of all the five types of children's behaviors involved that category of classroom, the quality of such classrooms can be regarded as a mix between appropriate and non-appropriate behaviors—in other words, of average quality. This finding alone indicated that the majority of existing preschool classrooms in Malaysia in both urban and non-urban locations could be of average quality.

The data also indicated there were twice as many well-defined classrooms in the non-urban location as compared to those in the urban location. The proportion of poorly defined classrooms in the urban location as compared to the non-urban location was similar. Despite this disproportionate distribution of the classrooms categorized in both locations, the analyses revealed that more appropriate behaviors were exhibited in the well-defined classrooms, while non-appropriate behaviors were observed in the poorly defined classrooms. Thus, it seemed that a well-defined classroom would inhibit more appropriate behaviors.

These findings seemed to be similar to those found earlier by Moore and Zimmons, which involved Western children. Hence, it can be deduced that despite their cultural differences, children would universally exhibit more appropriate behaviors in more well-defined classrooms.

These findings have important implications for the design of future classrooms of preschools. Designers should create more well-defined spaces for the various necessary activities in these classrooms, so as to propagate and nurture more appropriate behaviors among the preschool children.

Two peculiar events that involved different behavioral patterns in classrooms in urban and non-urban locations should be noted. The first involved non-interactive behaviors that occurred more frequently in poorly defined classrooms in the non-urban location, while no difference in behaviors in the classroom categorized were observed at the urban location. In the non-urban location, this was not surprising, since the interactive behaviors occurred much more in the well-defined classrooms. Of concern would be the appropriate interactive behaviors, which occurred more in the well-defined classrooms in both the urban and non-urban locations, as shown in Table 3.

The other peculiar event involved gender interactions. These occurred much more in well-defined classrooms in the urban location, in contrast to the non-urban location, where it was more frequent in poorly defined classrooms. As analysis on gender differences is beyond the scope of this paper, it surely warrants further investigation.

6. Summary and Conclusion

In sum, this study seemed to reveal universality among preschool children social behaviors, wherein they tended to exhibit significantly more appropriate behaviors when spaces were more well-defined as compared to those which were more poorly defined, in both urban and non-urban locations. As such, future designs of pre-school classrooms should provide more well-defined spaces for the diverse activities conducted in the classrooms. In addition, as the majority (70%) of the existing classrooms involved in this study were rated as moderately defined—in other words, of average quality—in both urban and non-urban locations, these should be upgraded to be more well-defined classrooms, if quality is of essence. Further, as this study was confined to samples of preschools within the Klang Valley, it is suggested that future research involve samples of preschools nationwide.

The slightly different behavioral patterns observed with regard to gender interactions within the confinement of the spatial definitions categorized between classrooms located in urban and non-urban locations should also be noted. As analysis of this phenomenon is beyond the scope of this paper, it could be investigated further in future studies.

Table 3. Distribution of Categorized Classrooms in Relation to Social Behaviors

Social Behaviors	Classroom Spatial Definition	Overall (%)	Urban (%)	Non-Urban (%)	Similar	Different
		N = 1131	**n = 320**	**N = 811**		
Appropriate:	Moderately Defined	61	60	61		
	Well Defined	**29**	**25**	**31**	√	
	Poorly Defined	10	15	8		
		N = 235	**n = 36**	**N = 199**		
Non-appropriate:	Moderately Defined	70	69	70		
	Well Defined	12	6	14		
	Poorly Defined	17	**25**	16	√	
		N = 1027	**n = 237**	**N = 790**		
Interactive:	Moderately Defined	60	62	59		
	Well Defined	**30**	**23**	**32**	√	
	Poorly Defined	11	15	9		
		N = 572	**n = 156**	**N = 416**		
Appropriate Interaction:	Moderately Defined	56	63	53		
	Well Defined	**34**	**22**	**38**	√	
	Poorly Defined	11	15	9		
		N = 466	**n = 157**	**N = 309**		
Non-interactive:	Moderately Defined	70	60	75		
	Well Defined	14	20	10		
	Poorly Defined	16	20	**15**		√
		N = 219	**n = 130**	**N =89**		

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References

Ahrentzen, S., & Evans, G.W. (1984). Distraction, privacy and classroom design. *Environment and Behavior, 16*(4), 437-454.

Kantrowitz, E.J., & Evans, G.W. (2004). The relation between the ratio of children per activity area and off-task behavior and type of play in day care centers. *Environment and Behavior, 36*(4), 541-557.

Legendre, A. (1999). Interindividual relationships in groups of young children and susceptibility to an environmental constraint. *Environment and Behavior, 31*(4), 463-486.

Mashburn, A.J. (2008). Quality of social and physical environments in pre-schools and children's development of academic, language, and literacy skills. *Applied Developmental Science*, *2*(3), 113 – 127.

Maxwell, L.E. (1996). Multiple effects of home and day care crowding. *Environment and Behavior, 28*, 494-511.

Moore, G.T., (2008). The children's physical environments rating scale (CPERS). Sydney: Environment, Behaviour and Society Research Group, University of Sydney, Australia.

Moore, G.T., Lane, C.G., Hill., A.B., Cohen, U., & McGinty, T. (1994). Recommendations for child care centers (3rd ed.). Milwaukee: Center for Architecture and Urban Planning Research, University of Wisconsin-Milwaukee.

Morrow, V. (2001). Using qualitative methods to elicit young people's perspectives on their environments: Some ideas for community health initiatives. *Health Education Research*, *16*, 255–268.

Morrow, L.M. (2007). *Developing literacy in pre-school*. New York, NY: Guildford Press.

Ozcan, H. (2006). *Healing design: A holistic approach to social interaction in pediatric intensive care units in the United States and Turkey*. (Doctoral dissertation, Texas A & M University, USA).

Raja Harun, R.H., Kamri, B., & Megat Abdul Rahman, P.Z. (2005). *Tadika Berkualiti*. Batu Caves, Selangor: PTS Profesional Publishing Sdn. Bhd.

Read, M.A., Sugawara, A.I., & Brandt, J.A. (1999). Impact of space and color in the physical environment on pre-school children's cooperative behavior. *Environment and Behavior*, *31*(3), 413-428.

Sanoff, H. (1995). *Creating environments for young children*. Raleigh, NC: School of Design at North Carolina State University.

Stanković, D., & Stojić, J. (2007). Psycho-developing needs of children and spatial features for children's stay. *Architecture and Civil Engineering, 5*(1), 71 – 75.

Weinstein, C.S., & David, T.G. (Eds.). (1987). *Spaces for children: The built environment and child development*. New York, NY: Plenum.

Yin, Y.K. (1994). *Case study research - Design and methods* (2nd ed.). London: Sage Publications.

Zimmons, J. K. (1997). *The effect of spatial definition on preschool prosocial interaction*. (Doctoral dissertation, Texas Tech University, USA).