

RE-DESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE

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Spring 2011

*Submitted towards the fulfillment of the requirement for the Doctorate of
Architecture Degree.*

School of Architecture
University of Hawai'i at Mānoa

Doctorate Project Committee

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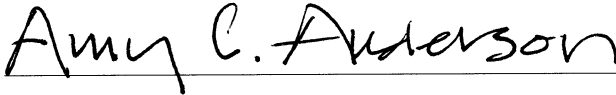
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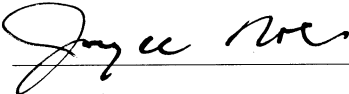
Spring 2011

We certify that we have read this Doctorate Project and that, in our opinion, it is satisfactory in scope and quality in fulfillment as a Doctorate Project for the degree of Doctor of Architecture in the School of Architecture, University of Hawai'i at Mānoa.

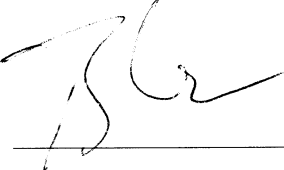
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I. ABSTRACT

“Children learn by being active participants with their environment” –Piaget

Children perceive space very differently than adults. Their progression in physical and cognitive development limits them from experiencing space as an adult would. With this understanding it is an interesting fact, that many of our buildings are designed by adults without the understanding of a child's perception of space. Sometimes the adult's misperception limits children from being active participants with their environment. According to the United Nations Center for Human Settlements (UN-HABITAT), “it has been estimated that by the year 2025 the world's largest cities would need to accommodate four billion people. In which, an average of one-third of this estimated population will consist of children under the age of 18 years and in result the majority of these city residents (at least 45-50 percent) will be children.”¹ With such a high ratio of children in the overall future population of cities, much more effort must be made to create children-friendly apartment buildings.

The purpose of this doctorate project is to research and propose several spatial ideas to address the spatial and social limitations of children in our developing world, specifically with high-rise apartments. Spatial limitation theories, derived from Psychologist Jean Piaget's child development cognitive and physical observations, are defined and incorporated into the proposed spatial designs of this doctorate project in order to encourage a child's social participation within the apartment building as they develop through their childhood. Social spaces within the apartment building are the focus of this project.

Assuming that a child learns by being an active participant with the environment and that a child's perception of space grows concurrently with age, personal spatial interpretations are paired with Psychologist Jean Piaget's child development stages. Initially, to better understand how a child perceives space, the apartment building space is broken down into three spatial focuses:

1. The apartment unit,
2. The apartment floor, and
3. The apartment building as a whole.

¹ UNCHS, *An Urbanizing world: Global Report on Human settlements 1996*, Oxford: Oxford University Press

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE

Then, as stated above, the three spatial focuses of the apartment building are paired off with Psychologist Jean Piaget's developmental stages beginning with the smallest in scale to the largest:

Chapter 1: Redesigning the Apartment Unit
Piaget's Pre-operational Stage (2-7 years)

Chapter 2: Redesigning the Apartment Floor
Piaget's Concrete Operational Stage (7-12 years)

Chapter 3: Redesigning the Apartment Building – Connection to the Community
Piaget's Formal Operational Stage (12+ years)

** Note The sensori-motor stage ages 0-2 was omitted from the doctorate project based on the assumption that spatial perception does not significantly affect the child's socialization due to the child's undeveloped cognitive memory.*

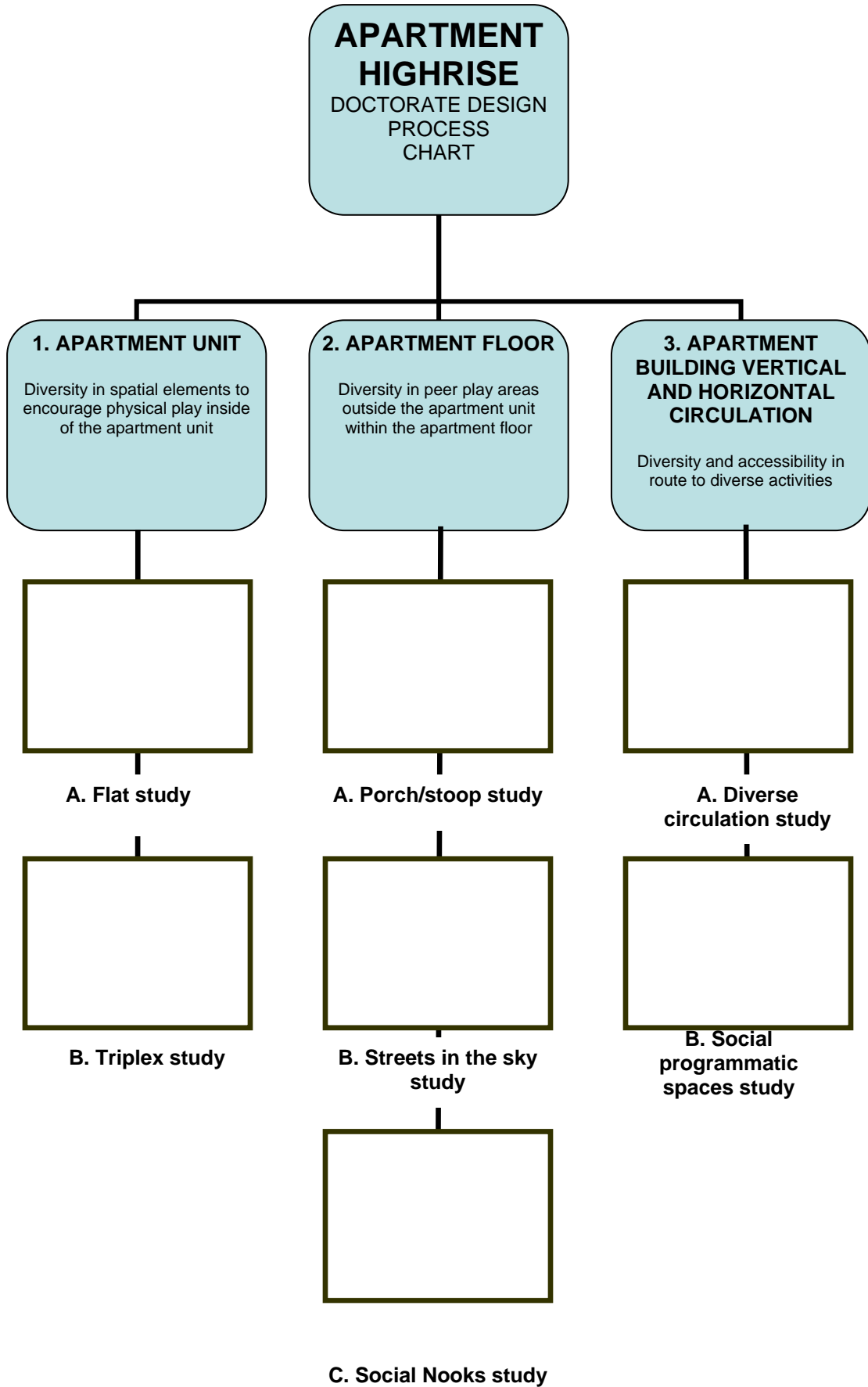
Each chapter is comprised of three parts. The first part, spatial problem, emphasizes the idea of varying spatial perception unlike those of adults by identifying physical and cognitive spatial limitations based on Piaget's observations of child development. The second part, spatial research, interprets Piaget's observations and defines a spatial problem pertaining to the spatial focus. Finally, the last part, spatial solution, proposes a design solution to the spatial problem. Overall, the doctorate project proposes creative and engaging social spaces, which encourage increased cognitive development and enhanced physical skills for children.

In chapter one, Redesigning the Apartment Unit, this doctorate project proposes to redesign the apartment unit with emphasis on spatial components such as the floor, wall, ceiling, and furniture. Typically, a child between the ages of 2-7 has difficulty focusing on one particular space and usually associates space with play activities. With this assumption, the goal of the design is to encourage a child's development of simple motor skills and subtle cognitive understanding of familial lifestyle influence by defining the public spaces within the apartment unit through innovative spatial applications of the spatial components.

In chapter two, Redesigning the Apartment Floor, this doctorate project proposes to redesign the apartment floor with emphasis on social spaces for peer relationships. Typically, a child between the ages of 7-12 begins to recognize that others require interaction and plays with peers to develop life lessons such as morality, reciprocity, and cooperation. However, with the child's limited logical reasoning, their independent path of travel is limited, thus limiting potential peer socialization. With this assumption, the goal of the design is to encourage a child's development of peer relationships within the proximity of the apartment floor by integrating a range of diverse social spaces.

In chapter three, Redesigning the Apartment Building, this doctorate project proposes to redesign the apartment building with emphasis on wayfinding techniques and potential for socialization. Typically, a child between the ages of 12-18 begins to develop stable peer relationships and searches for independence. With this assumption, the goal of the design is to encourage a child's departing and exploration of nearby social spaces with ease of returning back to the apartment unit. Vertical circulation along with peer meeting places within the apartment building is encouraged.

Overall, this doctorate project analyzes and proposes several new typologies of apartment spaces based on the perception of a child and not an adult. The proposed designs should provide a setting, encouraging social interactions for children, which lead to a community-based lifestyle, and work to avoid the creation of settings that discourage or prevent such interactions. The proposed designs emphasize the need for an interactive apartment building to strengthen a child's spatial understandings and use of the built environment. To clarify, this doctorate project does not propose an ideal solution, but rather, poses the endless options of redesigning apartment spaces for children. In conclusion, this doctorate project proposes a new typology of urban living, "a vertical neighborhood from the perception of a child".



II. JEAN-PIAGET - CHILD DEVELOPMENT INFLUENCE ON DOCTORATE PROJECT

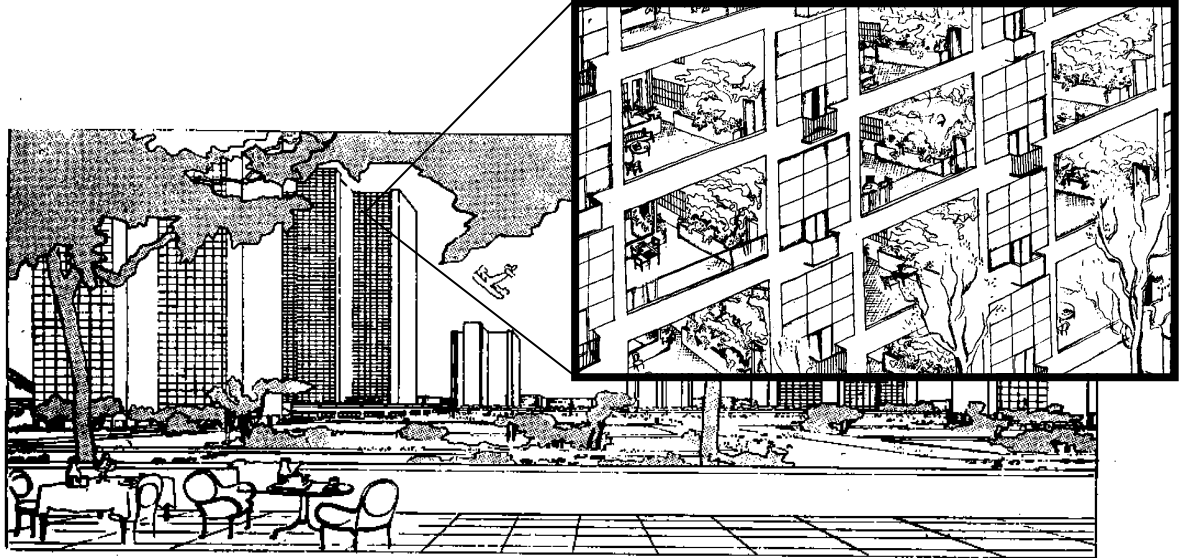
While children have the least influence on their physical environment they are deeply affected by it. Planners and architects play an important role in shaping the environment, however, sometimes the child's perception of spaces are not integrated. To ensure that the child's perception of space is integrated into this doctorate project, observations from renowned child development psychologist Jean Piaget and interpretations of his studies are applied to spatial solutions and to current high-rise apartment conditions.

Swiss Psychologist, Jean Piaget is famously known as the forefather of child developmental psychology. Before he began his work in the 1920's, there was no recognizable field of cognitive development. Piaget was awarded the Erasmus prize for his constructivist child development theory stated as, "Children learn by being active participants with the environment. Children initiate the activities they use to learn. Children construct knowledge for themselves in response to their experiences". A large portion of Piaget's research has gone into understanding how a child conceptualizes the world. This study incorporates Piaget's child observations on the impacts of the environment on child development. Therefore, Piaget's research and observations are a key component of this study and are applied in order to interpret a child's perception of space and its applicability in high-rise apartments.

Piaget divided the stages of child development, into four stages, which are roughly correlated with and becoming increasingly sophisticated with age:

- Stage 1: Sensorimotor (0-2 years)
- Stage 2: Preoperational (2-7 years)
- Stage 3: Concrete Operational (7-12 years)
- Stage 4: Formal Operational (12+ years)

Piaget's four developmental stages are a universal application and not culturally specific. Each stage is outlined by physical and cognitive achievements of the child. However, the ages associated with the developmental may vary, however the sequence of the stage does not. Piaget's study extends from the first days of infancy through adolescence and examines topics as diverse as conceptualization of time, space, distance, number, language use, memory, and understanding of other people's perspectives, problem solving, and scientific reasoning. For simplicity, simple generalizations of child's developmental skills specific to the stages are interpreted as spatial limitations. These spatial limitations are the key components researched and interpreted within the doctorate project.



APARTMENT UNIT

INTRODUCTION: A CHILD IN THE APARTMENT UNIT

“Children do not see spaces as rooms, but as opportunities where various activities can take place.” – (Piaget)

In chapter one, this doctorate project analyzes the apartment unit as a child's first stable spatial relationship. Unlike the adult perception, children view the apartment unit as an interactive play space rather than a place of set functions such as sleeping, eating, and relaxing. According to cognitive theorist Jean Piaget, children do not see spaces as functional rooms but as opportunities where various activities or play can take place¹. Unfortunately play or any other non-typical home function is generally not incorporated into the usual apartment unit design. Assuming that there are no nearby play spaces, the goal of this chapter is to research and design an apartment unit that focuses on the importance of play space within the apartment unit.

The analysis begins by comparing four different apartment types: flat, split/level, duplex, and triplex apartment units. Key spatial adjacencies and potential play spaces are studied and noted. After the spatial characteristics are identified, the study focuses on basic spatial elements that can be redesigned to offer children diverse spatial experiences to strengthen both physical and cognitive development. Four basic spatial elements: the floor, wall, ceiling, and furniture are identified and integrated into the design with a playful indoor application.

This chapter proposes two models demonstrating how apartment units can address children's play needs through the definition of spatial elements. Although, personal space is a significant part of children's development the design only focuses on public space within the apartment unit.

**Note: The term children, in chapter 1, refers to children between the ages of 2-7 years.*

¹ Piaget, J. Play, Dreams and Imitation in Childhood. Heinemann, 1951, cited in The Psychology of Play by S. Millar. Baltimore: Penguin Books, 1968

DOCTORATE PROJECT STRUCTURE

PART 1: SPATIAL PROBLEM

Lack of Child's Play Space in the Apartment Unit

Jean Piaget's Influence on Spatial Design:

Spatial Limitation(s) based on child's perception of space are defined as the following:

Piaget Limitation 1: Children's inability to perceive large spaces.

Piaget Limitation 2: Children's inability to recognize other's point of view.

Spatial Problem:

The undefined and compact programmatic spaces within the apartment unit both limits children's physical and cognitive development and segregates informal lifestyle influences.

- **Note: Study only analyzes public programmatic spaces including: kitchen, living room, and dining room.*

PART 2: SPATIAL RESEARCH

Research Objective:

To study how social public spaces have been designed within the apartment unit and how to redesign those spaces to encourage indoor play through the definition of spatial elements.

Section 1: Architecture - Apartment Typology: Flat, Split-Level, Duplex, & Triplex

Section 2: Architecture - Re-Inventing the Backyard

Section 3: Piaget's Spatial Elements: Floor, Wall, Ceiling, & Furniture

PART 3: SPATIAL SOLUTION

Doctorate Project Solution:

To address children's inability to perceive larger spaces, the key is to focus on smaller spaces and to strengthen those spatial relationships through interactive play activities. This doctorate study redesigns the four basic spatial elements to better suit their physical development. Although children are egocentric in nature, they are still very easily influenced by parents and siblings, thus the proposed design maintains an open plan which allows the family to use space to meet their needs while simultaneously allowing children to become participatory students by observing learn life lessons through family mannerisms.

PART 1: SPATIAL PROBLEM**Lack of Child's Play Space in the Apartment Unit**

Apartment units are generally small and compartmentalized discouraging children to play indoors. Unlike suburban homes, nearby play spaces such as the yard, porch, and street are no longer accessible in the elevated apartment unit. In addition, limited by their age, children have yet the ability to move independently to more conducive play spaces without parental supervision. According to Johnson², many urban homes in North America restrict indoor play and limits children from developing skills essential to their age group. In addition, studies by Rubenstein and Howes³, found that children at day-care centers have more positive exchanges with adults and more play with peers in contrast to children at home who had more negative exchanges with the adults caring for them. Most importantly, (insert last names) believed that these results were based on physical space. Commonly, a daycare setting is more conducive for child development because it is designed specifically around the needs of young children.

To further prove that current apartment unit settings promote sedentary tendencies in children, another study by Johnson & Dineen⁴, surveyed 300 caregivers who provided daycare in their own homes to children of working parents and were questioned on types and location of play activities that their children would partake in. The results stated that children who are left at the caregivers' homes spend relatively little time in active, creative, and exploratory activities. Children in these settings were more likely to watch television, look at books, and play with structures games and toys. Surprisingly, children's time in front of the television was equivalent to the time spent in cars, averaging to a quarter of their day. The factors leading to this result lies in the disconnect of having a home do double duty as a family residence and a child's daycare setting. The home seems to be a symbolic value as a private enclave, protected from the outside world. Particular parts of the home, notably bedroom spaces, may be considered private and therefore off-limits to daycare children. According to Clark-Stewart, this restriction of exploratory behavior by young children may be detrimental to children and prohibit certain developmental skills. Although, both research studies suggests that a home environment is less "playful" and is conducive to children's learning, therefore the intent of this research is to seek alternatives to improve home settings through the eyes of a child and the interpretation of simplified spatial elements.

² Johnson, Laura, *The Developmental Implications of Home Environment*. Plenum Press. New York. 1987

³ Rubenstein, J. L. & Howes, C. *Care Giving and Infant Behavior in Daycare and in Homes*. *Developmental Psychology*, 1979

⁴ Johnson, L., & Dineen. J. *The Kin Trade*. Toronto: McGraw-Hill Ryerson, 1981

According to Piaget's observations, children perceive space through relatable-scaled objects/elements, and the element's ability to entertain their curiosity. Spatial perception of these simplified elements develops along with children's lifelong understanding of purpose and its spatial relationship. To encourage the cognitive and physical development of children, spatial diversity must be created to stimulate children's desire to play; to learn. Varied mini-spaces prevent boredom, disinterest, and discomfort by enabling children to seek out activities and levels of stimulation appropriate to their own moods, needs, and levels of arousal at different points in the day. According to Held and Hein⁵, adequate development depends upon self-induced experiences, "play", that give learners feedback about the consequence of their actions upon materials and their own movements in space. These activities help develop certain skill sets that will help children in the real world.

In addition, children within the pre-operational stage are extremely egocentric. A child can only see the world from its viewpoint and believes that everyone sees space just as it does⁶. For example, in Piaget and Inhelder (1956), the study demonstrated children's difficulty in taking to other people's spatial perspectives. The study includes 4 years olds sitting at a table in front of a model of three different mountains of different sizes. The 4 year olds were asked to identify which out of a set of photographs depicted what a doll would see if it were sitting on chairs at various locations around the table. Solving this problem would require children to recognize that their own perspective was not only one possible and to imagine what the view would be from another location. All of the children were unable to accurately depict what the doll would perceive. With these two observations, the doctorate project assumes that children's initial spatial needs are completely unaware of spatial needs of family members. Although, their spatial needs are indefinitely different from that of other family members, and it is essential that children's spatial needs are met along with the opportunity to observe family interaction and relationships. While school provides children with general academic lessons in life, the home is where a child learns values and belief systems. The lessons children learn in family-life guides them to develop their own personal values and behaviors. Strong family relationships will help children to develop positive interpersonal relationships outside the confines of the family home as well as within. Therefore the spatial concept developed for this chapter, in redesigning the apartment unit, is to segregate public programmatic activities without segregating family members through defining spatial elements.

⁵ Held, R., & Hein, A. Movement produced stimulation in the development of visually guided behavior. *Journal of Comparative and Physiological Psychology*, 1963, 56, 872-876.

⁶ Piaget, Jean. *The Construction of Reality in the Child*. New York: Basic, 1954. Print.

PART 2: SPATIAL RESEARCH

Section 1: Architecture - Apartment Typology: Flat, Split-Level, Duplex, & Triplex

Originating as the government's response for public housing, the first apartment units were never designed as an ideal setting for a family structure. As time passed apartment units evolved from essential one room housing units to private multi-room homes. In the past century, architects and planners have recognized the spatial constraints of the prototypical one-story apartment unit and since then have developed the concept of multi-storied apartment units to meet the needs of larger families.

In case study one, the Bergpolder Building is one of the earliest examples of the typical flat apartment. Built in 1934, this nine-story, high-rise apartment consisted of a total of 72 flats, eight units per floor, which were all identical. The typical flat consisted of two bedrooms, a kitchen, a living/dining room, and a private balcony. Wide sliding doors from the living room allowed residents some flexibility to use the adjacent room as a dining room, study, or bedroom. This model is still the typical apartment unit layout in many high-rise apartments today, with the exception of flexible sliding doors and flexible room.

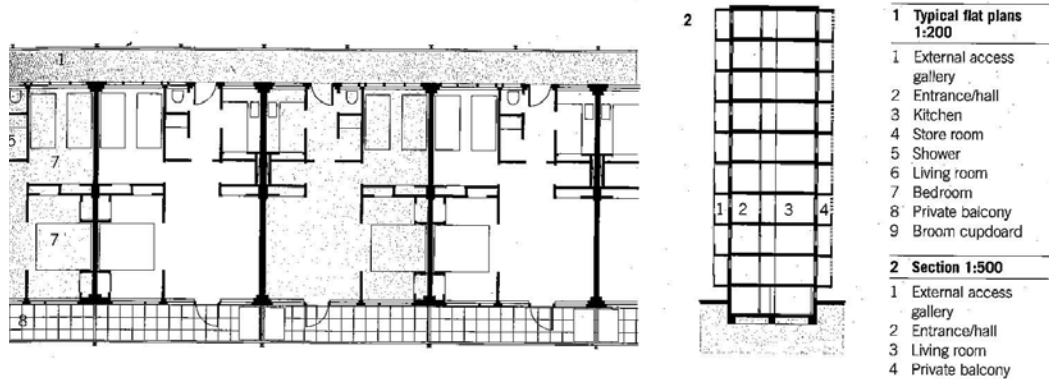


Figure 1: Bergpolder Building Apartment Unit Plan and Section⁷

Figure 1: French, Hilary. *Key Urban Housing of the Twentieth Century: Plans, Sections, and Elevations*. New York: W.W. Norton, 2008. Print.

In case study two, Architect L'corbusier modifies the typical one-story flat into a split level design in his 1947 Unite D'habitation residence. Designed to address the spatial needs and privacy of larger families, these split-level apartments allowed for larger apartment units by stacking floor plate and the ability to separate public and private spaces. Le-Corbusier modified the original access gallery circulation exposed to the elements on one side, Le Corbusier envisioned the corridor as a "vertical street" and created split-level apartments linked by a double corridor. These multi-leveled units were designed to be accessed through a social corridor from a skip and stop elevator system. In Figure 2⁸, the typical split level apartment unit is illustrated in yellow.

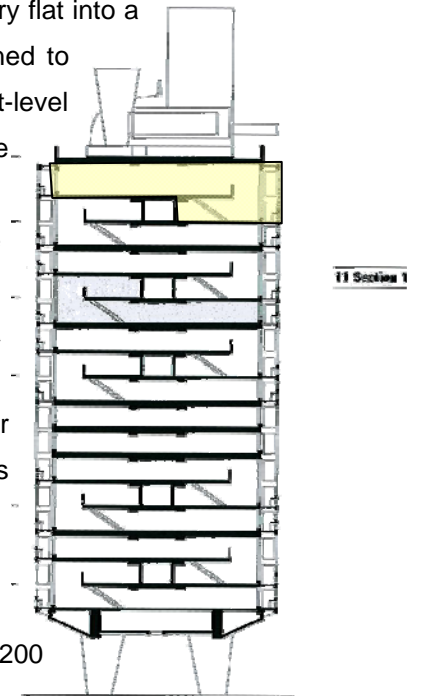


Figure 2: Unite D'habitation Section - illustrating split level unit (yellow)

One of the largest units in the Unite' building is a 1.055 square foot unit consisting of three bedrooms. Interesting, this unit is larger by 200 square feet from today's average apartment size⁹. The layout of space was unique in which it was based on a 12-foot module. This module maximized the use of the structural bays and enforced programmatic spaces to be arranged in a linear manner. The success of the split-level is its ability to separate public and private spaces. In Figure 3, the public space is completely open consisting of an entrance, kitchen, and living/dining room with access to a balcony. Unlike the typical corridor kitchen, its counter space encourages access from both the living room and kitchen space. This allows children to view, observe and take part in activities within the kitchen without accessing potentially harmful elements such as a hot stove or oven. The vertical separation allows for various play functions to occur within the home without disturbing other functions. Although a spatial layout of a home cannot guarantee a better family relationship, it can certainly encourage interaction between family members and discourage spatial frustrations between family members.

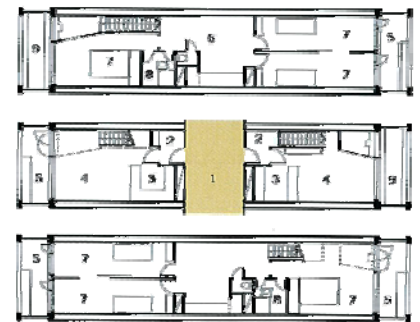


Figure 3: Unite D'habitation Floor plan - Largest split level apartment unit

- 14 Upper level
- 13 Middle/access level
- 14 Lower level
- 1 Interior street/access corridor
- 2 Entrance/hall
- 3 Kitchen
- 4 Living
- 5 Balcony
- 6 Landing
- 7 Bedroom
- 8 Bathroom
- 9 Brise-soleil

⁸ Figure 2 and 3 French, Hilary. *Key Urban Housing of the Twentieth Century: Plans, Sections, and Elevations*. New York: W.W. Norton, 2008. Print.

In case study three, Architect Tadao Ando designed a duplex called the Azuma residence with an internal courtyard, which is a successful playspace for children. Typically, residential gardens or backyards have been replaced by high-rise balconies. However, in Figure 4¹⁰ the rendering illustrates how children can gain access to daylight, natural ventilation, and have a view to see activities occurring below without being at risk from falling from windows or climbing over exposed railings to the exterior. Open spaces are an important part of child development. Open spaces should allow children to engage in a wide range of activities such as: playing with their pets, playing ball, hanging out with friends and family, sunbathing, gardening, relaxing, cycling, barbecues, parties, etc. A 10.5 feet wide x 42 feet long duplex¹¹ is a good example of a safe outdoor space and resolves parental concerns of children climbing over the guardrails. Tadao's concept was based on a central courtyard, which buffers other spaces from the outside world, while providing access to light and air. The same concept, where public and private is separated by levels, is included, however, there is a unique narrow bridge that connects the two bedrooms and overlooks the courtyard. Family members enter directly into the family room and must pass through the courtyard to reach the dining room and kitchen. This courtyard buffer allows guests to enter their home without intruding on any other activities. However, the



Figure 4: Azuma Residence - Rendered Section

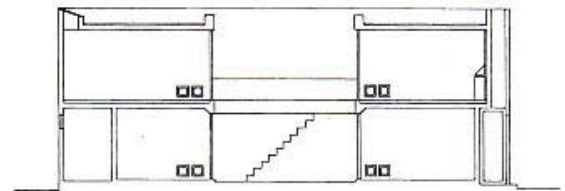
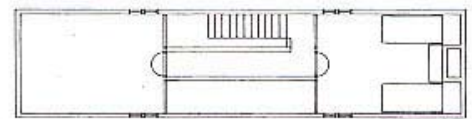
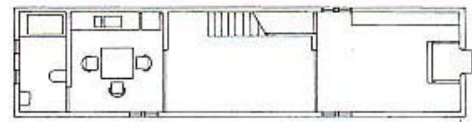


Figure 5: Azuma Residence - Floor Plan & Section

¹⁰ Figure 4: "Azuma House - CG Channel Forums." *CG Channel Forums - Powered by VBulletin*. Web. 22 Apr. 2011. <<http://forums.cgchannel.com/showthread.php?t=1620>>.

¹¹ Figure 5: "Azuma House - Tadao Ando - Great Buildings Online." *Architecture Design Architectural Images History Models and More - ArchitectureWeek Great Buildings*. Web. 22 Apr. 2011. <http://www.greatbuildings.com/buildings/Azuma_House.html>.

courtyard is open air and susceptible to the elements and could potentially affect the functionality of the house. This could easily be solved with a skylight or some sort of glazing system.

In case study four, MVRDV designed the Mirador apartment building that consisted of a triplex on the top floor. Figure 6¹² shows how the apartment unit is designed with an open kitchen, living room, and dining room, all located on the first floor. To offer some flexibility in the use plan, various rooms are equipped with sliding partitions allowing children to change the space to their needs. Located in the corner is a foldback staircase that connects the upper two floors. The second floor contains two children's rooms and the third floor is the master bedroom for the parents. Although this triplex is obviously larger than the typical flat, the vertical stacking of the levels create social segregation and limits play areas. In comparison to the Unite D'habitation and the Azuma residence, the three individual floor plate is extremely small, and provides no social space for interaction. Balcony/outdoors space is not designed to be accessible by all, but only to parents on the third floor. Although the overall square footage is large, this case study lacks spatial characteristic to socialize and play.

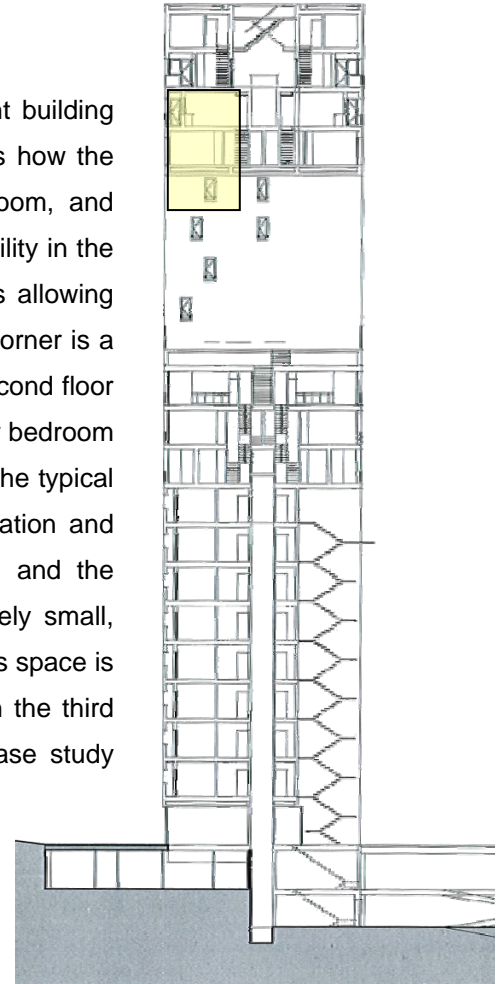


Figure 6: Mirador Floor section/plans



¹² Figure 6: French, Hilary. *Key Urban Housing of the Twentieth Century: Plans, Sections, and Elevations*. New York: W.W. Norton, 2008. Print.

Section 2: Architecture - Re-Inventing the Backyard

High-rise balconies have commonly replaced residential gardens or backyards. This outdoor space is very interesting to children because it is open to daylight, natural ventilation, and has a view to see activities that occur below. However, balconies are not considered good play spaces because of its semi-enclosure, height factor, and limited control over a difficult supervisable space. The typical four-sided balcony is only attached to the apartment unit by one side, thus leaving three sides open to potentially dangerous situations. Parents are typically concerned with the potential risk of injury, such as falling from windows or climbing over exposed railings to the exterior. To protect the children from harm, the building envelope must be secured either through an enclosure or vertical portion to discourage children from climbing over. The following are some examples of permeable building envelopes encouraging natural light and ventilation exposure.

In case study one, Tom Bishop designed an attachable enclosed plant room¹³. The concept behind this plant room is to provide more green space for an existing larger multi-family residence. This "clip-on room" allows for a gardening space and sustainable energy production all year round. This is a great solution for a personal semi-outdoor play space for children. However, this modular construction can only be applied with buildings that have an egg crate exterior so that proper clip-on can be installed.



Figure 7: Attachable enclosed plant room rendering and elevation

¹³ Figure 7: "Plant Room: Clips-on Prefab Room For Apartments Provide Food And Energy - Ecofriend." *Ecofriend: Green Living*. Web. 22 Apr. 2011. <<http://www.ecofriend.com/entry/plant-room-clips-on-prefab-room-for-apartments-provide-food-and-energy/>>.



Figure 8: Enclosed Interior Atrium

In case study two Dornob¹⁴ demonstrates the concept of an indoor courtyard/atrium, which allows for a safe naturally lit play space for children. Due to its restricting orientation and limited views outdoors, the multi-leveled interior garden design is able to bring in natural light through a skylight. This central space with glass sliding partitions creates an illusion of a larger space by allowing larger spaces to be made as expansions of adjacent spaces. The diversity in indoor/outdoor space allows children to take part in many different play activities.

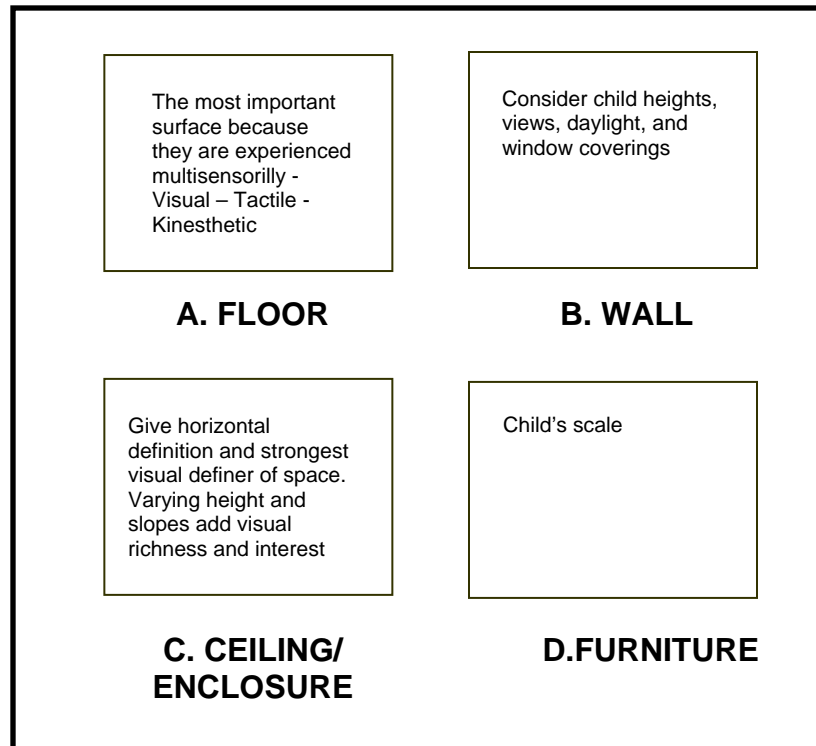


Figure 9: Dornob interior garden

¹⁴ Figure 9: "Amazing Home Atrium & Multi-Level Interior Garden Design | Designs & Ideas on Dornob." *Dornob | Modern Home, Interior & Furniture Designs & DIY Ideas*. Web. 22 Apr. 2011. <<http://dornob.com/amazing-home-atrium-multi-level-interior-garden-design/>>.

Section 3: Piaget's Spatial Elements: Floor, Wall, Ceiling, & Furniture

To resolve the lack of play within the home, four basic spatial elements were identified within the apartment: the floor, the wall (including apertures), the ceiling / enclosure, and the furniture, which could be redesigned to serve both family functional needs and the children's play needs. Variations in these elements allow for children's senses to be stimulated and encourage interaction with physical space. This study provides case studies, which illustrate promising applications to encourage indoor play. Examples derived from these case studies include: scale (small and large spaces, areas for privacy and groups, and furniture for adults and children); floor height (raised and lower platforms, lofts, and pits); ceiling heights (canopies, eaves, trellises, and skylights); and boundary height (wall, half-height dividers, and low shelves).¹⁵



¹⁵ Day, Christopher, and Anita Midbjer. *Environment and Children: Passive Lessons from the Everyday Environment*. Oxford: Architectural, 2007. Print.

A. FLOOR

To many, children's first spatial experience are based on the simple relatable ground floor. With a lower optical focal point, their spatial perception is strongest with low spatial components such as flooring and small vertical surfaces. These elements create intrigue, while providing clear visuals to nearby parents putting children at ease in terms of parental security. According to Piaget's Pre-Operational Stage, children need plenty of opportunities to roam freely, over moderate changes, and in levels that offer instigate and help develop motor skills. These skills include crawling, walking, jumping, running, and catching. However, the floor within the apartment is typically indistinguishable from any other floor space within the apartment and small footprint constrains children from using the floor space as a learning element. There are no level changes to help them develop motor skills, no spatial definition to delineate space, and no change in floor finish to create intrigue.

In contrast to the typical apartment unit floor, designers have created innovative, yet functional ways of designing floor applications. The first case study, A1, is a floor installation called Designliga¹⁶ that demonstrates how subtle undulating floor level changes can promote a children's motor skills (Figure 10). The varying height also lends itself to many uses



Ref 1: Designliga

Figure 10: Floor - Designliga – variations in level for play diversity

based on the measurement of the human body. According to Olds¹⁷, adults can best relate to infants and toddlers by being with them at floor level or by placing them on limited horizontal surfaces less than 36 inches high. Ideally, changes in level should be subtle to support safe and spontaneous play. It is also recommended that each level should be three to six inches high and at least 12 inches deep. Changes in level must allow for an easy, connected flow from one activity to the next and must afford children a perspective, an interaction, or access to something that would not be available if children remained in one place.

¹⁶ Figure 10: Sebastian J, Playground for Leif/ Designliga.

<http://www.google.com/imgres?imgurl=http://cdn.archdaily.net/wp-content/uploads/2009>

¹⁷ Olds, Anita Rui. *Child Care Design Guide*. New York: McGraw-Hill, 2001. Print.

The second case study, A2, demonstrates the importance of diversity in ground plane textures. In 1956, planner Kevin Lynch, decided to conduct a research document studying childhood memories in the city. This study proved that the diversity of the ground plane contributed the development of children's motor skills because certain ground textures would encourage a certain type of activity. He stated that children are sensitive to the floor and its various coverings because it is the prime condition of his main activity play. Below is a chart of key memories of the urban child.

Lawns	27	Water	15
Other ground surfaces	25	Cleanliness	15
Topography	24	Crowdedness	13
Wall materials	23	Awareness of neighborhood	12
Trees	21	Play in waste areas	12
Mass Transport	21	Order and Maintenance	11
Color	20	Traffic	9
Families per house	19	Shopping	8
Sense of space	17	Historical Association	7

Figure 11: Floor - Some Childhood memories of the city (1956)¹⁸



According to the study the lawn was referred to the most out of all the types of floor material mention. The lawn was often associated with spaciousness and a sense of freedom. This greenery also indicated a status of an area. For many, a lawn is a child's earliest play space. The second most commonly liked floor material were surfaces that allowed the children to perform certain activities, such as digging into dirt for gardening, or smooth surfaces that allowed for roller skating or bicycling. Driveways are occasionally mentioned for these activities. Surfaces the children seemed to dislike were asphalt, brick, gravel, cobblestones, rough surfaces that could hurt when they fall. Hills were another favorite of the spatial elements. The hills provided many types of unique activities, such as cardboard sliding. Variation in topography was also a very much desired feature. Interestingly none of children mentioned the aesthetic quality of the surfaces and none of these qualities were prevalent in current urban homes for children.

¹⁸ Figure 11: Lynch, Kevin, Tridib Banerjee, and Michael Southworth. *City Sense and City Design: Writings and Projects of Kevin Lynch*. Cambridge, MA: MIT, 1990. Print.

The third case study, A3, shows how the floor environment changes are dependent on the spaces they are adjacent to. The play net¹⁹ is located beneath a skylight that allows children to view the outdoor sky (Figure 12). This feature encourages cognitive development games such as imagining cloud animals or locating star constellations. In addition, the net is a fun surface that allows children to practice their balancing skills. If the skylight was not there the floor application of the net would serve a completely different purpose and provide a children's play activity.



Figure 12: Floor – Sky net / Play Application

¹⁹ Figure 12: *Modern Design*. Web. 22 Apr. 2011. <<http://moderndesign.canalblog.com/>>.

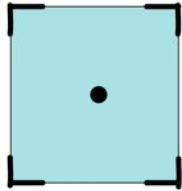
B. WALLS

After children perceive the ground plane, the second most influential spatial element is the wall. According to Piaget, their comprehension of space develops as they become more interactive with space. Within the first several years in the pre-operational stage, children prefer smaller relatable spaces such as edges and focal points rather than the compartmentalized rooms because they do not see rooms or large groupings of space, but rather edges of walls for activities rather than barriers. These edges create a relatable boundary and point of reference that comforts both the parent and child.

Spatial Perception Comparison:

Children: Multiple mood room

4 edges + 1 center



Adults: Single mood rooms

1 space



Soon after children become familiar with the edges, cognitive skills begin to group spatial elements together allowing for children to create larger spatial understandings transitioning the edges into a room. The ability to group spaces based on personal observations is key to spatial understanding, which eventually determines a child's ability to move independently in space.

Accepting the fact that apartment units are typically small and compact, the first case study, B1, demonstrates how multiple play zones can be created within one room by defining the walls within the space. Since the location of the wall in comparison to the other wall is not yet of importance to children, the focus should be on the characteristic of the wall such as, material, color, and texture. By clearly delineating the space apart from its



Figure 13: Walls – Defining space (Rooms without partitions)

surrounding, they can learn how to better locate that space. This case study includes home design ideas referred to as, “room borders without partitions”²⁰, where partitions or walls create a division of smaller spaces and defined confinement. This case study diversifies space through an illusion of a border or space, focusing to create more functions within a space. This concept maximizes an open layout with clear delineations of multiple spatial programs in one space. After the children become familiar with edges they begin to understand the next grouping of space, the room, and edges that form boundaries.

As children grow older they tend to create relatable spaces through their own interpretation of boundaries, an early step to independence such as making secret “homes” – even if only blanket houses or a chair to hide behind²¹. Boundaries are an architectural characteristic of space, which physically defines the space and creates a purpose for the space. This alteration of space are the children's first understandings of that space, which can be changed to fit your needs. Common boundaries



for children include complete enclosures such as creating “caves” by putting a linen sheet over a table or converting a storage closet into a house. These temporary enclosures help create play spaces that serve as stage sets for imagination stories, “sulk bins” to withdraw into when upset and enclosures for security.



Although boundaries are a great way to distinguish space and function, characteristics of

²⁰ Figure 13: "Interior Design Without Borders." *Anne Lubner Designs*. Web. 22 Apr. 2011. <<http://annelubnerdesigns.com/2010/08/interior-design-without-borders/>>.

²¹ Marcus, Claire Cooper House as *Mirror of self*. Conari Press (1995)

those boundaries are most important to young children. For example, rooms within an apartment unit are usually completely enclosed to create privacy for its users, but on the other hand children need a visual connection to its parent and walls in the apartment, which conflict with that need. In case study two, B2, transitional walls²² provide both privacy and spatial diversity for children's need. Sliding walls allow children to modify the size of their space. This is prominent element creates an open-plan living space. In this example, the sliding wall is shaped like a C, so it fits around the adjacent wall seamlessly, concealing its inner workings from view. Rather than interrupt the wall, which defines the space of the room, a moving partition can carry on the idea of the material used for the wall. The only issue with this design is that it may have some acoustical factors.

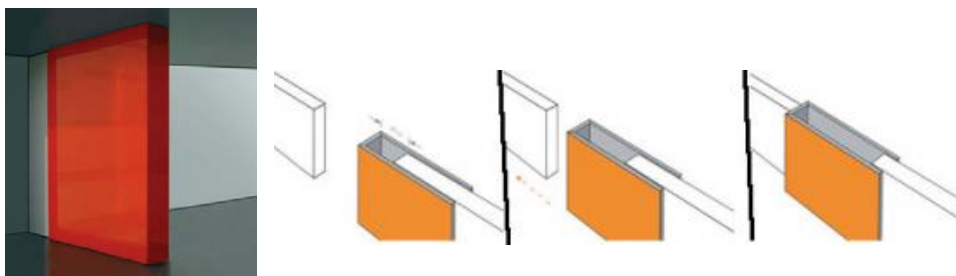


Figure 14: Wall – Sliding walls _ expansion of space

In the next case study, B3, doors within walls²³ are designed for both adult and child use. This attention to detail allows children to become independent users of space. To better encourage childhood independence scale and positioning of various fixtures in the home must be carefully considered. The height of light fixtures, shelves, coat hooks and racks, door knobs and light switches, should be planned according to children's needs.



Figure 15: Wall: Child's Scale

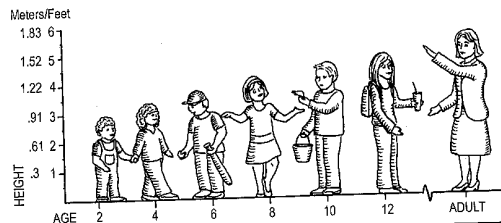


FIG 2-8. When designing for children, it is important to pay attention to the scale of children and to view details at their level. Average heights were determined by averaging the boys' stature for age and girls' stature for age in the 50th percentile of the pediatric growth charts developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000, <http://www.cdc.gov/growthcharts> "Pediatrics, Growth Charts for Boys and Girls." About.com. 26 August 2005. http://pediatrics.about.com/cs/growthcharts2/1/01_growthcharts.html, accessed 2005). (COURTESY OF BARBARA SIEGEL RYAN)

²² Figure 14: "Sliding Wall by Welter Wall | Do It Yourself." *Do It Yourself | The Latest Home Improvement & DIY Tips*. Web. 22 Apr. 2011. <<http://diybuilt.com/sliding-wall-by-welter-wall/>>.

²³ Figure 15: "Minjjoo Children's Door Adds A Door Within A Door." *CoolThings.com | Cool Stuff, Cool Gadgets, Cool Gifts & Things*. Web. 22 Apr. 2011. <<http://www.coolthings.com/minjjoo-childrens-door/>>.



In addition to the concept of sliding walls, case study B3 is a very interesting example of diverse space within a small footprint. In 2010, architect Gary Chang created one of the most inspirational homes through a simple idea of sliding walls.²⁴ Consisting of a total of 330 square feet room similar to the size of a U.S. living room, Chang designed a series of sliding panels on tracks to convert one room into a total of 24 different rooms. The wall units are suspended from steel tracks. This apartment can transform many different spaces such as a kitchen, library, laundry room, dressing room, a lounge with a hammock, an enclosed dining area, and a wet bar. This is a great case study for large diversity in a small space; however this application may be difficult for larger families since transitioning spaces would require family members to move into certain locations so that sliding partitions could be moved appropriately. This case study demonstrates how home sizes, spatial functions, and degree of personal space vary from culture to culture. For example, personal space in Hong Kong is very different than personal space in the United States. There seems to be a fine line between private spaces and public spaces.

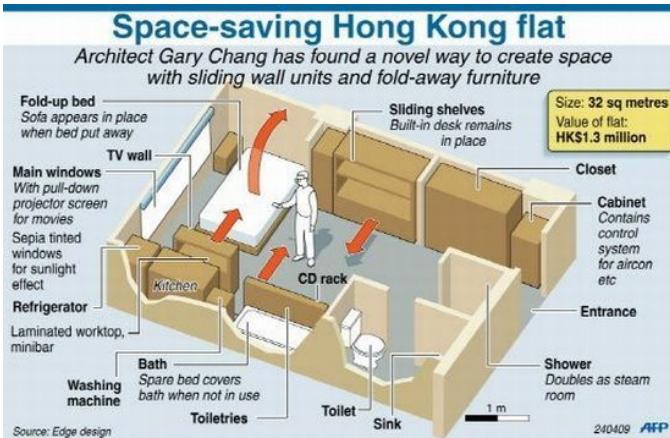
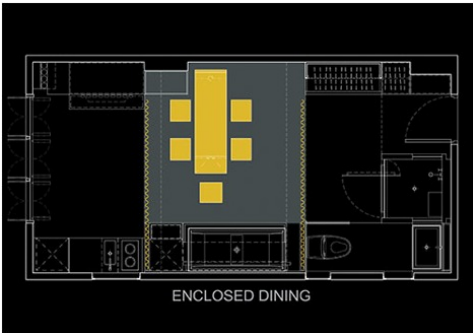


Figure 16: Wall – Sliding walls creates multiple rooms – Hong Kong Apartment 24 rooms in a 32 sq meter apartment

²⁴ Figure 16: "Gary Chang's 24 Rooms in a 32sqm Apartment | Auhana." *Welcome at Auhana Web Directory*. Web. 22 Apr. 2011. <<http://www.auhana.com/architecture/gary-changs-24-rooms-in-a-32sqm-apartment/>>.

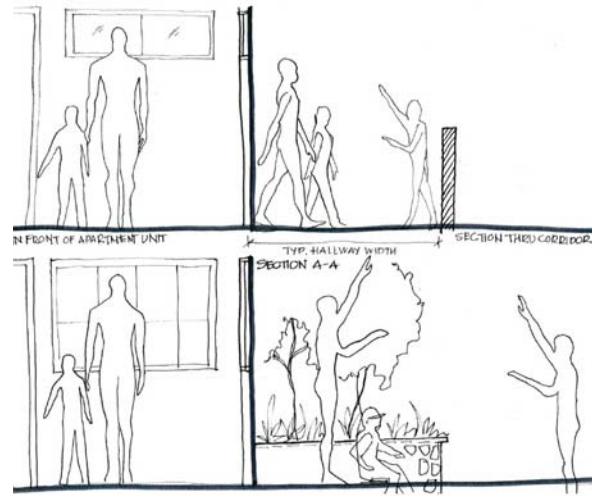
For a more innovative and creative installation of walls case study, B4, is a spatial installation called Anthropodino in New York's Park Avenue Armory²⁵. This indoor womb-like playground encourages children to actively touch, smell, see, and listen to their surroundings. A 192 feet long and 122 feet wide the playground consists of colorful transparent semi-enclosures, which allow children to easily read their surroundings (Figure 17). Fabric tubes are filled with 1,650 pounds of spices such as ginger, turmeric, and cumin. Its net like characteristic create a fun, spatial understanding of space, unique forms and textures. This interactive art allows children to observe how people interact and react to certain elements. Although these spatial applications are not applicable within an apartment unit, it does create intrigue.



Figure 17: Walls – Anthropodino innovative application to encourage spatial exploration

²⁵ Figure 17: "Artist Ernesto Neto Builds Anthropodino for Park Avenue Armory." *Shopping Blog: Shopping Trends, Fashion and Culture*. Web. 22 Apr. 2011. <<http://www.shoppingblog.com/blog/517097>>.

After boundaries are established, children are very curious and will have a constant urge to expand to new boundaries. To explore new spaces, boundaries should vary and include openings to introduce children to other spaces. Unfortunately, windows are typically located next to narrow hallways, which are very stark and uninteresting. In addition the windows are often located high in the wall and inaccessible for children to view out of. Windows should be located in a



commonly used area such as the dining or living room that overlooks a common public space such as a park or garden. This connection to the outdoor space not only allows children to be aware of their surroundings, but is also an opportunity for children to socialize. For example, children in their apartment could look out of their living room window and see a group of children playing. This could stimulate a child's need to play outdoors and to develop social relationships with neighboring kids. Without this window, the chances of their developing life-long relationships or experiences would diminish.

In case study B5, Taka-tuka-land ²⁶ features a simple window wall near a playful level change, which allows children to observe the activities outside of the apartment unit. This adjacency and attention to child scale is key and helps children observe the life occurring outside of the home (Figure 18).



Figure 18: Walls-partial height wall and steps allow for easier access to window viewing

²⁶ Figure 18: "Taka Tuka Land For Kid." *Architecture Buildings*. Web. 22 Apr. 2011. <<http://www.architecture-buildings.com/taka-tuka-land-children-playground-by-baupiloten/view-taka-tuka-land-for-kid/>>.

C. CEILING

As children are observing their vertical surroundings there is a third element that contributes to their understanding of space, which is spatial volume. As a unit, the floor, wall, and ceiling create an enclosure of space, which can vary in height and form adding visual richness and interest through a child's perception. Its volume of space certainly instigates certain types of activities that can occur within that space. By creating a diversity of space, children are encouraged to use space for many fun activities. For example young children enjoy creating mini enclosures. These small spaces simulate a sense of security. When children want to take part in physically active play they prefer larger spaces such as a playground, which includes both horizontal and vertical play.

According to child development experts, diversity in space allows children to imaginatively adapt those spaces to their needs. Even though a child's imagination may seem like a means to escape reality, this creativity contributes to the beginning of a child's understanding of reality. Imagination is necessary for learning about people and events which children do not have the opportunity to directly experience. Children analyze their ideas by imaginative play and mimicking what has been observed. By providing creative spaces imaginative thoughts and cognitive understanding are more likely to take place.

In case study C1, the Kid's Republic Bookstore in Beijing China²⁷, a variation of spaces was designed so that children could create their own space. Large gathering spaces were designed, so that adults could read books to large groups of children. In addition, small nooks were designed so that children could read comfortably by themselves or with a friend (Figure 19). Children like small spaces because they are drawn to spaces that are sized according to their own smaller perspective. They tend to feel more comfortable and secure in smaller spaces.

In addition to various sized enclosures, details such as openings in the ceiling create intrigue and curiosity within the group reading room. A Colorful theme is found throughout the bookstore allowing for children to identify spaces through color (Figure 19). For example, a child may tell his mother that he will be reading inside the green circle. Without that color, the child would have a more difficult time to explain his location.



Figure 19: Ceiling – Kid's Republic Bookstore Various sizes of spaces are created by various enclosure characteristics such as color, shape, openings, etc.

Many apartment units consist of one-story volumetric space, which limits how space can be diversified. However, there are some compact apartment units that increase their ceiling height so that a loft may occur, serving both as a children's play space and an additional sleeping space for family members or guests. By increasing the volume of apartment units, vertical circulation becomes a fascinating way to encourage play. Below are some examples²⁸.

²⁷ Figure 19: ""KID'S REPUBLIC in Shanghai" by Keiichiro Sako/SAKO Architects-architecturephoto.net - En." *Architecturephoto.net*. Web. 22 Apr. 2011. <http://architecturephoto.net/en/2009/02/kids_republic_in_shanghai_by_k.html>.

²⁸ Figure 20: "Staircase Slide Combo Built By The Coolest Parents Ever | Gizmodo Australia." *Gizmodo Australia, the Gadget Guide | Technology and Consumer Electronics News and Reviews*. Web. 22 Apr. 2011. <http://www.gizmodo.com.au/2009/04/staircase_slide_combo_built_by_the_coolest_parents_ever-2/>.



Ref 1: Architect Home (Stair/slide)
(London)



Ref 2: Children's Room (Ladder to loft space)
(Hampstead, London)



Ref 3: Interior Climbing wall



Ref 4: Sliding Pole
(Scandinavian)

Figure 20: Furniture – Various method of floor, wall, and ceiling application and the integration of vertical play activities

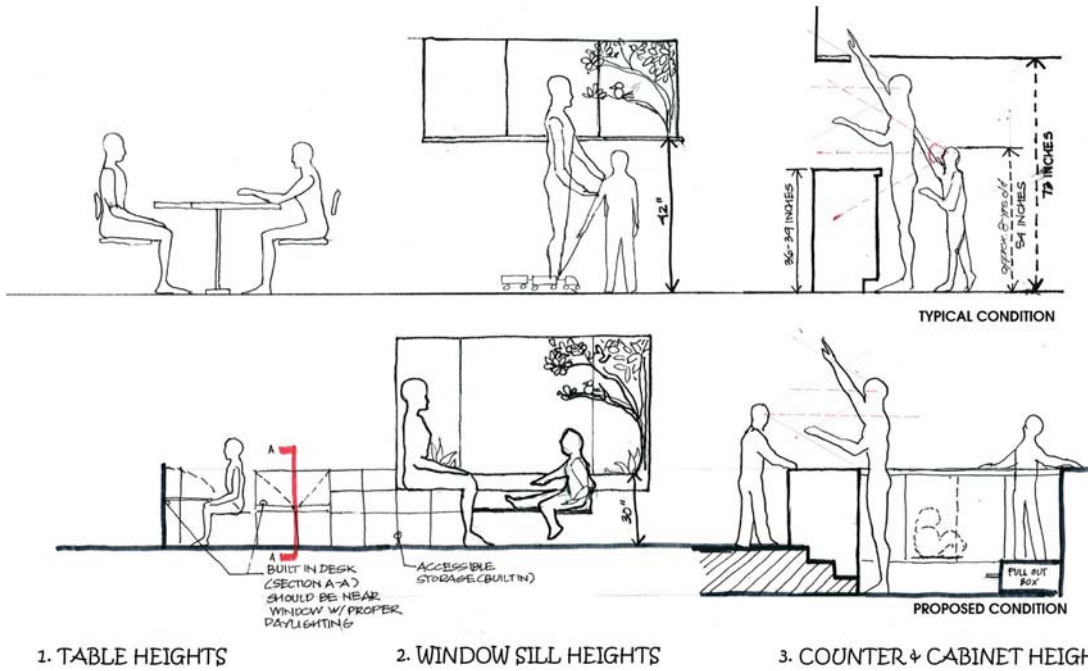
D. FURNITURE

As the spatial elements, including the floor, wall, and ceiling are spatially defined to encourage children's use, the last element that is often overlooked is spatial scale. Specifically, the study of the child's scale in the adult environment is defined. To encourage childhood independence scale and positioning of various elements in the apartment unit must be carefully considered. Below is an anthropometrics study of the child's scale in a typical apartment unit.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE

REDESIGNING THE APARTMENT UNIT- Piaget's Pre-Operational Stage (2-7 years)

1

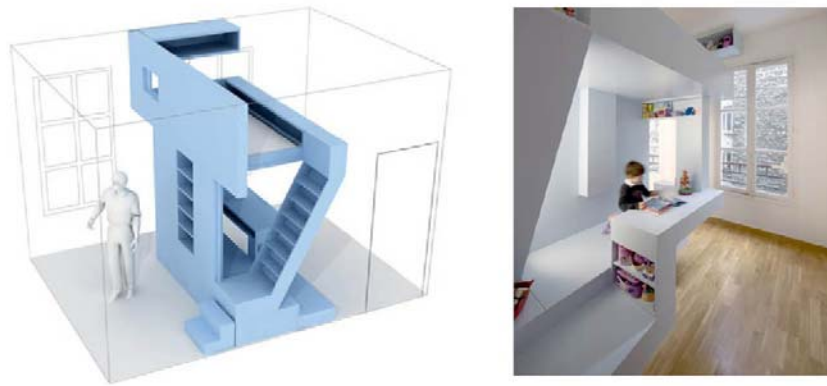


Study of Furniture Scale and Accessibility

Immediately noticeable, table height, windows sills, and counter heights are inaccessible and typically too high for the children's use. Space furnishings should encourage their daily independent movement and use. The height of light fixtures, shelves, coat hooks and racks, door knobs and light switches, mirrors, towel racks should be planned according to children's needs. Spatial attention to scale will allow them to establish experiences that may add to their self-esteem and independence. For example a properly scaled kitchen will allow children to help with household chores and cooking. Having some simple jobs for the children to do are important, encourages children to feel that they are a part of the family, and gives them a sense of importance and accomplishment.

To encourage children to become independent users of space, the following case study, D1, H20²⁹ Architect's uses children furniture to demonstrate how integrated furniture allows children to take control of their space. The circulation/play space (Figure 21) allows children to access any space without parental help. This furniture features raised surfaces two to five feet to allow the children to exercise limbs while providing them with a bird's eye view of the space. Variation of levels are created to encourage multi-functional uses.

Figure 21: Furniture - h20 Architects built in furniture - bedroom



The second case study, D2, demonstrate how furniture can be concealed to provide maximum use of space. As displayed by Figure 22, the case study illustrates how usable space can be stored by means of stacking and pull out spaces.



²⁹ Figure 21: "Multi-Furniture Functional Children Own Personal Space Design - Home Design Ideas | Decorating | Gardening." *Home Design Ideas | Decorating | Gardening - House Design Innovation*. Web. 22 Apr. 2011. <<http://archinspire.com/home-design/multi-furniture-functional-children-own-personal-space-design.htm>>.

PART 3: SPATIAL SOLUTION

DESIGNING AN APARTMENT UNIT WITH DIVERSE SPATIAL ELEMENTS TO ENCOURAGE PLAY

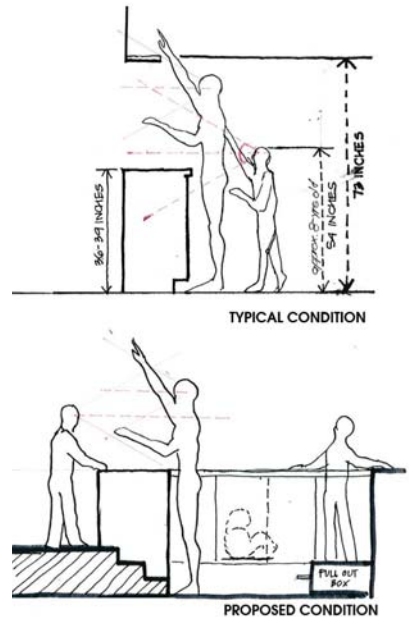
Assuming that there are no nearby play spaces within the apartment building, this chapter proposes two spatial ideas to illustrate that concept of indoor play spaces in apartment units. In both ideas, the design focuses on defining spatial elements: floor, wall, ceiling, and furniture that would encourage the child's play activities. These proposed spatial configurations should allow children to not only learn directly from various play activities but also indirectly by observing how their parents interact with people, respond to stress, and individual values basically an overall observation of "lifestyle". This chapter proposes two models, a typical condition and an optimal condition. Both concepts focus on indoor obstacle courses that encourage a continuous flow of play activities.

MODEL 1: FLAT APARTMENT UNIT

The first concept is a transitional room/obstacle course. To address the small footprint of typical apartment units, this model proposes to increase the unit height to 12'-0" which allows for the creation of a loft space. Typically loft spaces are spaces created adjacent to the walls and most likely located at the corner of the apartment unit. This location allows the loft to serve as a private sleeping quarters. However, this model proposes to mobilize part of the loft space dividing the apartment unit into either one large space with a central play space or multiple smaller play spaces. The mobilization of the loft space is achieved by a system of tracks allowing residence to change their surroundings based on the activities they are engaged in. Privacy is achieved through sliding walls and diversity in functional needs is made possible by incorporating and concealing furniture into the basic spatial elements.

FLOOR & FURNITURE:

To address the two spatial elements of the floor and furniture, Model One combines both elements and creates a multifunctional floor. The first key feature is the adjacency of level changes to encourage child's play to occur near adult spaces. By increasing the floor level adjacent to the kitchen counter, children are able to access the counter and are encouraged to interact with family members. Through proper layout of space and scale of furnishings, kitchens are a great place for children. This space not only serves as a food prep area, but also as a space for children to learn teamwork, responsibility in chores, how to create a healthy diet, do homework, etc.



The second key feature is a floor that defines space at convenient heights which can be used as table heights. Model One uses an elevated floor plan and steps with a maximum of 24" level difference to create a multi-purpose floor that serves both as steps and desk areas. The last key feature is to address the compact spaces where furniture is concealed within the floor plan. To save space, pull-out beds are included and concealed within the floor.

WALL & CEILING:

To address the small sizes of apartment homes, Model One focuses on the flexibility of room sizes to accommodate different functional needs by creating an adaptable volume of space. By creating spaces that change with personal needs, quality family time will not be affected by the built environment. For example, many apartment units have traded larger bedrooms and separate dining rooms for dual purpose space and family rooms. Unfortunately, these living rooms and dining rooms are generally combined together creating an unclear use of space. The combination of these spaces creates the illusion of a larger space, but according to Paxton's surveys people prefer a separation of living and dining spaces because separation of these areas allows for two activities to take place simultaneously. The clear delineation of the dining area encourages the social process of sharing a meal and promotes conversation. Mealtime is a perfect time for parents to learn what is going on in their child's life and vice versa. A common problem with larger family rooms that combine dining and living room spaces is that children have been eating in front of the television, which prohibits communication within the family. To resolve this issue, transitional separation in spaces can temporarily create "boundaries" for children, which defines their play space without compromising space. Therefore, Model One proposes sliding walls that reconfigure public spaces to private spaces.

INDOOR BACKYARD:

Model One proposes an L-shaped, 6'-0" deep, backyard, which allows all rooms within the apartment unit to have a view to the outdoors. To address safety, the backyard is designed with an enclosed permeable patterned mesh that protects children from climbing and falling over. This mesh provides daylight and natural ventilation while addressing the safety of children. The outdoor space allows for a wider range of activities such as playing, hanging out with friends and family, gardening, sunbathing, barbecues, parties, etc. Model One is also designed so that as different rooms are created by the sliding loft space and walls different levels of privacy are created, along with a view outdoors. The wrap around backyard gives an illusion of a larger space as the adjacent indoor spaces transition outdoors.

MODEL 2: TRIPLEX APARTMENT UNIT

In contrast to Model One, Model Two is a three-level apartment unit that is connected by a series of steps and slides that create a continuous indoor play obstacle. The concept of Model Two is to use vertical egress as the social connectivity between multi-leveled homes. The circulation route along the perimeter of the apartment allows other children or family members to take part in other activities without disturbing others. The indoor obstacle path starts off at the first level where children walk up the steps. They can either cut through the second floor and go down the slide or walk up another flight of stairs and slide down a higher slide.

FLOOR & FURNITURE:

The floor is designed to be the play medium. Transitioning between platforms, stairs, and slides a continuous indoor play obstacle is created. Spaces underneath stairs are used as bathroom and storage.

WALL/ CEILING (VOLUME OF SPACE):

Each floor is designed to overlook another floor, so that all family members are aware of what is going on inside of the apartment unit. In addition the layering of the floor levels creates various volumes of spaces that encourage various types of play to occur.

BACKYARD:

To encourage outdoor play, a corner garden is located in the corner of the ground floor and serves as an extension of the kitchen. Sliding doors allow play to be contained outdoors or incorporated into the ground floor family space. Outdoor environment lends itself to many life lessons unavailable indoors, such as the concept of life, relationships, time, and nature. Outdoors, children play more, and more imaginatively³⁰ Play is normally "more free", more relaxedly expressive and socially harmonious in gardens than amongst hard, solely man-made, surroundings³¹ Outdoor learning develops visual and emotional literacy by allowing children to investigate things in a more concrete and rich sense. By relating soil chemistry, plants, animals and weather data to how places look, sound, smell, and feel children learn to understand places at a deeper level than any single indoor subject permits.

³⁰ Dongju Shin and Frost, Joe. *Preschool Children and symbolic play indoors and outdoors*. International Play Journal 3, 1995.

³¹ Day Christopher, *Environment and Children* Architectural Press 2007

CHAPTER 1 SUMMARY

Chapter one studies how the apartment unit can be redesigned to meet the needs of both parent and child. Although children will play in any environment, there are many interior architectural solutions that can encourage children to develop their physical and cognitive skills indoors when access to outdoors is unavailable. To encourage children's interaction with space, spatial elements such as the floor, wall, ceiling, and furniture must be re-designed to be relatable and accessible in their small scale. By arranging these spatial elements in a continuous vertical loop, children can develop a wider range of simple motor skills.

By focusing on the four basic spatial components: floor, wall, ceiling/enclosure and furniture, this research demonstrates that proper redesign of space can encourage a child's sense of security and sensorimotor development. With a lower optical focal point, their spatial perception is strongest with low spatial components such as flooring and small vertical surfaces. To encourage motor skills beyond low spatial elements, accessibility to other elements was integrated into the proposed design by incorporating intriguing vertical elements such as ladders and sliding poles.

Based on the concept of a continuous/ indoor obstacle course, each of the two proposed models address spatial limitations of current apartment unit design. Model One addresses the spatial limitation in size. Assuming that the apartment units must maintain their small footprint, Model One, a 610 sq foot home, increased the ceiling height to create a half level. The concept of Model One was to create a flexible, multi-configurational element, which allows the occupants to change their spatial needs. The key element of Model One was the sliding loft that could be transformed into a central obstacle course. In contrast to the flat design, Model Two has no spatial limitation, but utilizes the vertical egress connecting the three leveled apartment as a play element. Located along the perimeter of the apartment unit, a series of steps, platforms, poles, and slides creates an indoor obstacle course. The key element of Model Two, is that play is designed to occur along the perimeter of the house leaving other family functions and activities in the center and undisturbed.

In both models spatial scale is addressed to meet both adult and child needs. This dual accessibility can help facilitate communication and interaction strengthening open-family relationships. It can also help children to better develop self-care skills and learn how to adapt the environment to their needs.

APARTMENT UNIT DESIGN GUIDELINES:

Apartment unit must encourage a child's physical motor skills:

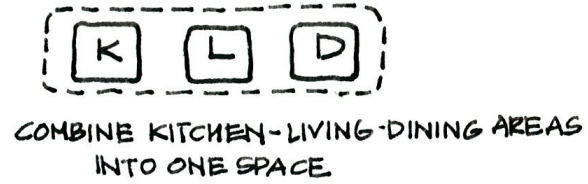
1. Apartment units should have an open plan with various vertical obstacles to encourage simple motor skills when unable to do so outdoors.
2. Apartment units should have built-in furniture that is accessible by both parent and child.
3. Apartment units should have spatial elements such as sliding walls to help define space to better control noise and activities. (temporary boundaries)
4. Apartment units should have a diverse range of spaces to allow children to create their own personal play space.
5. Apartment units should have an enclosed outdoor space with the option to open up to the elements allowing for outdoor motor skills.
6. Apartment units should have windows that allow children to observe other children at active play to encourage both social and motor skills.
7. Apartment units should include spatial characteristics such as color and form because it helps children locate themselves and understand how to behave within certain settings, and how to use the environment to improve themselves both physically and mentally.

**Note: Guideline 7 is an application to apartment floors and apartment building design.*

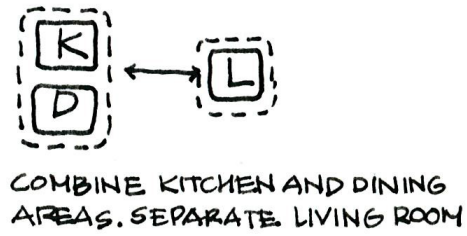
TYPICAL CONDITION
one-storey



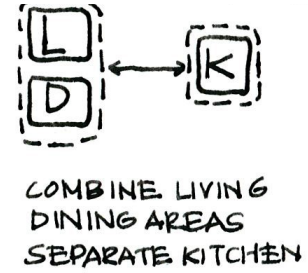
TYPE A
1 1/2-storey



TYPE B
two-storey



TYPE C
three-storey

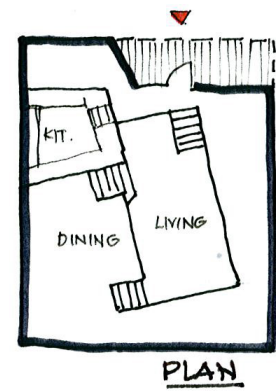


APARTMENT UNIT

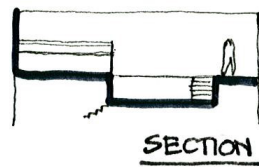
CASE STUDIES OF POTENTIAL CHILD'S INDOOR PLAY SPACE

Case studies:

1. **FLAT APARTMENT - one level**
typical apartment unit
2. **SPLIT LEVEL APARTMENT - 1 1/2 level**
L'corbusier d'habitation apartment unit
3. **DUPLEX APARTMENT - two level**
Tado Ando Azuma apartment unit
4. **TRIPLEX APARTMENT - three level**
MVRDV Mirador apartment unit

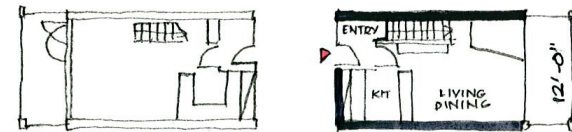


PLAN

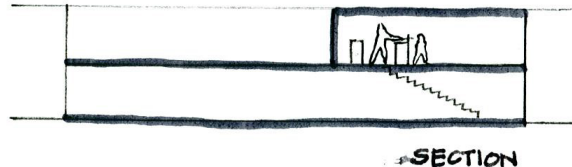


SECTION

typical apartment unit



PLAN

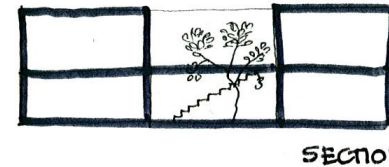


SECTION

L'corbusier d'habitation apartment unit

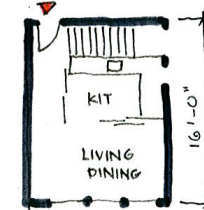


PLAN

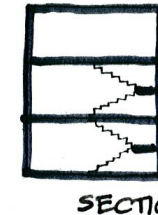


SECTION

Tado Ando Azuma apartment unit



PLAN



SECTION

MVRDV Mirador apartment unit

FLAT APARTMENT UNIT
child's play spaces

1. A child's play space is limited is an unusually spacious room, but with no way to separate noisy and quiet activities or messy and clean ones, except by shifting some of these activities to the bedroom

SPLIT LEVEL APARTMENT UNIT
child's play spaces

1. A child can play in the upper floor where kitchen, living room, and dining room is combined into one space. However this compact space discourages the child from any

2. A child can play on the lower floor, where the bedrooms are separated by a family office

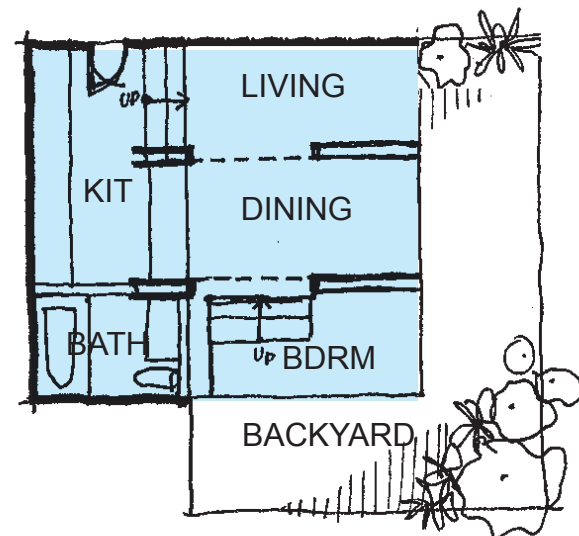
DUPLEX APARTMENT UNIT
child's play spaces

1. A child can play in the internal courtyard of the duplex. This non-traditional space expands the types of play a child can engage in with its outdoor elements such as - sun, plants, etc.

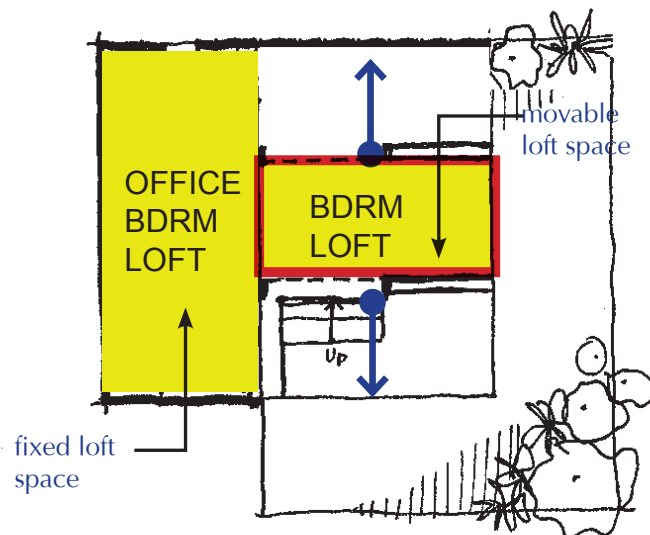
2. With the kitchen and dining room separated from the living room. Two different activities can occur simultaneously offering a wider range of spatial use for family members. For example child creating hand paintings in the kitchen will not disturb their siblings focusing on their homework in the living room. Two fair size rooms permit noisy and quiet, or messy and clean activities to go on at the same time without disturbing each other

TRI-PLEX APARTMENT UNIT
child's play spaces

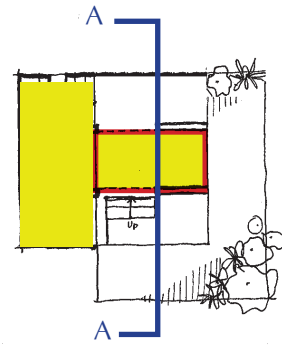
1. A child can play on all three levels of the apartment unit.



GROUND FLOOR PLAN

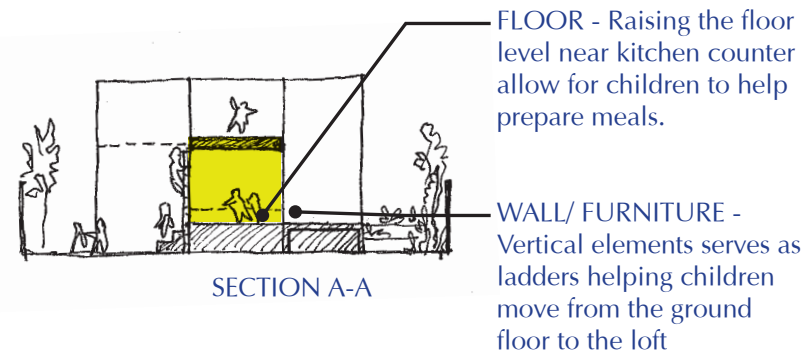


LOFT FLOOR PLAN



LOFT IN THE MIDDLE

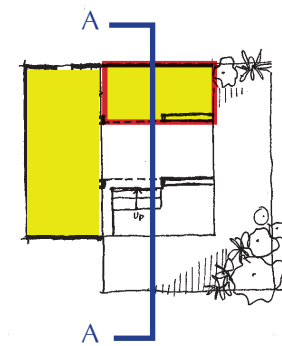
By moving the loft in the middle of the apartment a continuous obstacle course is created where children can climb up the ladder jump on the bed, slide down the pool, work on some arts and craft at the kitchen counter, and walk down the steps.



FLOOR - Raising the floor level near kitchen counter allow for children to help prepare meals.

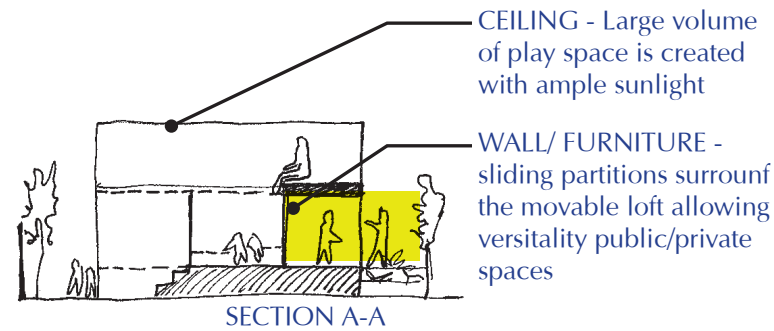
WALL/ FURNITURE - Vertical elements serves as ladders helping children move from the ground floor to the loft

SECTION A-A



LOFT ABOVE ENTRY

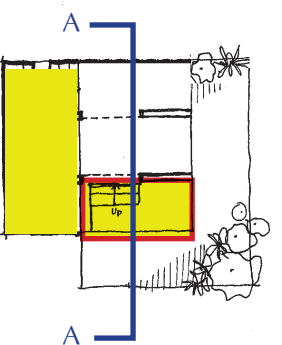
By moving the loft near the entry a semi-public private space can be made as an introductory space to children's new play mates. A larger volume of play space is created.



CEILING - Large volume of play space is created with ample sunlight

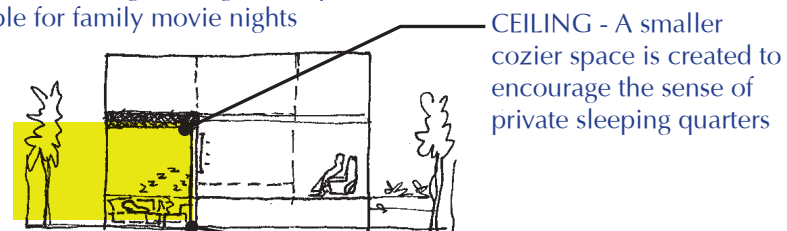
WALL/ FURNITURE - sliding partitions surround the movable loft allowing versatility public/private spaces

SECTION A-A



LOFT NEAR BACKYARD

By moving the loft near the back of the home, smaller sleeping quarters can be made for children and a larger living room space is available for family movie nights



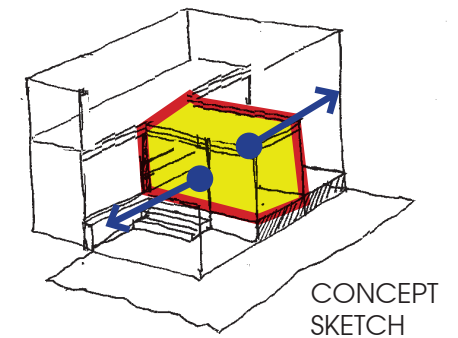
CEILING - A smaller cozier space is created to encourage the sense of private sleeping quarters

FLOOR/ FURNITURE - Pull out beds are concealed within the floor plane

SECTION A-A

APARTMENT UNIT

A. FLAT MODEL



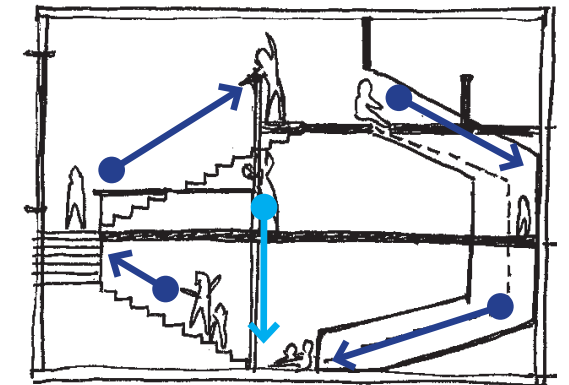
CONCEPT SKETCH

DESIGN CONCEPT:

The first concept is a transitional room/ obstacle course. To address the small footprint of typical apartment units, this model proposes to increase the unit height to 12'-0" which allows for the creation of a loft space. Typically loft spaces are space are created adjacent to the walls most likely located at the corner of the apartment unit. This location allows the loft to serve a private sleeping quarters. However this model proposes to mobilize the loft space dividing the apartment unit into either one large space with a central play space or multiple smaller play spaces. The mobilization of the loft space is achieved by a system of tracks allowing residence to change their surrounding based on the activities they are engaged in. Privacy is achieved through sliding walls and diversity in functional needs is made possible by incorporating and concealing furniture into the basic spatial elements.

APARTMENT UNIT

B. TRIPLEX MODEL



SECTION

DESIGN CONCEPT:

In contrast to the flat model, this concept uses the vertical egress of the apartment unit to tie all rooms within the apartment home.

The obstacle path starts off at the first level where children walk up the steps. They can either cut through the second floor and go down the slide or walk up another flight of stairs and slide down a higher slide.

Each floor is designed to overlook another floor, so that all family members are aware of what is going on inside of the apartment unit.

KEY SPATIAL ELEMENTS

A. FLOOR

Within the three floor apartment unit, each level is adjacent can access in the indoor obstacle course. On the first level the child has access to an outdoor play space where the child can observe nature. On the second level the child's can play in their bedroom room to enter the slide from the platform on the perimeter. On the third level, children can play on the book stair walk up the stairs to slide down to the second floor.

B. WALL

Sliding walls that allows the child to change the size of their bedroom and the access to and from the 2nd floor slide

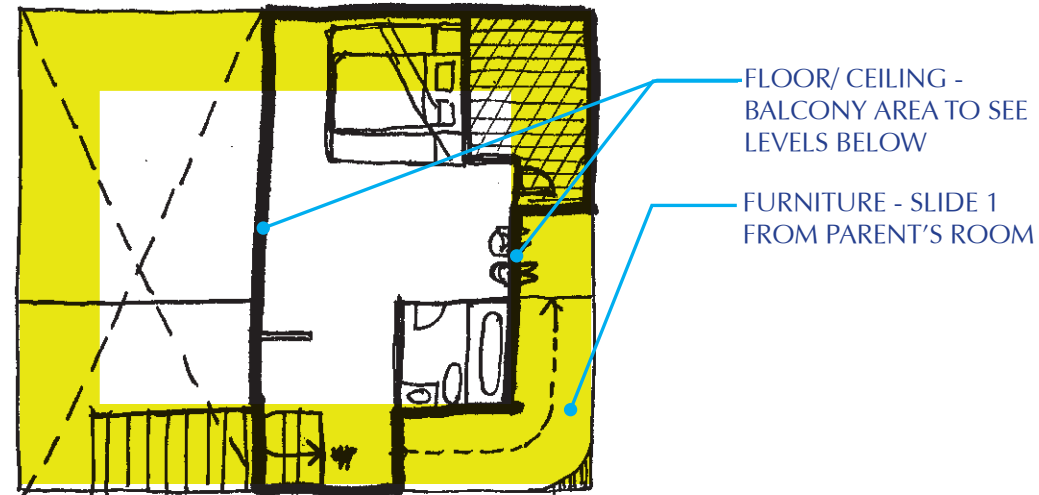
C. CEILING

Various openings in floor plan help create different volumes of space. The spaces encourage different types of play. For example from the 3rd floor to the ground floor is a sliding pole that allows children to quickly move from one space to another

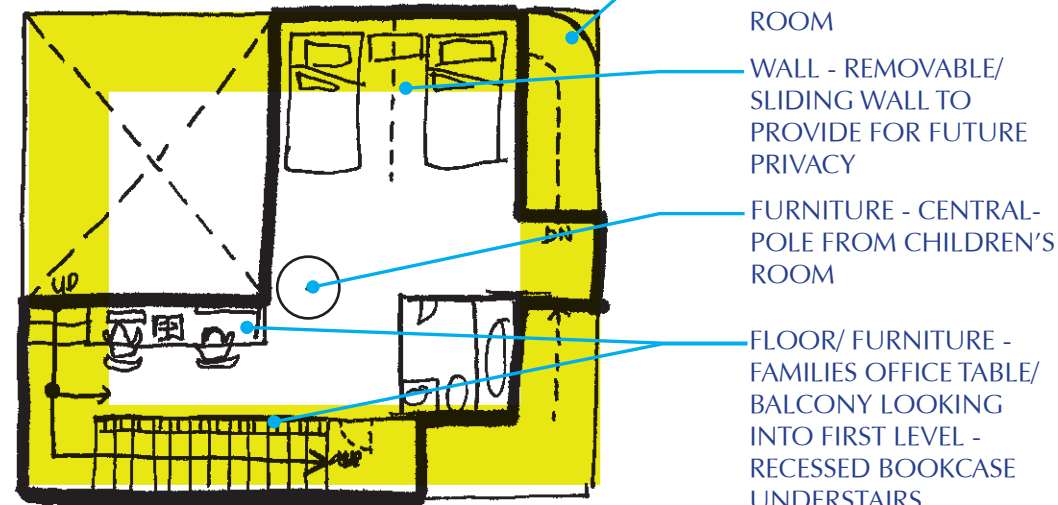
D. FURNITURE

Along the perimeter of the apartment unit is an "obstacle course" comprised of stairs and slides. By locating these built in features around the outskirts of the usable space, activities occurring the middle of the apartment unit is less likely to be disturbed.

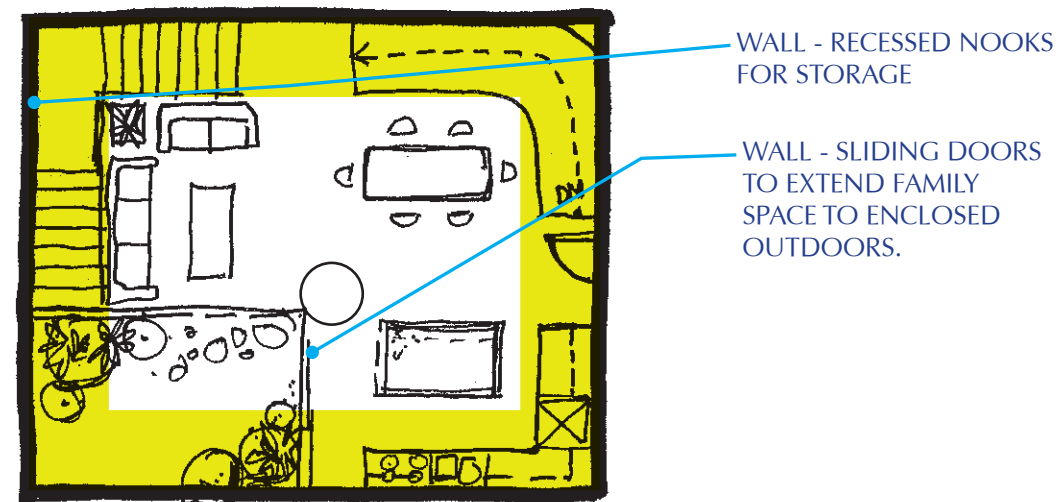
-  CENTRAL FAMILY SPACE - LESS ACTIVE PLAY AREA
-  PERIMETER OBSTACLE COURSE - ACTIVE PLAY AREA



THIRD LEVEL - PARENTS MASTERBEDROOM



SECOND LEVEL - CHILDRENS ROOM



FIRST LEVEL - FAMILY ROOM

FLOOR/ CEILING - BALCONY AREA TO SEE LEVELS BELOW

FURNITURE - SLIDE 1 FROM PARENT'S ROOM

FURNITURE - SLIDE 2 FROM CHILDREN'S ROOM

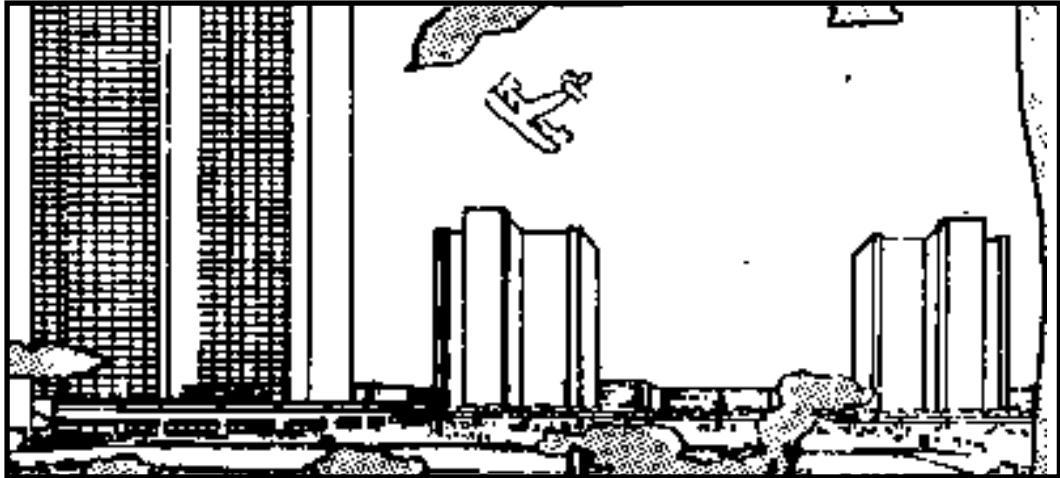
WALL - REMOVABLE/ SLIDING WALL TO PROVIDE FOR FUTURE PRIVACY

FURNITURE - CENTRAL-POLE FROM CHILDREN'S ROOM

FLOOR/ FURNITURE - FAMILIES OFFICE TABLE/ BALCONY LOOKING INTO FIRST LEVEL - RECESSED BOOKCASE UNDERSTAIRS

WALL - RECESSED NOOKS FOR STORAGE

WALL - SLIDING DOORS TO EXTEND FAMILY SPACE TO ENCLOSED OUTDOORS.



THE APARTMENT FLOOR

INTRODUCTION: CHILDREN IN THE APARTMENT FLOOR

“Play is a tool for facilitating children’s cognitive thinking”-Piaget

In chapter two, the doctorate project analyzes the apartment floor as children’s second stable spatial relationship. Transitioning out of their cognitive egocentric stage, children begin to develop awareness of others and begin to move independently outside of the apartment unit to establish social relationships with peers. According to cognitive theorist Jean Piaget, peer relationships are the key source of moral concepts such as equality, reciprocity, and justice.¹ It is through these peer relationships that sometimes peer relationships are valued more than adult-child relationships. Unfortunately development of peer relationships through social play is generally not incorporated into the typical apartment floor design. Social spaces are located on the ground floor however children between the ages of seven and twelve rarely travel there independently. The goal of this chapter is to research and design an apartment floor that focuses on the importance of diverse peer play spaces within the apartment floor.

The analysis begins researching how social spaces have been incorporated into the apartment floor. The three conceptual social spaces that have been identified are porches/stoops, streets in the sky, and social nooks. After these concepts of social spaces have been studied, the research then identifies how those social spaces can be defined to encourage Piaget’s four categories of social play.

The chapter proposes three models demonstrating the three social space concepts. Within each of the concept various types of children’s social play is identified through spatial elements.

**Note: The term children in chapter 2 refer to children between the ages of 7-12.*

¹ Piaget, Jean. *The Moral Judgment of the Child*. Free Pr., 1969. Print.

DOCTORATE PROJECT STRUCTURE

PART 1: SPATIAL PROBLEM

Lack of Social Spaces within the Apartment Floor

Jean Piaget's Influence on Spatial Design:

Spatial Limitation(s) based on child's perception of space are defined as the following:

Piaget Limitation 1: Children's inability to reason logically limits their independent path of travel, thus limiting children's access to potential peer socialization.

Spatial Problem:

There are nearly no places for children to play. The apartment floor consists of small and undefined public spaces that does not encourage children to play with peers.

PART 2: SPATIAL RESEARCH

Research Objective:

To study how social spaces have been designed within the apartment floor and how to redesign those spaces to encourage peer relationships to be established through play.

Section 1: Architecture - Social Spaces within the Apartment Floor

Section 2: Piaget's Children Play Types

PART 3: SPATIAL SOLUTION

Encouraging Diverse Social Play within the Apartment Floor

Doctorate Project Solution:

To address children's inability travel far distances for social purposes, the key is to focus on integrating easily accessible play spaces within the apartment floor. The doctorate identifies four apartment floor configurations and redefines these relationship between the apartment unit (private space) and social space (public space). The design proposes to increase children's social proximity to other peers by increasing the density within the apartment floor. In addition the design proposes to reinsert semi-public private space such as a porch or a stoop to create a transitional social space that children can use to ease into the public social space. To further encourage peer socialization, play spaces such as family gardens and playgrounds are integrated into the apartment floor with emphasis of children's spatial boundaries within the floor to prevent children from traveling to other floors without required supervision.

PART 1: SPATIAL PROBLEM

Lack of Social Spaces within the Apartment Floor

The apartment floor consists typically of apartment units and hallways for circulation. Due to economical efficiency in construction, social spaces that were once key spaces for homes are no longer part of the high-rise typology. Spaces such as entry/porches, streets, and social/community gathering spaces are typically omitted. Although cost savings are apparent, this chapter studies the benefits of putting those social spaces back into the apartment floor.

According to Piaget, children within the Concrete Operational Stage (7-12 years) need and benefit from peer relationships. At this age, children need to be able to make consistent logical reasoning and need to find peer relationships independently. However, without nearby play spaces, it is much more difficult for children to establish peer relationships. According to the Harris poll, 92 percent of the parents of ages 2-12 year olds say that their children spend less time playing outside than they did when they were growing up. This statistic is due to spatial inaccessibility, security, and maintenance. Parents are afraid for their children's safety when they leave the house alone. Many children are no longer free to roam their neighborhoods unless accompanied by adults. Others attend after schools care activities. For families who can't afford after school programs, children are left unattended within their homes. Overall children's lives are more structured and guarded limiting their opportunities for free plays. When children do have free time, they often choose to spend it inside in front of the television or computers. Although the built environment cannot be the sole reason for these statistics, the lack of play spaces and inaccessibility certainly does discourage children to socialize and supports a sedentary lifestyle for kids.

With Piaget's observation of spatial limitation, this doctorate project assumes that children are unable to travel independently to meet peers. To resolve this issue, the study first proposes to change the scale of the floor to create a more relatable group of apartment units to share a social space. By creating a social space on each floor children will have a higher opportunity to take control of their social relationships and parents will have an easier time supervising their children from their apartment units. After a general social space has been defined, spatial characteristics that encourage certain peer play activities will be applied to the design. These spaces should encourage children to learn all types of play and to learn and explore, to help develop exposure, values, and attitudes.

PART 2: SPATIAL RESEARCH

Section 1: Architecture - Social Spaces within the Apartment Floor

To address the importance of socialization within the high-rise, there has been several case studies that re-conceptualized social space within the apartment floor. Below are the three types of space which are analyzed:

- A. THE PORCH/STOOP
- B. THE STREETS IN THE SKY
- C. SOCIAL NOOKS IN APARTMENT NEIGHBORHOODS

A. THE PORCH/STOOP:

After children understand the space within their apartment unit, they are ready to move outside on their own. Playing outside of the apartment unit in a public area is important and the beginning development of their social self. This outdoor environment lends itself to many life lessons unavailable indoors, such as the concept of life, relationships, time, and nature. Doorstep play is prominent as their area of free movement increases gradually. It is a period in which visibility and accessibility to the home base is a psychological security necessity. Social life only occurs when psychological security is established.

The porch or doorstep has always been a place where children first learn to socialize with other children. It is an informal space that allows casual interaction to take place. Unfortunately, the typology of apartment buildings has omitted the function of a porch. Corridors or hallways directly connect private apartment units, completely eliminating the semi-public, "porch", once provided.

The traditional porch is a semi-private space parallel to the public space of the "street". The porch does not force one to make the unattractive choice between admitting people to the full intimacy of the home or keep them in the distanced relation of the formal public realm. The result is interactions that are easy and only minimally committal, thus promoting relationships with neighbors and the neighborhood. Without this space informal social interaction has diminished. To resolve this issue, semi-public/private spaces should be re-programmed into the high-rise design. As an extension of their apartment home, intermediate play spaces close to home are an important part of childhood development. The more secure and spontaneously early experiences can be, the more children will achieve a sense of autonomy within the physical setting.

B. STREETS IN THE SKY

A corridor is a gallery or a passageway that leads to several apartment units. The main purpose of space is to provide a means of egress to escape to the exterior of the building in times of danger. However, in the 1960s and 1970s architects began experimenting with the idea of “streets in the sky”, and this idea combined public circulation space with social spaces. With the increase in vehicular traffic and traffic casualties, redesigning apartment corridors into vertical streets would be the perfect opportunity to create safer play spaces for children.

In case study B1, Unit D'Habitation Residence² Architect Le-Corbusier created an internal pedestrian circulation and strengthened the idea by locating various public amenities such the pool, a grocery store, and a kindergarten at various levels of the high-rise to encourage social interaction within the building. However, in regards to the apartment floor, Le-Corbu widened the public corridors to approximately 3 meters in hopes that this increase in shared social space would encourage spontaneous social interaction (Figures 22-24). Unfortunately, although these corridors are generously spaced they still only serve as hallways. The problems with these corridors “streets” were its windowless, dark, gloomy characteristic that would be scary to children to play in. In addition, acoustics is another restricting component of child's play. In addition, the corridors consist of stained concrete on all surrounding surfaces creating an uncomfortable social environment with an echoing acoustical ambience. Other than widened corridors, no other social space was designed.



Figure 22: Linear Floor Plan

■ SOCIAL SPACES IN THE APARTMENT FLOOR



Figure 23: Photo - Enclosed Concrete Double Loaded

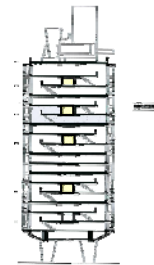


Figure 24: Building Section

² Figure 22, 23, and 24 French, Hilary. *Key Urban Housing of the Twentieth Century: Plans, Sections, and Elevations*. New York: W.W. Norton, 2008. Print.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)

In case study B2, Robin Hood Gardens Residence³, Architect Alison and Peter Smithson's designed a two block residence surrounding a garden. The key feature within the building was the 12 foot wide terraces⁴ with exposure to the natural elements every three stories. The Smithson's believed that by expanding the width of the typical walkway and orienting them into a large garden, community relationships would strengthen through the encouraged social activities to occur in these elevated walkways. These single sided passages⁵ provide views of the outer world and weather, orienting children in time and space. These walkways are designed to take on a segmented linear pattern to mimic London streets.



Figure 25: Exposed concrete single loaded



Figure 26: Building Section

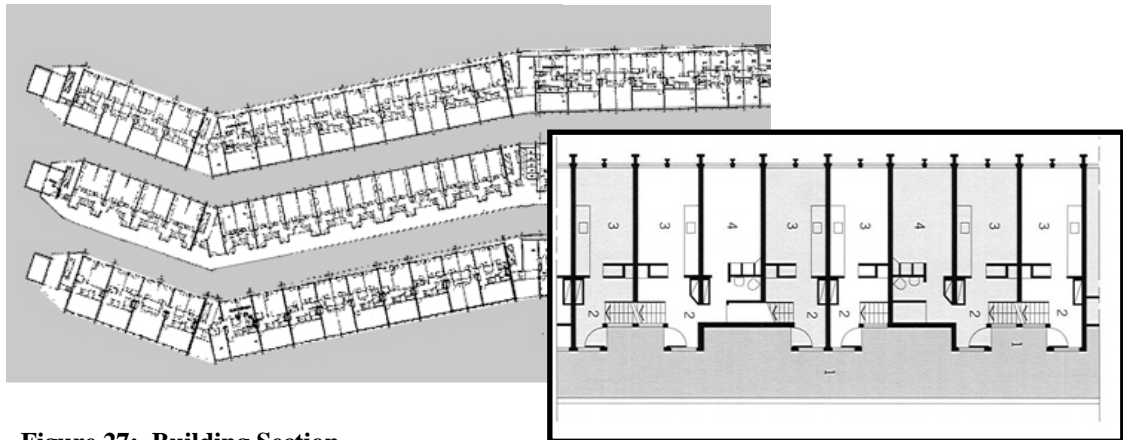


Figure 27: Building Section

SOCIAL SPACES IN THE APARTMENT FLOOR

³ Figure 25: "Robin Hood Gardens - Demolish or Refurbish It? - SkyscraperCity." *SkyscraperCity - Powered by VBulletin*. Web. 22 Apr. 2011. <<http://www.skyscrapercity.com/showthread.php?t=630875>>.

⁴ Figure 26: "Robin Hood Gardens Is Not the Same as a Digital Model of Robin Hood Gardens." *Cityofsound*. Web. 22 Apr. 2011. <<http://www.cityofsound.com/blog/2008/03/robin-hood-gard.html>>.

⁵ Figure 27 & 28: "Robin Hood Gardens." *Space 72*. Web. 22 Apr. 2011. <<http://space72.blogspot.com/2010/07/robin-hood-gardens.html>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)

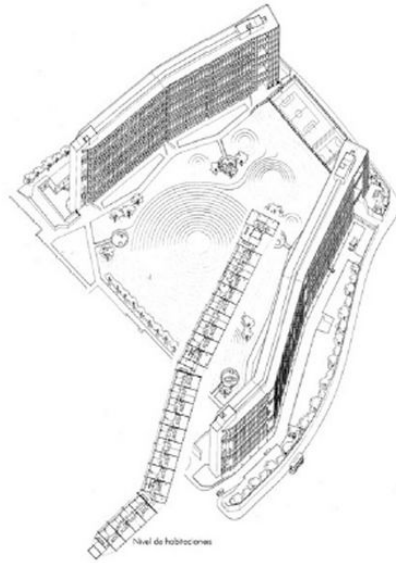


Figure 28: Aerial view

Although “streets in the sky” is a great idea, the lack of maintenance and mixture of unfortunate social residences have negatively influenced these social walkways to become a no man’s land and allowed burglary with its ease of escape. High-rise design relies on self-help rather than on government intervention for security. Interior circulation space such as stairs, corridors, elevators, and lobbies were indefensible public space.

This case study proves that culture and context does play a significant role in the function of the building, even if the idea was successful.



Figure 29: Photo of stacked apartment units in Habitat 67

"The average family wants privacy, its own garden, parks, sunlight, fresh air and, equally important, a sense of identity with its home," he said. "Habitat is a complete environment because it has these requirements."

- Moshe Safdie

In case study B3, Architect Moshe Safdie designed Habitat 67⁶ another version of "streets in the sky". Designed to be a modern version of an Italian Hill town, this 10-story apartment complex created many intriguing spaces in terms of volume and characteristics. The design relied on a module apartment unit (17'-6"L x 38'-6"W x 10'-0"H) and sixteen types of stacking configurations. The pattern of stacking created gaps within the formal allowing for public areas to receive light and air to pass through. Although the stacked units seemed random pyramidal in shape, every apartment unit was designed to have a roof top garden atop the roof of the unit below. Home sizes ranged from one bedroom (600 sqft) to four bedrooms (1700 sqft).

⁶ Figure 29: "Habitat 67 (Montreal, Canada)." *Unusual Architecture*. Web. 22 Apr. 2011. <<http://unusual-architecture.com/habitat-67-montreal-canada/>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)

A variation of outdoor space was created through the stacking pattern⁷ and improved spatial diversity in public space. Throughout the complex, there is an external walkway, which Safdie referred to as "pedestrian streets". This walkway connected the multi-leveled apartment units from the ground floor, plaza, 5th, 6th, and 10th floor. On the ground level was a service road system and parking facility. Above the ground floor was the pedestrian plaza connecting the entire complex through walkways and bridges. In Safdie's design pedestrian walkways were always separated from vehicular interaction. Children were able to travel to parks on the ground floor, plaza, and upper levels.

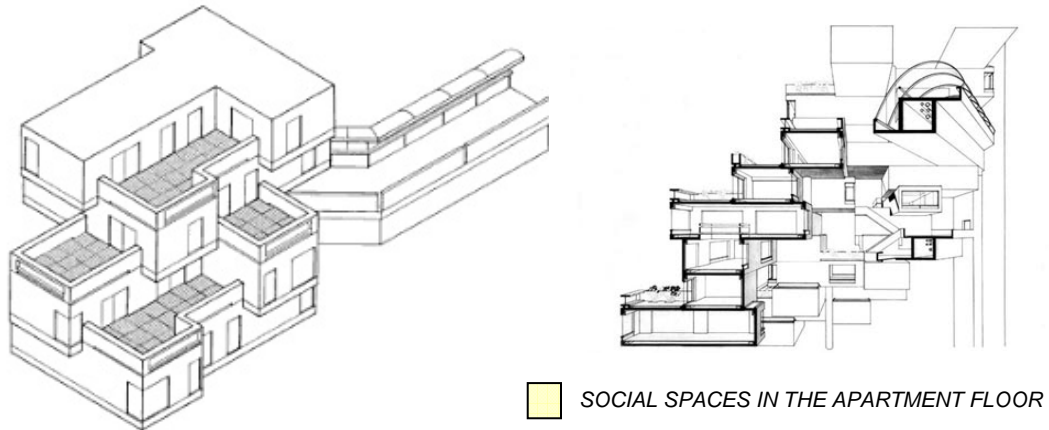


Figure 30: Habitat 67 section



Figure 31: Construction Photo

These walkways varied in width and the path was composed of linear angular turns. In contrast to the typical apartment high-rise pedestrian circulation is not repetitive by apartment floor but intriguing and different due to the stacking pattern⁸. Various volumes of space were created, which encourages various play activities to occur. The tiered stacking and external stairs also allows multiple residence to share the same public space.

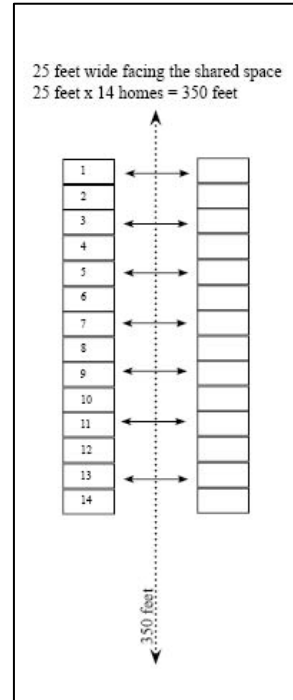
⁷ Figure 30: Abbas, Mohammed Ali. "Habitat '67 - Planning and Architectural Drawings." Web. 22 Apr. 2011. <<http://cac.mcgill.ca/safdie/habitat/showplans.htm>>.

⁸ Figure 31: "The Habitat 67 Residences by Moshe Safdie - Montreal, Canada." TwistedSifter - The Best of the Web, Sifted, Sorted and Summarized. Web. 22 Apr. 2011. <<http://twistedSifter.com/2009/05/the-habitat-67-residences-by-moshe-safdie-montreal-canada/>>.

C. SOCIAL NOOKS IN APARTMENT NEIGHBORHOODS

Transitioning from “streets in the sky” to social spaces within the apartment floor, case study C1 describes Architect Christopher Alexander’s mathematical formula, which determines the maximum width of a home to ensure the probability of children’s interaction with peers.

In Alexander’s study⁹, he thought that each home must be, “a 350 feet walk of 27 other houses.” Assuming that there are two children per household in the areas where children live, and that these children are evenly distributed, in age, from 0 to 18. Roughly speaking, a given preschool, child who is “x” years old with play with children who are “x+1” or “x-1” years old. In order to have a reasonable amount of contact, and to spontaneously create play groups, each child must be able to reach at least five potential playmates. Statistical analysis shows that in order for each child to have a 95 per cent chance of reaching five playmates, each child must be in reach of 27 households. Assuming that children around the ages 2-12 are not able, or allowed to go more than 350 feet in search of playmates, house lots would have to be less than 50 feet wide and about half the width and twice the density they are today. Homes would have to be maximum of 25 feet wide.



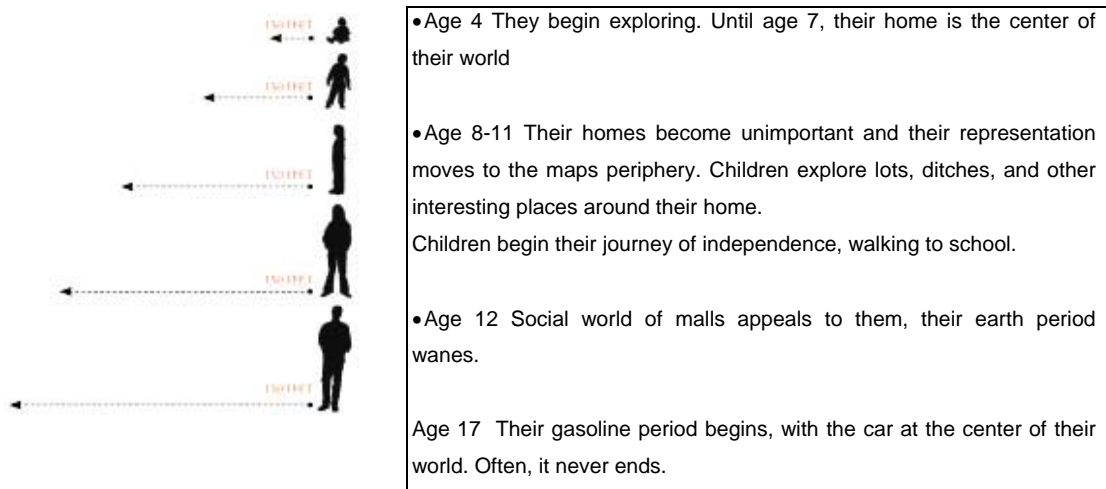
⁹ Alexander, C. “The City as a Mechanism for Sustaining Human Contact.” In *Environment for Man: The Next Fifty Years*, edited by W.R. Ewald, Jr. Bloomington: Indiana Press, 1967

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)

Assuming that the minimum apartment unit width is 25 feet, case study C2, Sobel's "child movement through space"¹⁰, studies the minimum distance a child is able to travel independently. According to child psychologist Sobel, the distance a child travels independently is usually proportional to their age. Children between the ages of 1-4 should be able to wander a maximum distance of 150 feet. This dimension is based on a comfortable distance from parent to child. Young children feel more comfortable with parents nearby; they are a form of security. With parents as a child's first understood sense of secured familiarity young children perceive risk and danger when their parents are not in close proximity. As these children grow older, the complete opposite takes place where the spaces they enjoy are the ones furthest away from adults.

Similar in theory McDonald¹¹ states that children between the ages of 5-10 will stay within five minutes from home in terms of distance they will rarely go beyond a radius of 350 feet on a regular basis. When school starts children between the ages of 6-10 should be able to socialize with other children outside of school in neighborhood play areas. Children between the ages of 10-17 should have access to cultural and recreational facilities to support their social development.

According to both studies, spatial relationships occur proportionally to children's age and levels of development. In Sobel's experiment he asked the participants to draw maps, this helped him to understand the places that made up their world as were important to them. To better illustrate spatial development and its relationship to spatial development below are phases defined by Sobel's study:



¹⁰ Sobel, David. *Children's Special Places: Exploring the Role of Forts, Dens, and Bush Houses in Middle Childhood*. Tucson, AZ: Zephyr, 1993. Print.

¹¹ McDonald, Noreen. *Children's Travel: Patterns and Influence*. California, 2005. Print

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A child's immediate environment should be relatable and properly scaled. When the apartment floor becomes too large, it is difficult to secure because there is a lack of familiarity between neighbors and strangers. However, if the apartment floor is too small children will not gain enough peer relationships. By creating the proper groupings of apartment units, more personable relationships can be created and trusted neighbors can help supervise children at play.

In case study C3, the Shanghai Tower¹², a similar concept of groupings of apartment floors was implemented. Comprised of 112 floors, the Shanghai Tower consists of eight neighborhoods each consisting of fourteen floors. Each neighborhood contains an atrium podium, however this space is located around the core of the apartment units and offers no diversity for child's play.

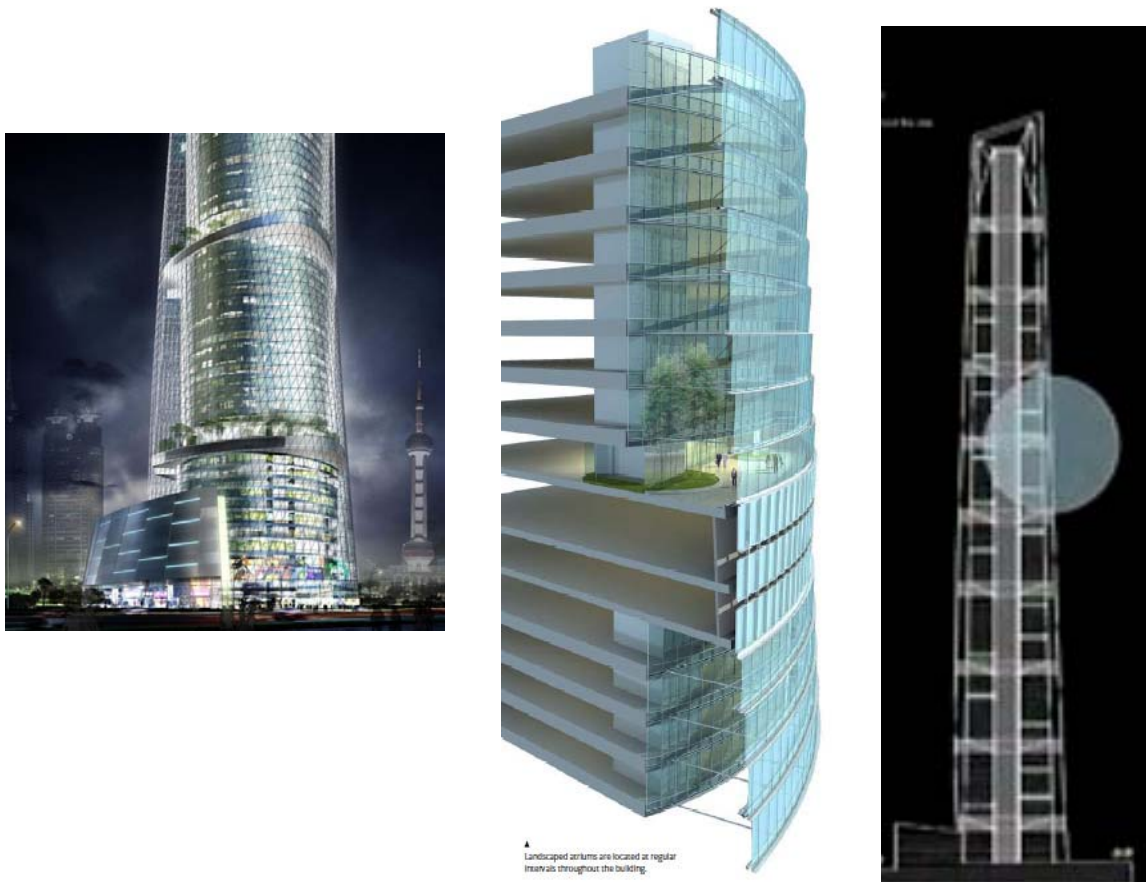


Figure 32: Shanghai Tower “neighborhood”

¹² Figure 32: "Shanghai Tower | OpenBuildings." OpenBuildings | Archiving the World's Built Environment. Web. 22 Apr. 2011. <<http://openbuildings.com/buildings/shanghai-tower-china-by-gensler-profile-2209>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
 REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)



Figure 33: Interlace Rendering

In case study C4, Interlace housing in Singapore is a gated community designed by Office for Metropolitan Architecture (OMA). This complex follows the same concept of creating relatable neighborhoods in dense high-rise apartments. OMA breaks down the monolithic scale of Interlace by creating stacks of modular neighborhood blocks in a hexagonal pattern. Each of their neighborhood blocks consists of six apartment floors and 31 apartments per block. The complex consists of 23 neighborhood blocks. The interlocking blocks create sky gardens for both public and private uses. In addition, the interlace's spatial program¹³ is child friendly, which includes a pool, landscaped courtyard, fitness station, clubhouse with a function room, gymnasium, children play area, gardening zone, lotus pond, tennis courts and party pavilions. The ground floor, houses a majority of the public amenities, is a safe pedestrian environment. All parking is below grade.



Figure 34: Spatial Program

¹³ Figure 34: "Singapore Condo Launch The Interlace." Singapore Property Hunt, One-Stop Service for SingaporeProperty Hunters and Home Owners. Web. 23 Apr. 2011.
 <<http://www.singaporepropertyhunt.com/singapore-condo-launch-interlace.html>>.

Section 2: Piaget's Children Play Types

Play activities are essential to healthy development for children and adolescents. It is the medium in which children develop skills physically, emotionally, socially, and intellectually. Activities engaged in by children both stimulate and influence the pattern of the connections made between the nerve skills. Through repetition and awareness, these actions assist children to make choices and practice actions, which leads to mastery. According to Piaget, play is a major tool for facilitating child's mental development.¹⁴ Piaget believed that the changes in play were parallel to different levels and or opportunities for cognitive and emotional development.¹⁵ According to Piaget (1952), interacting with other children gives children one more opportunity to find out whether their current ways of thinking or behaving are appropriate to all situations. A variety of opportunities for children to engage in social play are the best mechanisms for progressing through the different social stages. According to the Child Development Institute, by interacting with others in play settings, children learn social rules such as, give and take, reciprocity, cooperation, and sharing. Through a range of interactions with children at different social stages, children also learn to use moral reasoning to develop a mature sense of values. In addition, to be prepared to function effectively in the adult world; children need to participate in lots of social situations.

¹⁴ "How Much Do We Know about the Importance of Play in Child Development? | Childhood Education | Find Articles at BNET." Find Articles at BNET | News Articles, Magazine Back Issues & Reference Articles on All Topics. Web. 23 Apr. 2011.
<http://findarticles.com/p/articles/mi_qa3614/is_200207/ai_n9147500/>.

¹⁵ Piaget, Jean, *Growth of Logical Thinking : From Childhood to Adolescence*, The. New York, 1958. Print.

Unfortunately, there are no accessible play spaces for children within the apartment floor. Spaces adjacent to the typical apartment units have one primary function, which is to get people from and to their apartment unit as quickly and conveniently as possible. The function has omitted quality social spaces that assist children with the development of social peer relationships. According to Piaget, there are two types of social relationships, adult-child relations and peer relations. Both of these relations teach children basic moral rules that children will need to understand and live by. From the adult/child relations, a child learns rules of constraint, based on a top-down, unilateral respect for superiors. However, it is from peer relation that children learn rules of cooperation, based on mutual respect for one's equal. The establishment of peer relations is key to a child's development because together they learn cooperative problem solving and peer cooperative relations, provided the arena for the emergence of child operations¹⁶, which for Piaget requires the absence of any constraining influence .

According to Piaget, there are four general types of play (1) sensorimotor play (2) symbolic play (3) games construction (4) games with rules, each type of social play can help children learn a valuable life lesson, so as how to learn to understand others, social rules – behavioral settings, and cooperation/sharing. Play provides important motivation for children to become active, engage with others, extend themselves and adapt and learn skills. There are many physical, social, cognitive and emotional benefits which accrue from play.

¹⁶ Müller, Ulrich. *Social Life and Social Knowledge: toward a Process Account of Development*. New York: L. Erlbaum Associates, 2008. Print.

PIAGET PLAY TYPE 1: SENSORI-MOTOR PLAY

The first type of play, sensori-motor play may be the most important one in regards to today's obesity in children. Children generally enjoy activities that encourage movement. Slides, swings, bouncy bridges, aerial runways and rocking boats are several methods that encourage this type of play. This particular type of play provides critical opportunities for children to develop both individual gross and fine muscle strength and overall integration of muscles, nerves, and brain functions. Recent research has confirmed the critical link between stimulating physical activity and brain development. Movements help develop physical skills, as well as, assists disturbed children to find ways to reconnect to the world.¹⁷ Studies show activities that allow children to relieve their excess energy is calming and therapeutic, even the Department of Health is recommending children to have at least 60 minutes of active outdoor play every day.

Sensori-motor spaces are generally open spaces providing ample room for children to run, jump, leap, etc. These spaces help children learn their physical limitation; encourage their curiosity to push the envelope, and the strengthening of a child's confidence through know-how and mastery of motor play. Additional lessons include a potential lifelong understanding and maintenance of a healthy lifestyle through routine exercise/sports.

¹⁷ Kuhfuss, Werner Evolution genom Lek. Jarna Trykeri (1979)

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)

Below is a creative vertical play space that exercises children's motor skills with little risk to harm with its mesh enclosure. The image below is a playground obstacle designed by artist Noguchi to encourage social interaction by means of competitive racing down a symmetric slide.



Figure 35: Sensori-Motor Play – Climbing, Sliding, Bicycling

PIAGET PLAY TYPE 2: CONSTRUCTIVE PLAY

"The second type of play is constructive, when children manipulate their environment to create things. This type of play occurs when children build towers and cities with blocks, play in the sand, construct contraptions on the woodworking bench, and draw murals with chalk on the sidewalk. Constructive play allows children to experiment with objects; find out combinations that work and don't work; and learn basic knowledge about stacking, building, drawing, making music and constructing. It also gives children a sense of accomplishment and empowers them with control of their environment. Children who are comfortable manipulating objects and materials also become good at manipulating words, ideas and concepts". - Child Development Institute

Children learn practical day to day activities such as dressing oneself, cleaning, overall sense of independence through the simple accessibility and use of the built environment. Often times features within a home such as indoor furniture is not built for child use thus causing children to rely on his or her parents to complete daily tasks. This may delay the development of self-reliance and independence in a child. (See Chapter 3)

In contrast to the indoor environment, the outdoor environment is another medium in which children manipulate to develop skill sets. A good example would be a learning garden. According to Wells and Lekies's study on linkages between childhood nature experiences and adult environmental attitudes and behaviors, results show that childhood participation with wild nature (e.g., hiking, camping, or playing in the woods), had a significant, positive effect on both adult environmental attitudes and behaviors. Surprisingly, people who participated in wild nature activities as children were more likely to have pro-environmental attitudes and behaviors as adults. In addition, these psychologists found that childhood interaction with domesticated nature (e.g., picking flowers or planting seeds), did not have as great an influence as that of wild nature on environmental attitudes and had only a marginal effect on environmental behaviors. This study shows that children's interaction with a touchable and changeable environment encourages children to learn their responsibility to nature thus emphasizing the urban need for green space.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)



Figure 36: Constructive Play- Sandbox Play, Dirt Play, Gardening

PIAGET PLAY TYPE 3: SYMBOLIC PLAY

"The third type of play is symbolic play, when children learn to abstract, to try out new roles and possible situations, and to experiment with language and emotions. In addition, children develop flexible thinking; learn to create beyond the here and now; stretch their imaginations, use new words and word combinations in a risk-free environment, and use numbers and words to express ideas, concepts, dreams, and histories. In an ever-more technological society, lots of practice with all forms of abstraction - time, place, amount, symbols, words, and ideas - is essential."- Child Development Institute

According to Piaget¹⁸, symbolic play leads to an increasing differentiation of the objective and the subjective, with consequent decrease in egocentrism. Children learn to see the world from another perspective. This type of play allows children to take control of their environment through make-believe. The acting out of different roles during play may also facilitate the development of social behaviors such as sharing, cooperation and altruism. Creative play leads to the development of creativity, intrinsic motivation, perseverance, and self-confidence. Below is an innovative twist on symbolic play from a bird's perspective.

¹⁸ "The Psychology Of Intelligence : Jean Piaget : Free Download & Streaming : Internet Archive." Internet Archive: Digital Library of Free Books, Movies, Music & Wayback Machine. Web. 23 Apr. 2011. <<http://www.archive.org/details/psychologyofinte002598mbp>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)



Figure 37: Symbolic Play – Role Playing

PIAGET PLAY TYPE 4: GAMES WITH RULES PLAY

Last but not least is play type four, games with rules play. This play type is very structured. "The 'games with rules' concept teaches children a critically important concept - the game of life has rules (laws) that we all must follow to function productively. At about age 9 to 12, team sports take on increasing importance, children refine their abilities to reason, think strategically, and interact with others. They also improve these skills through play activities such as crafts, advanced building sets, science projects, sophisticated jigsaw puzzles, and computer and video games."

"This learning process helps children transition from an egocentric view of the world to an understanding of the importance of social contracts and rules. Part of this development occurs as they learn that games like Follow the Leader, Red Rover, Simon Says, baseball and soccer cannot function without everyone adhering to the same set of rules".- Child Development Institute

This play type encourages teamwork communication and problem solving. Since games with rules are so general there are no specific spatial requirements and can happen throughout the built environment.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT FLOOR - Piaget's Concrete Operational Stage (7-12 years)



Figure 38: Games with Rules Play – soccer & chess

PART 3: SPATIAL SOLUTION

Encouraging Diverse Social Play within the Apartment Floor

Assuming that there are no nearby play spaces within the apartment floor, this chapter proposes three spatial models to illustrate that concept of porch/stoop, streets in the sky, and social nooks as play spaces. Each of the three designs follows Architect Christopher Alexander's social proximity study in which a child must be within reach of 27 apartment units without traveling more than 350 feet. In addition, to create a variation in the models, each design focuses on a different type of social circulation pattern.

The first model "porch/stoop" uses a central/branching configuration. As the glass elevator stops at a third-story floor, a child is able to play in a large central public space with different activities dispersed throughout the space.

The second model "streets in the sky" uses a hybrid of linear paths with visible social amenities that give children a reason to use space. These "streets" are vertically layered allowing for viewing platforms to create intrigue and hopefully encourage children to travel to other social spaces to meet peers and make friends.

The third model "social nooks" uses a linear configuration that connects two rows of apartment units. The social space consists of a recessed social play spaces allowing for the perimeter walkway to stay clear of any play activities that are taking place. Within the central play space are nooks that allow for various play activities to occur. From seating areas that serve as outdoor story time to planting areas for children's gardens, these social spaces are ideal for instigating conversation between peers.

The goal is to create memorial social play spaces by connecting fun activities with space

SUMMARY

Chapter two studies how the apartment floor should incorporate immediately accessible social play spaces to encourage peer relationships. These spaces should be diverse in spatial characteristics to accommodate all types of play and learning experiences. To increase children's opportunities to make friends and freedom of movement, apartment floors with shared social spaces should be grouped vertically to create a denser, more relatable neighborhood unit.

Limited by independent mobility, accessible play spaces are important to help children develop peer social skills. It is through this interaction that children learn life lessons such as morality, reciprocity, and cooperation. With this observation, this doctorate study proposes three various apartment floor configurations, which can encourage the development of peer relationships within the proximity of the apartment floor. To address varying spatial needs of children of all ages, a variety of play spaces are designed within the apartment floor so that children have the option to play other games or slowing progress to the harder, more advanced games.

Overall, play activities help children develop the qualities necessary in adulthood such as problem solving, independence, self awareness, creativity, resilience, spatial knowledge, and flexibility, in addition to the ability to deal with change. It is a vehicle for self-expression and social interaction. Play provides important motivation for children to become active, engage with others, extend themselves, adapt to situations and learn skills. It also allows children to better control their body through locomotion, pursuit, fighting, and hiding, control the environment through fantasy, control danger, and the learning of new skills. In addition, children will learn incorporation of observed behavior, the development of adult-like behavior, and the loosening of the bond between adult and infant.

In many cases, play activities at this age become the basis for life-long interests and hobbies. While children begin to play less in the traditional sense as they move into their teenage years, they begin to transform their interests and hobbies into the "play of the adult."

APARTMENT FLOOR DESIGN GUIDELINES:

Apartment floor must be sized appropriately to achieve appropriate density to create an opportunistic neighborhood to develop peer relationships through informal play spaces:

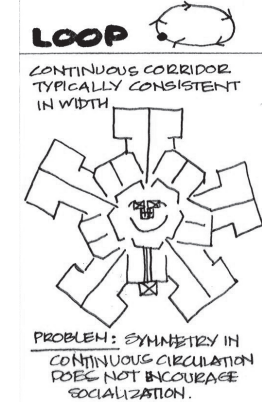
1. Apartment floor play spaces can be created out of corridor space. These paths can be re-directed from pass thru space to communal space.
2. Apartment floor play spaces should be arranged in a central location to create a sense of security so that parents can indirectly supervise their children.
3. Apartment floor play spaces should be clear and accessible without requiring adult-available periods, for example weekend blocks of time.
4. Apartment floor play spaces should be diverse and encourage sensorimotor play, constructive play, symbolic play, and games with rules play.
5. Apartment floor play spaces must have an identifiable boundary.
6. Apartment floor play spaces must encourage a particular type of physical activity to instigate use.

APARTMENT FLOOR

A. PORCH/STOOP MODEL

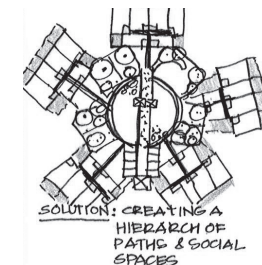
DESIGN CONCEPT:

This concept focuses on a central space that is shared by all residences.



PROBLEM: SYMMETRY IN CONTINUOUS CIRCULATION DOES NOT ENCOURAGE SOCIALIZATION.

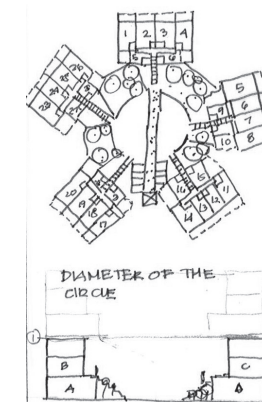
EXISTING CONDITION



SOLUTION: CREATING A HIERARCHY OF PATHS & SOCIAL SPACES

- SMALLER SOCIAL/PLAY SPACES ARE CONNECTED TO MAIN PLAY SPACES
- CONTINUOUS CIRCULATION IS EASIER FOR CHILDREN TO REMEMBER BECAUSE AS LONG AS THE CHILD REMAINS ON THE PATH THEY WILL EVENTUALLY REACH THEIR STARTING POINT.

CONCEPT: SOCIAL NOOK



DIAMETER OF THE CIRCLE

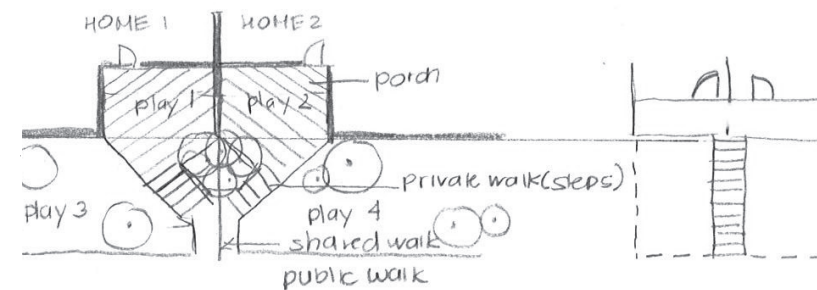
INCREASE APARTMENT FLOOR DENSITY TO INCREASE SOCIALIZATION

CONCEPT: ADDING THE PORCH INTO THE APARTMENT FLOOR

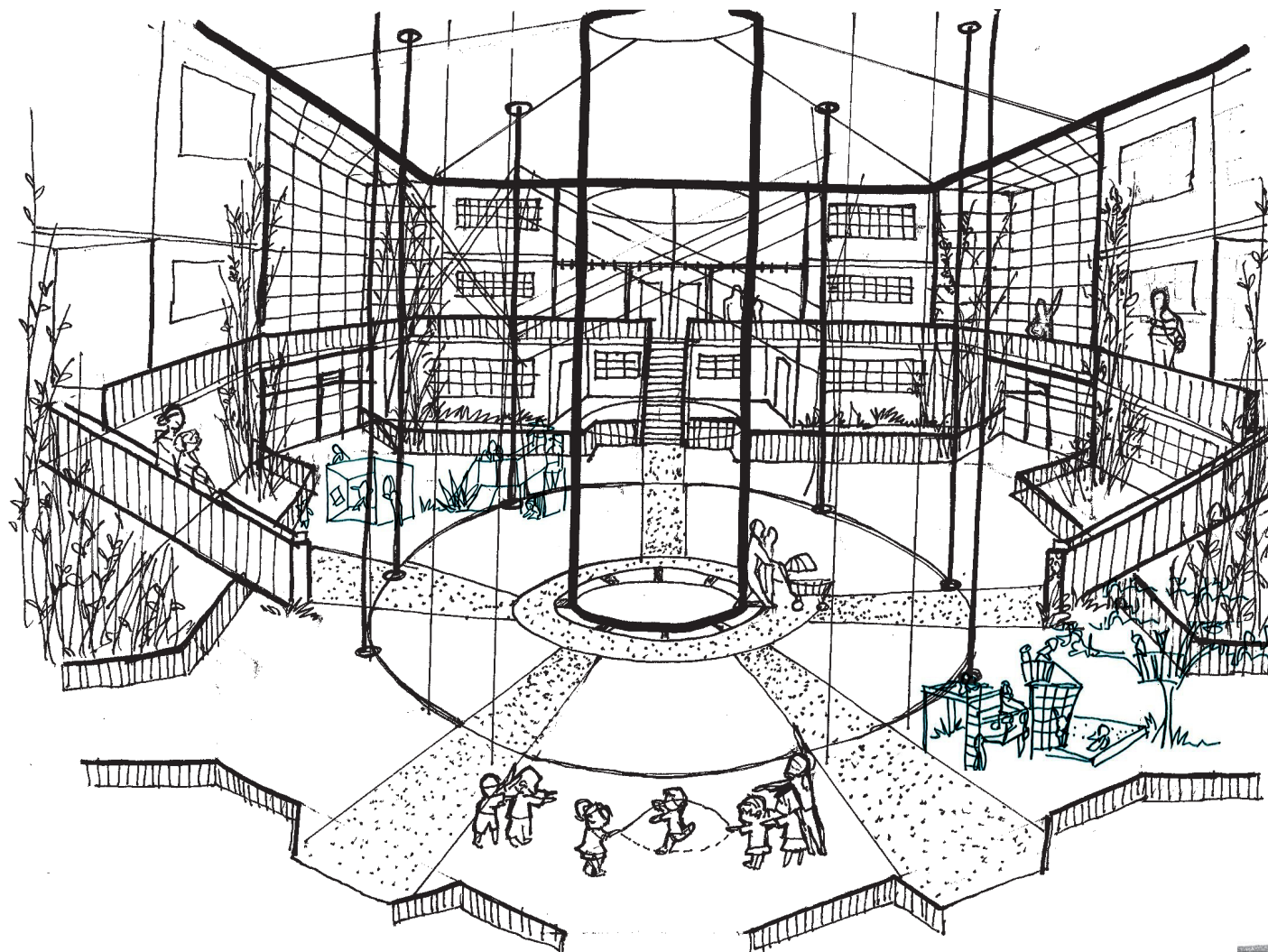
Physical characteristics

1. Various sized porches/ stoops are created on all two levels - level 1 (flats) level 2 (duplexes)
2. Diversity in spatial sizes and physical characteristics will encourage various play activities for children to take place
3. Cork flooring, structural materials, and landscaping help environmental acoustics.
4. Natural daylighting is brought into the apartment floor space, so that children can gauge their outdoor play time.

The traditional porch is a semi-private space parallel to the public space of the "street". The porch does not force one to make the unattractive choice between admitting people to the full intimacy of the home or keeping them in the distanced relation of the formal public realm. The result is interactions that are easy and only minimal committal, thus promoting relationships with neighbors and the neighborhood. Without this space informal social interaction has diminished. To resolve this issue, semi-public private spaces should be re-programmed into the high-rise



CONCEPTUAL SKETCH PORCH/STOOP



SOCIAL PEER PLACES ranging from simplistic play to more complex play activities

A. SENSORIMOTOR PLAY

Simple obstacle course allows for a multitude of motor skills to be explored - climbing-jumping- balancing- sliding



B. GAMES OF CONSTRUCTION

Development of fine motor skills - the ability to manipulate objects.

C. SYMBOLIC PLAY

Small nooks allow for children to recreate those spaces. For example children who play house, take on role playing and learn about parental responsibilities such as caring for a baby.



D. GAMES WITH RULES

Large public spaces allow for physical activities such as jump rope. This game teaches children about taking turns and cooperation with peers.

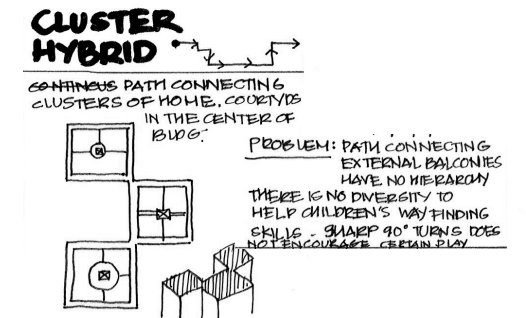


APARTMENT FLOOR

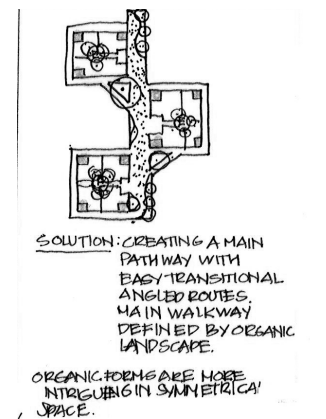
B. STREETS IN THE SKY MODEL

DESIGN CONCEPT:

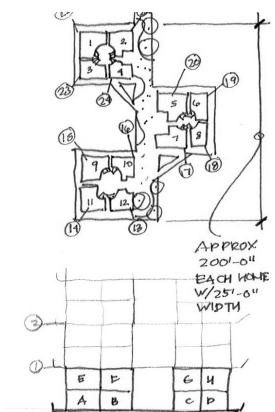
This concept focuses on a central space that is shared by all residences.



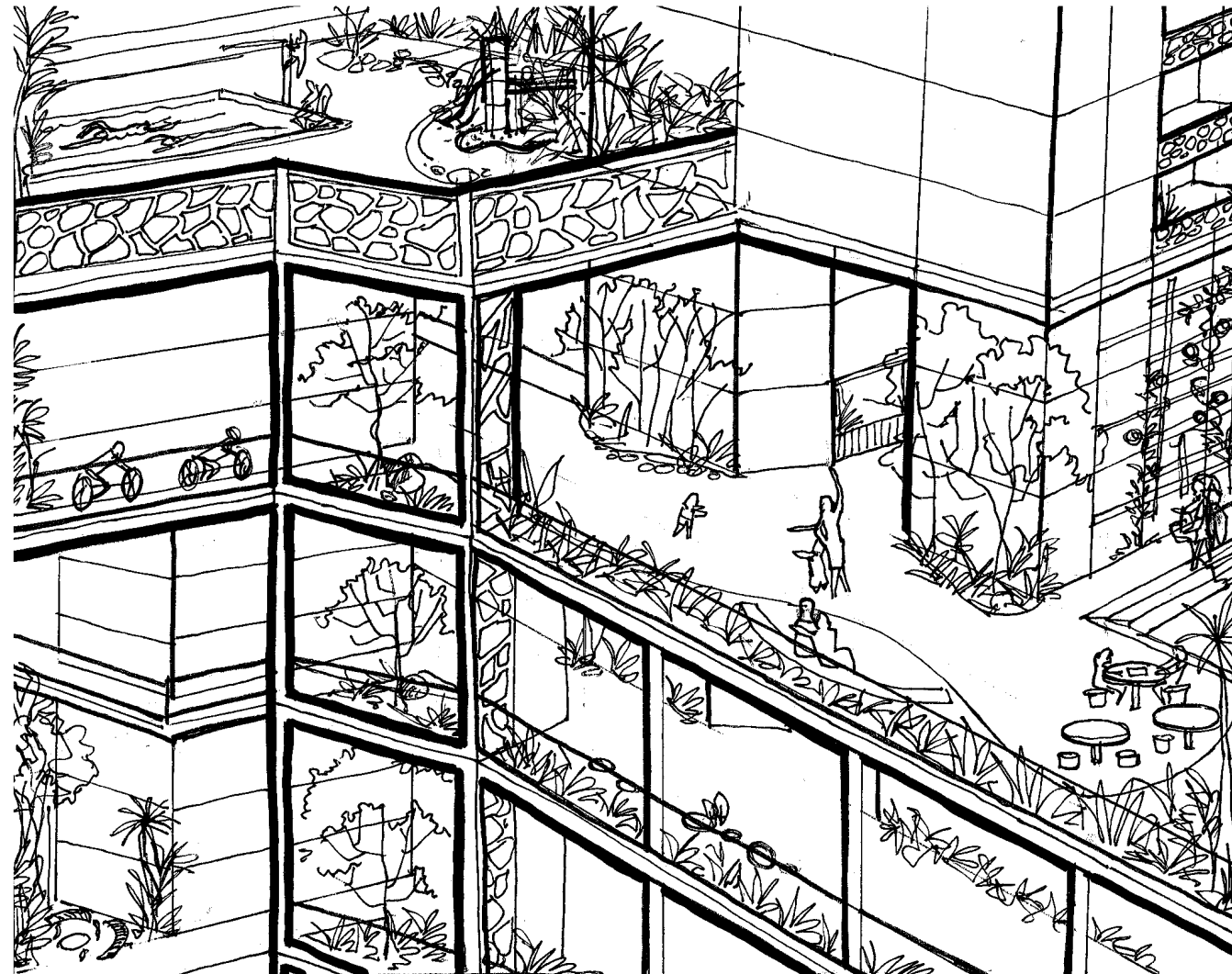
EXISTING CONDITION



CONCEPT: SOCIAL NOOK



INCREASE APARTMENT FLOOR DENSITY TO INCREASE SOCIALIZATION



CONCEPTUAL SKETCH
STREETS IN THE SKY

CONCEPT: CONVERTING CORRIDORS INTO SOCIAL STREETS

Physical characteristics

1. Diversity in paths encourage circulation. Open air walkways, enclosed corridors, arcades, etc
2. Layering of paths allow for spaces to be looked into causing intrigue and the need to take part in that activity.

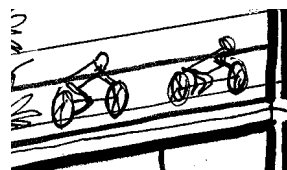
The traditional street is a public space of the brings

Without this space informal social interaction has diminished. To resolve this issue, semi-public private spaces should be re-programmed into the high-rise

SOCIAL PEER PLACES ranging from simplistic play to more complex play activities

A. SENSORIMOTOR PLAY

Active play activities that require larger spaces. EX. Racing bicycles help children learn about competition.



B. GAMES OF CONSTRUCTION

Spatial characteristics can help children interact and learn from objects EX, children tending to their vertical community garden allows them to understand how to care for their environment, how to grow their own food and prepare a healthy meal.



C. SYMBOLIC PLAY

Make-believe helps children to use their creativity and to learn in an environment that they would not have access to. EX. children

D. GAMES WITH RULES

Programmatic amenities found throughout the social streets can help observant children learn about rules. EX. children watching a game of water polo.



APARTMENT FLOOR

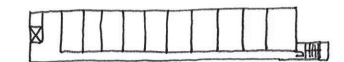
C. SOCIAL NOOKS MODEL

DESIGN CONCEPT:

This concept focuses on a central space that is shared by all residences.

LINEAR → → → →

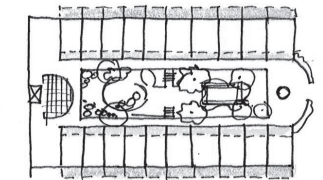
ONE DIRECTIONAL PATH STARTING FROM THE ELEVATOR TO THE FIRE STAIRS



PROBLEM: WITH NO PUBLIC SOCIAL SPACES WITHIN THE FLOOR, CIRCULATION FOR SPONTANEOUS GREGGARIANIZATION IS LIMITED TO TRAVEL BACK TO ENTRY INDIVIDUALS MUST BACKTRACK "DEAD END"



EXISTING CONDITION

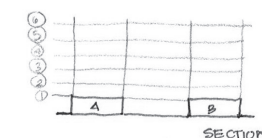
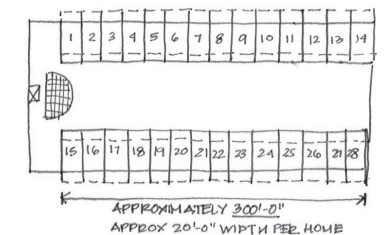


SOLUTION: BY WIDENING THE CORRIDOR TO CREATE A "VERTICAL STREET"

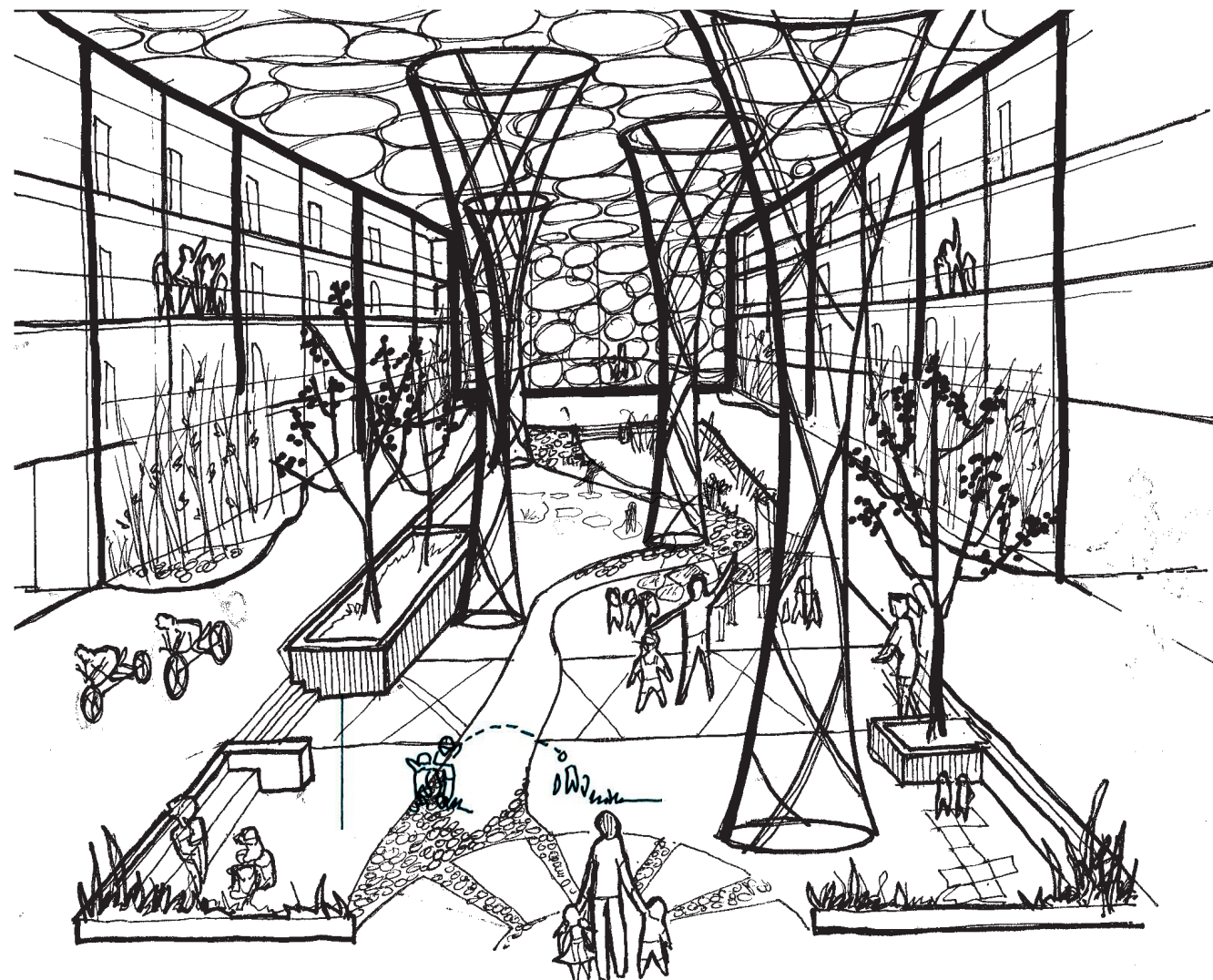
• CLEAR PHYSICAL BOUNDARIES ARE DELINEATED SO THAT CHILDREN PLAYING IN SOCIAL SPACES MAY PLAY INDEPENDENTLY.

• ELEVATOR LOBBY IS ELEVATED SO THAT ALL RESIDENCES MAY SEE OTHERS ENTERING INTO THE SPACE.

CONCEPT: SOCIAL NOOK



INCREASE APARTMENT FLOOR DENSITY TO INCREASE SOCIALIZATION



CONCEPTUAL SKETCH
SOCIAL NOOKS

CONCEPT: CREATING DIVERSE SOCIAL NOOKS FOR DIVERSE SOCIAL PLAY

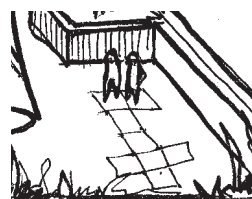
Physical Characteristics

1. Social nooks should be diverse in spatial sizes and physical characteristics. This will encourage various play activities for children to take place.
2. Social nooks should encourage a particular type of physical activity to instigate child's use.
3. Social nooks should be a part of a larger space with an identifiable boundary.
4. Social Nooks are clear and accessible without requiring constant adults supervision.

SOCIAL PEER PLACES ranging from simplistic play to more complex play activities

A. SENSORIMOTOR PLAY

Small nooks that are outside of high-traffic areas that allow children to practice simple motor skills such as hopscotch.



B. GAMES OF CONSTRUCTION

Exploring the outdoors with a friend helps them learn. For example two children

C. SYMBOLIC PLAY

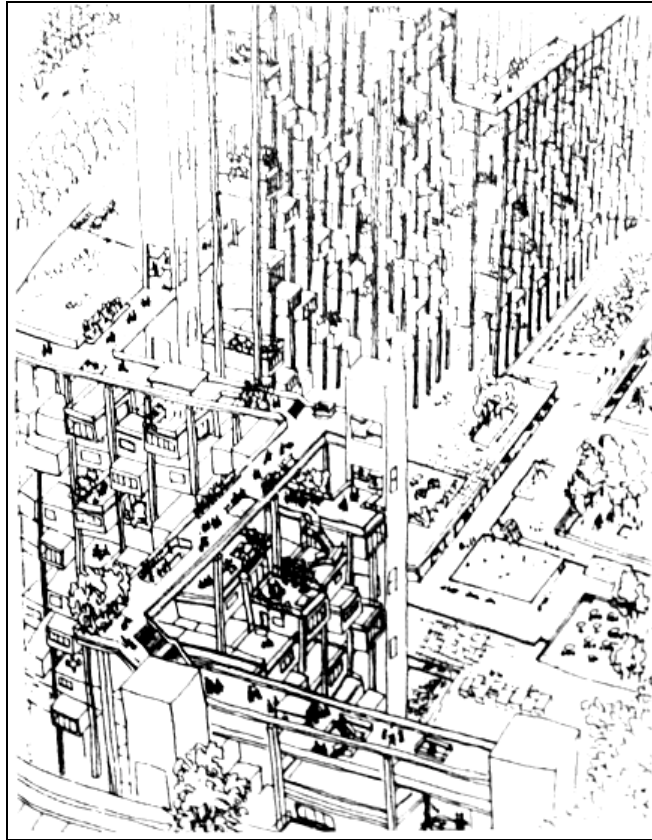
Mimicking animal movements are fun and imaginative ways to encourage children for physical exercise and development. For example bounce like a kangaroo, run like a cheetah



D. GAMES WITH RULES

Playing in teams allow children to work with other children to achieve a similar goal. For example, playing a game of soccer allows a group of children to work together to put the ball in the end goal.





APARTMENT BUILDING

INTRODUCTION: A CHILD IN THE APARTMENT BUILDING

"I take my children everywhere, but they always find their way back home."

– Robert Orben

In chapter three, this doctorate project analyzes circulation within an apartment building as a child's third stable spatial relationship. As children develop peer relationships, they soon require the means to build upon those relationships and to expand on their independence further away from the home. According to cognitive theorist Jean Piaget, children's ability to think abstractly and the need for independence encourages them to establish peer relationships further away from home. Unfortunately circulation within the residential high-rise either promotes children to stay indoors or pushes children to travel long distances away from home. The typical high-rise lacks a well-connected, direct, and convenient pedestrian network, thus limiting a social lifestyle for a child. The goal of this chapter is to research and design a social connection that focuses on the importance of peer gathering places within the apartment building.

The analysis begins by researching various types of building circulation that encourages socialization and meeting spaces. After these circulation concepts are identified, this chapter studies key spatial characteristics that help children navigate in the built environment. Three strategies are based on Piaget's theory of a child's mental map development: diversity in route, a landmark, and public amenities. In the end, this chapter proposes one model demonstrating how circulation within the building can both encourage socialization and clarity in wayfinding.

**Note: The term children in chapter 3 refers to children between the ages of 12-18.*

DOCTORATE PROJECT STRUCTURE

PART 1: SPATIAL PROBLEM

Jean Piaget's Influence on Spatial Design:

Spatial Limitation(s) based on child's perception of space are defined as the following:

Piaget Limitation 1: Children's ability to think abstractly and need for independence encourages children to establish peer relationships further away from the apartment unit and parental influence.

Spatial Problem:

There is no peer gathering place for children within the apartment building, thus children will find available peer gathering places further away from the apartment unit. Peer relationships can result in either positive or negative spaces based on the individual child's upbringing.

PART 2: SPATIAL RESEARCH

Research Objective:

To study how diverse spatial programming and indirect means of circulation can encourage children to travel throughout the apartment building and nearby neighborhood.

Section 1: Architecture: Social circulation within the apartment building

Section 2: Piaget: Play is no longer the primary means for socialization. Integration of peer focused program within the apartment building.

PART 3: SPATIAL SOLUTION

Doctorate Project Solution:

This doctorate project proposes to help children develop peer interaction by diversifying spatial programming throughout the apartment building.

Public amenities that exceed the demands of one apartment building will be made accessible to the neighborhood through pedestrian bridges, which decreases children's travel distance and increases peer interaction, simplifying a child's route back home.

PART 1: SPATIAL PROBLEM

Jean Piaget's Influence on Spatial Design:

As children begin to develop the ability to think about abstract concepts, logical thought, deductive reasoning, systematic planning, and rational thought process, children begin to intellectually challenge their parents. Common disputes include parental and societal beliefs about religion, work, dress, ethics and family¹. Typically children's difference in parental judgment and strive for independence will encourage them to move away from the apartment unit. It is during this stage, that children feel the need to be away from conflicting parental influence and closer to relatable peers going through those same situations.

Unfortunately, peer-gathering places are not a common spatial program within the apartment high-rise. In general, the high-rise consists typically of one general public area the ground-floor level where shared amenities such as the mailroom, lobby, laundry mat, and outdoor areas are available for public use. However, those amenities do not encourage peer-gathering places because these amenities are designed for parental/adult use. Children in their later teen years are most likely to socialize in spaces without direct adult influence.

Therefore, this chapter focuses on encouraging social interaction within the apartment building and the nearby neighborhood. The goal is to disperse the peer oriented amenities throughout the building to encourage the child to socialize closer to home at a later curfew. According to Lynch, children appreciate "living in localities with clear geographical boundaries that contain a variety of spaces for unprogrammed activities: local streets, courtyards, other hangouts where young adolescents could talk and meet and walk about together, play informal pickup games, and mess around"².

¹ "Massachusetts General Hospital for Children: Research." *Massachusetts General Hospital Home*. Web. 22 Apr. 2011. <<http://www.massgeneral.org/children/research/default.aspx>>.

²Lynch, Kevin, Tridib Banerjee, and Michael Southworth. *City Sense and City Design: Writings and Projects of Kevin Lynch*. Cambridge, MA: MIT, 1990. Print.

PART 2: SPATIAL RESEARCH

Section 1: Architecture: Social circulation within the apartment building

Circulation within a high-rise apartment is very efficient. Its stacked fire escape stairs and elevator system offers a quick method of egress, however, the repetitious vertical circulation decreases opportunities and spaces for children to socialize or create secondary uses for these public spaces. For example, suburban street offers dual use of the street, a place to play for children, a place to garden, etc. In hopes to mimic the suburban streets, there have been several spatial concepts to create these spaces in high-rises. However, compared to street circulation, hallways and vertical circulation in high-rises offers little or no advantage in creating social relationships. Although this stacked circulation system has worked throughout the years, the quality of life within the apartment building deeply affects the children residences.

There are two main reasons for this change in spatial use. First, is how high-rises lack space legibility. Its carbon copy of stacked apartment floors creates unrecognizable means of circulation. Consisting of enclosed fire stairs, dark corridors, and elevators it is extremely difficult for children to socialize in these spaces. Secondly, is the lack of purpose to circulate throughout the building. Other than the few typical public amenities in the apartment lobby, there are no social spaces within the apartment building that encourage socialization. Children could use these vertical egress systems not just for emergency escape but for exercise routes, exploration, and meeting places. To support the concept of socialable space in high-rise, various case studies with strong concepts in spatial diversity and legibility is studied in the following pages.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
 REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)

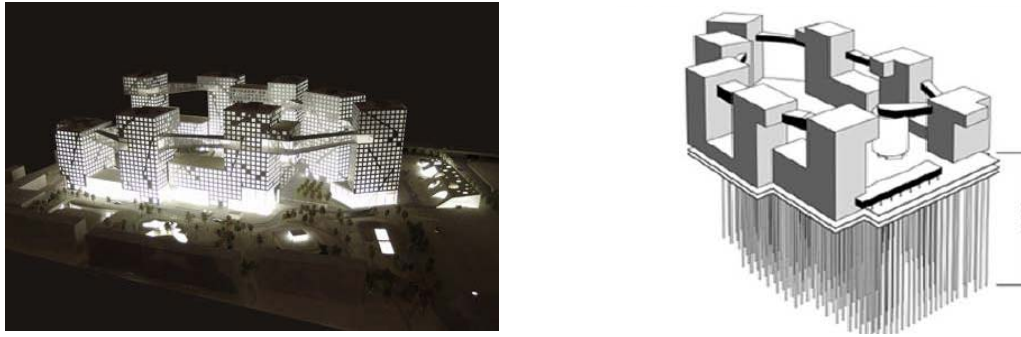


Figure 39: Hybrid Loop Model

In case study one, The Hybrid Loop³ in Shanghai demonstrates how social circulation is encouraged by its concept of a continuous pedestrian bridge. This elevated pathway connects eight buildings between the 12th and the 18th floor⁴. This concept is beneficial for children of all ages. For young children, this bridge is completely enclosed and separated from vehicular activity creating a safe space for young children. For middle aged children who are beginning to gain their mobile independence, the continuous loop path established spatial boundaries to help direct children back to their point of origin. For children in their teen years, the diversity in bridge public spaces encourages random relationships to generate, similar to the nature of a street. Social amenities include a group exercise space, viewing platform, dining area, tea sitting, café, gallery, and a book store. In addition to this social bridge, social spaces are also located within the complex grounds. These spaces include a public green space, commercial zones, hotel, movie theatres, kindergarten, Montessori school, swimming pool, and auditorium.

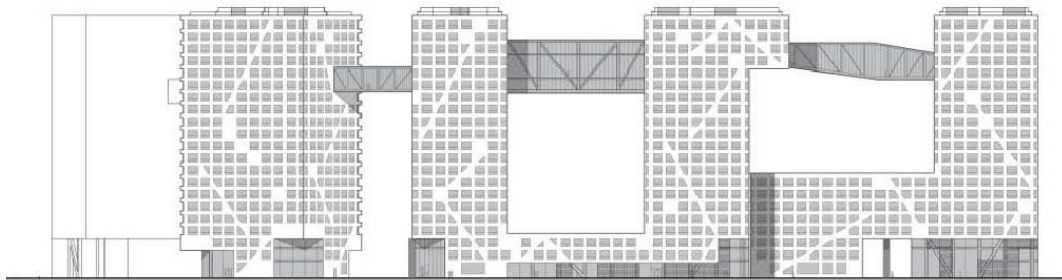


Figure 40: Section through Hybrid Loop

³ Figure 39: STEVEN HOLL ARCHITECTS. Web. 23 Apr. 2011. <<http://www.stevenholl.com/news-detail.php?id=70>>.

⁴ Figure 40: "Dezeen » Blog Archive » Construction of Linked Hybrid by Steven Holl." *Dezeen Architecture and Design Magazine*. Web. 23 Apr. 2011. <<http://www.dezeen.com/2008/03/06/construction-of-linked-hybrid-by-steven-holl/>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



5

Figure 41: Social bridges & Ground Floor Public Amenities

⁵ Figure 41: "Steven Holl Unveils Huge Green Complex in China." *TreeHugger*. Web. 23 Apr. 2011. <http://www.treehugger.com/files/2008/02/steven_holl_chengdu_leed_mixed_porosity_block.php>.



Figure 42: Eyebeam Section

various exhibition spaces, artist-in-residence studios, education center with multi-media classrooms, theatre, bookstore, and archive.

In case study two, the Eyebeam Museum of Art and Technology⁶, uses vertical egress as the social condenser. In contrast to the Hybrid loop, this pathway is vertical. Located along the building perimeter, the vertical loop utilizes a series ramps, stairs, and pathways to create different volumes of space. The diversity in path and spatial experiences creates a mixture of potential social spaces with varying degree of natural ventilation and daylight. These spatial difference allows people, especially children, to better navigate themselves throughout the path. To encourage a looping vertical circulation various public programs

were placed along the path. Programs include

One of the key successes of the Eyebeam museum is the ability to bring leisure circulation within a high-rise typology. By creating a continuous vertical path, children have the opportunity to use a more social path to circulate throughout the building rather than using the typical elevator or the enclosed fire stair. If applied to a high-rise apartment the vertical loop with long ramps can encourage different modes of active transportation such as rollerblading and bicycling.

⁶ Figure 42: *This Week at Eyebeam* | *Eyebeam.org*. Web. 23 Apr. 2011. <<http://www.eyebeam.org/>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



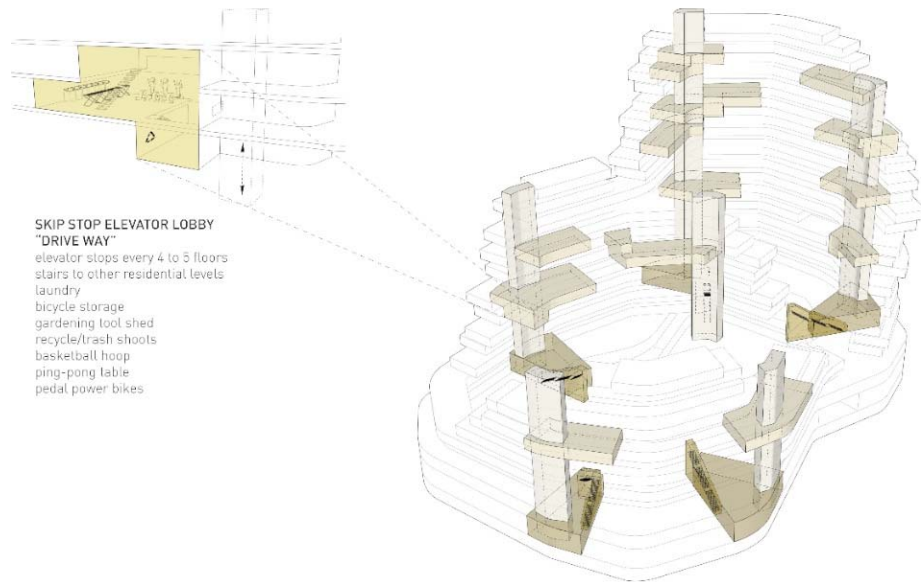
Figure 43: Co-Op Canyon rendering

In case study three, Re:Vision Dallas architects proposed an innovative solution to apartment buildings called co-Op Canyon⁷. Designed to serve 1,000 people, this terraced building's circulation system consists of four skip and stop lobbies to access multi-story apartment units. The elevator stops every 4 to 5 floors. Surrounding these elevators are public amenities that promote fitness and social interaction such as shared laundry facilities, recycling chutes, and small exercise areas. Irregularly shaped terraces create unique spaces to socialize and viewing platforms into other social spaces.

The key feature in this case study is the food theme that ties the community together. Gardens are located in front and in back of every apartment unit. This space encourages residents to grow, exchange, and share home grown produce. Unlike the programs in the previous case studies, these social spaces are very specific and support a lifestyle theme which is a sustainable food producing community. For example on the ground floor a large community farm and kitchen is accessible to all residents. Produce from the farm can be consumed in the community or sold in the ground floor markets. To encourage participants, the community kitchen teaches the residents how to cook techniques, importance of nutrition, and food tasting. In addition to the food focuses programs, the apartment building also includes a child care, play space, fitness center community center, and wellness center.

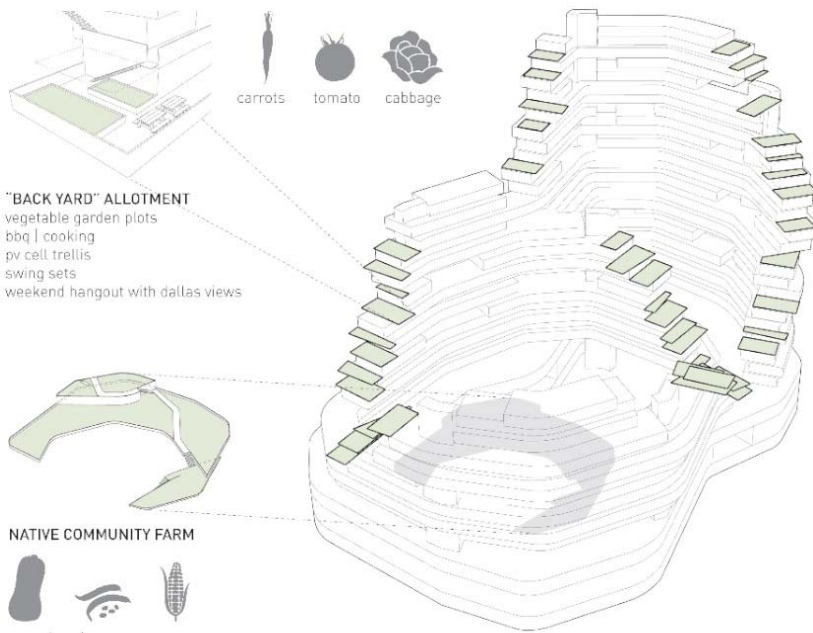
⁷ Figure 43: "URBAN RE:VISION | RESULTS RE:VISION DALLAS." *URBAN RE:VISION | Reshaping Urban America, One Block At A Time*. Web. 23 Apr. 2011. <<http://urbanrevision.org/who-we-are/competitions/revisiondallas/>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



SKIP STOP ELEVATOR LOBBY
"DRIVE WAY"
 elevator stops every 4 to 5 floors
 stairs to other residential levels
 laundry
 bicycle storage
 gardening tool shed
 recycle/trash shoots
 basketball hoop
 ping-pong table
 pedal power bikes

VERTICAL CIRCULATION



"BACK YARD" ALLOTMENT
 vegetable garden plots
 bbq | cooking
 pv cell trellis
 swing sets
 weekend hangout with dallas views

NATIVE COMMUNITY FARM

squash beans corn

CROPS
 native beans: 50 - 100 bushels per acre
 native Corn: 100 - 150 bushels per acre
 native Squash: +/- 400 bushels per acre

CROPS | FOOD PRODUCTION

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



Similar to both case studies one and two, Co-Op housing follows the same concept of loops of circulation. Concentric rings of circulation circle allow terrace planting plots to obtain adequate lighting and nutrients while simultaneously encouraging residents to be visible within the public so that socialization may occur.



Figure 44: Circulation Diagram⁸

⁸ Figure 44: "Co-Op Canyon / Standard Architects of | Furniture - House Design and Decoration - Gardening @ RoomU.net." *Furniture - House Design and Decoration - Gardening @ RoomU.net of | Interior Design*. Web. 23 Apr. 2011. <<http://www.roomu.net/architecture/coop-canyon-standard-architects.html>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



Figure 45: Co-op Canyon Rendering⁹

⁹ Figure 45: "Co-op Canyon." *Architecture Documents*. Web. 23 Apr. 2011.
<<http://archen.mr926.me/tag/co-op-canyon/>>.

In case study four, the conceptual Dubai Vertical City¹⁰ proposes a social circulation system that remains in the center of the high-rise. Comprised of four 100 story neighborhoods, is a re-conceptualized elevator “vertical bullet train” that stops at each neighborhood’s sky plaza. Within each sky plaza, social amenities such as parks and leisure shopping facilities are located within short walking distances. Along the edges of the triangular plaza are three internal circulation systems consisting of the typical elevator and fire stairs. Each of these systems serve a portion of the rotating outer building containing apartment units.

The key element in this design, is the scale and how circulation patterns change when environmental scale increases. Dubai Vertical City is not an apartment building but a self-sustaining city. Social amenities within the structure will increase from small parks and gathering spaces to larger public spaces such as kindergartens,

middle schools, libraries, playfields, etc. With schools located within walking distance, children are able increase their physical well being by walking to school rather than catching the bus. This “walking school bus” exercise route can begin as social activity where groups of children walk to school together supervised by a parent. As children build up their ability to read their environment they can use these experiences to travel independently.

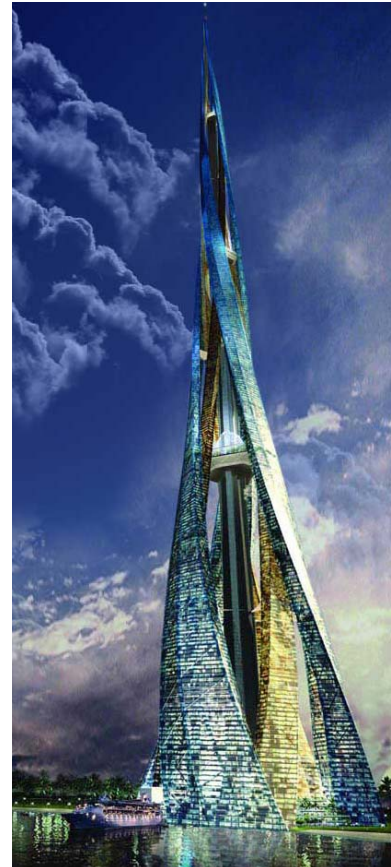
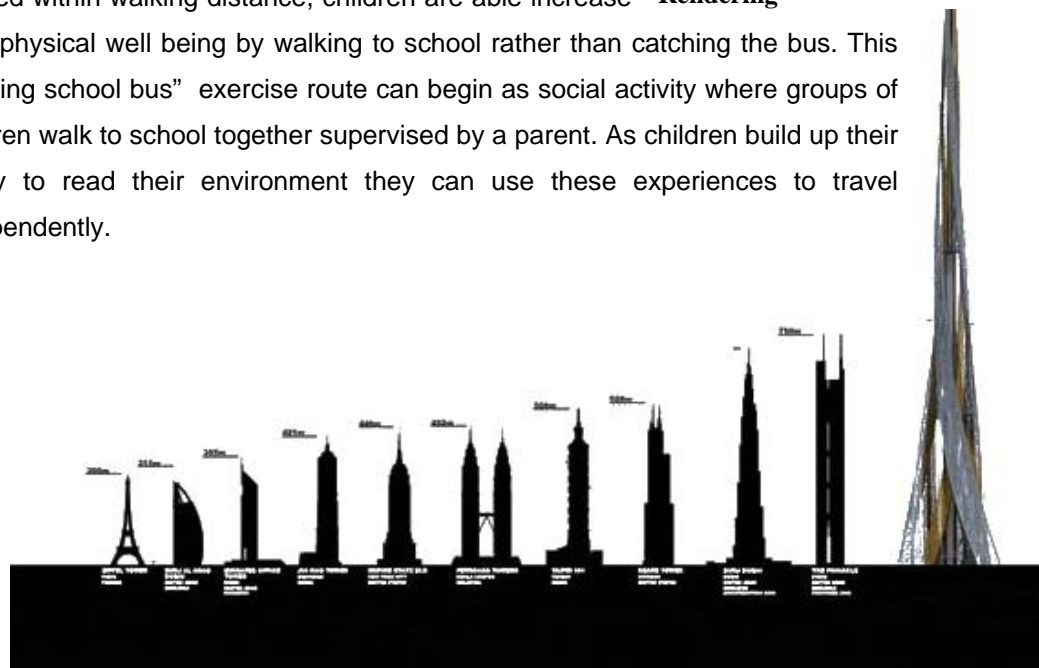
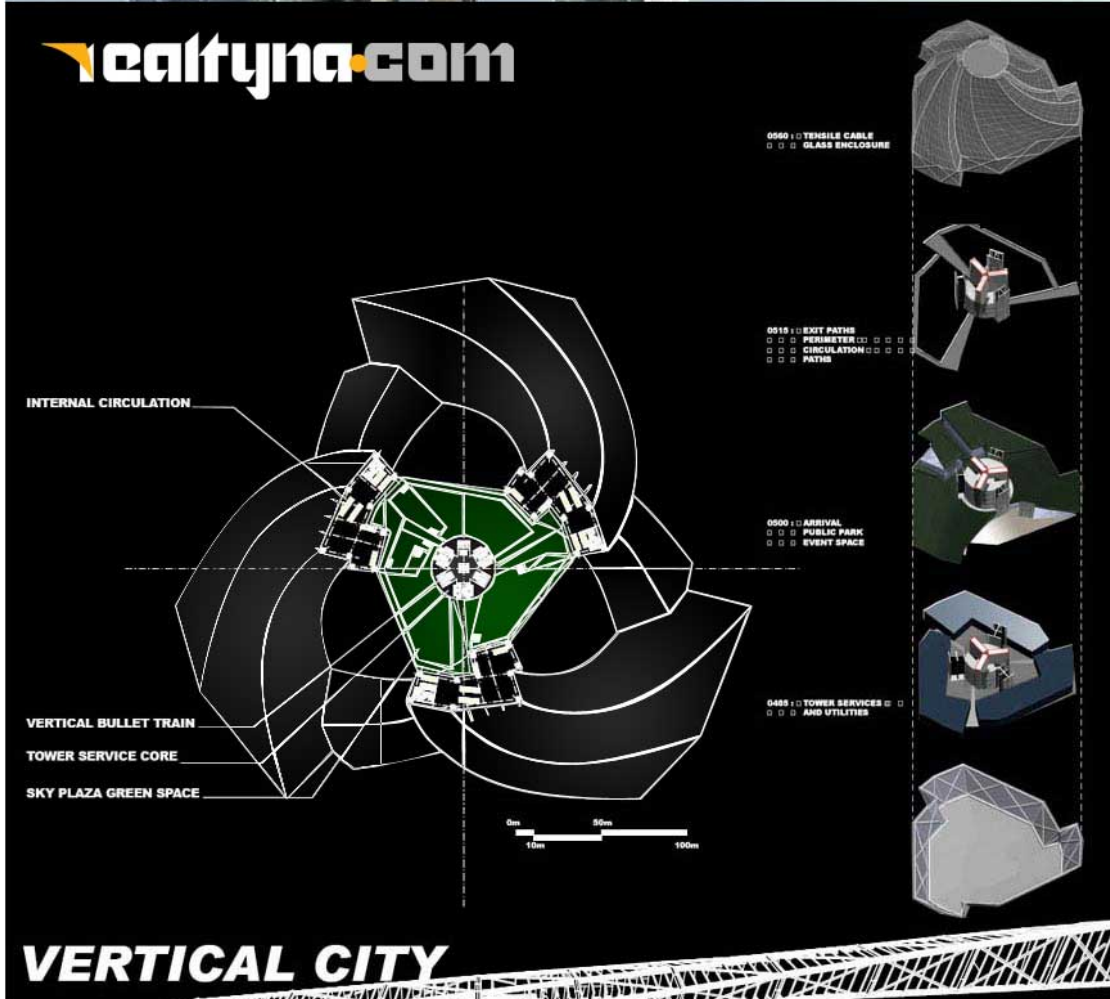


Figure 45: Dubai Vertical City Rendering



¹⁰ Figure 45: Dubai Vertical City - <http://www.irintech.com/x1/blogarchive.php?id=3672>

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
 REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
 REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



Figure 46: New York Highline

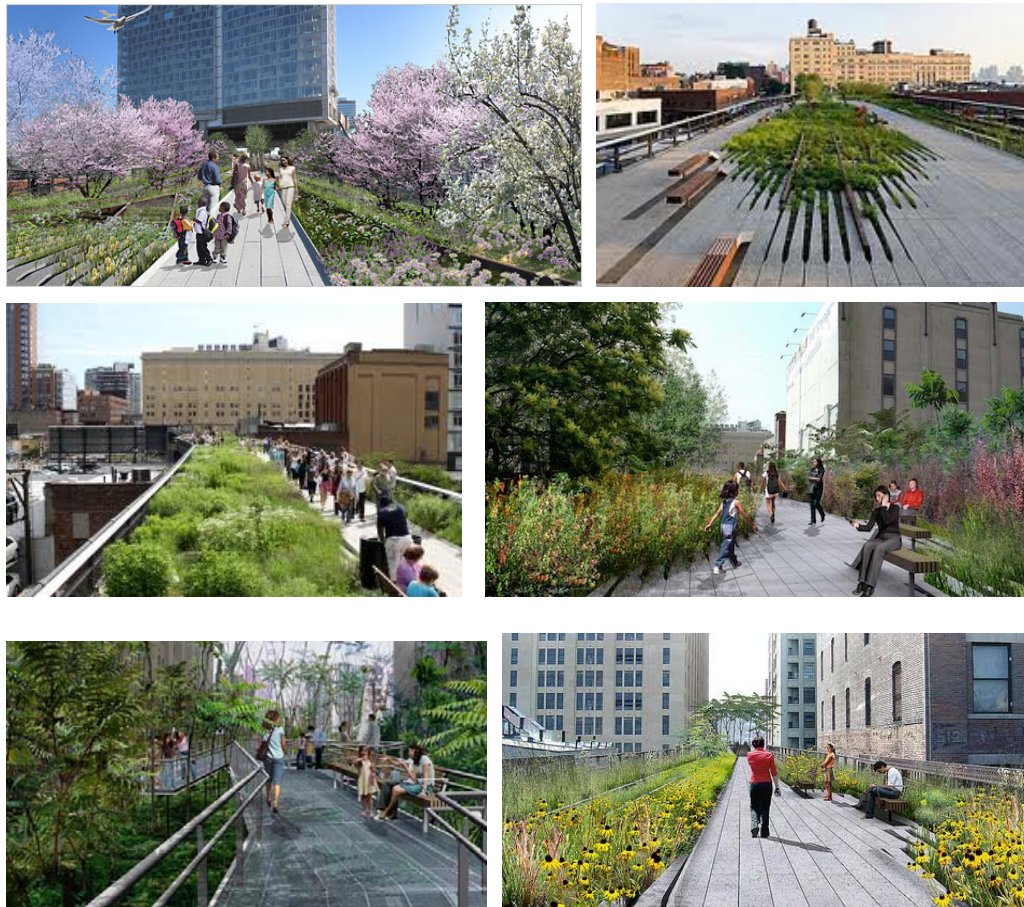
Although, this case study, five, New York's Highline¹¹ is not applied to a high-rise typology, it successfully demonstrates spatial qualities that encourage social gathering places. Designed as an adaptive reused of a elevated railway system, James Corner Field Operations, with Diller Scofidio + Renfro designed a social bridge that runs through three of Manhattan's most dynamic neighborhoods: the Meatpacking District, West Chelsea, and Hell's Kitchen/ Clinton. The Highline is known for its series of outdoor gathering places each with a unique architectural/ landscaped element. In contrast to Hybrid Loop's social bridge, the Highline is a complete exterior application with no enclosed programmatic spaces but simply spaces to socialize or reflect.

¹¹ Figure 46: *The High Line*. Web. 23 Apr. 2011. <<http://www.thehighline.org/>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
 REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)



1.45 miles long, the Highline is comprised of 21 key social spaces. Each social space can be identified by either landscaping¹² or leisure activities. To provide privacy, leisure activity areas are surrounded by landscaped areas. All spaces provide areas to sit and nooks to gather without being in the direct path of travel.



**Figure 47: Landscaped areas noted from left to right:
 Gansevoort woodland, Washington grasslands, Chelsea grassland, Chelsea thicket,
 woodland flyover, wildflower field**

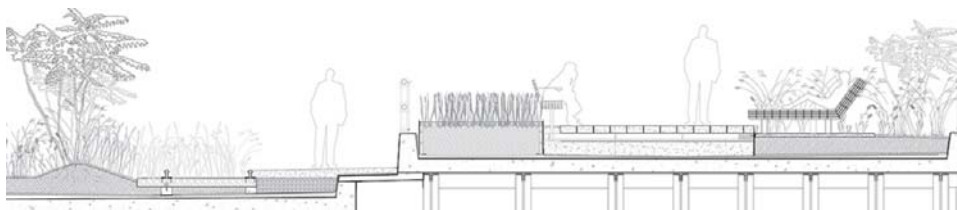
¹² Figure 47: "Image Galleries." *The High Line*. Web. 23 Apr. 2011.
 <<http://www.thehighline.org/galleries/images>>.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
 REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)

Leisure activity zones¹³ are designed for various social gatherings. For example, the public art program zone consists of series of 10 rows of bleacher seating that overlooks into the street below. Seating configuration can accommodate both small and large groups of people, such as a class full of students or a two person bench in the sun deck area.



**Figure 18: Leisure activity areas noted from left to right:
 Sun deck/ water feature, public art program, 10th Avenue square, 22nd Street seating steps/
 23rd Street lawn, 26th Street viewing spur, 30th Street cutout**



¹³ Figure 48: "Image Galleries." *The High Line*. Web. 23 Apr. 2011.
 <<http://www.thehighline.org/galleries/images>>.

Section 2: Piaget: Play is no longer the primary means for socialization.

Integration of peer focused program within the apartment building.

Throughout children's cognitive development, Piaget notes that they will develop a proficiency called "mental mapping" a skill that helps children learn how to navigate themselves in the built environment and to establish peer relationships. This skill is an on-going process that starts off after children are able to develop memories, approximately around age 3. To emphasize the difference in child and adult perception of space, in the early pre-operation stage children describe route on memory of movement through the environment not of physical descriptions. Piaget quotes one child (6 years) describing a familiar route "I go straight along, I turn there, I go straight along again, I turn there, then I keep going straight and I turn once more" (Piaget et al, 1960,11). As children begin to develop physical and cognitive skills in the concrete operational phase, children begin to use landmarks to describe their route, however these landmarks are not located accurately. But these are simply tacked on to the recollections, astonishing as it may seem, subjects fail to respect the true positions of landmarks and do not even preserve the order in which they come to them" (Piaget et al, 1960,12). For example, the home and school may be inaccurately shown as close together because of the importance of those two places for the child. During the Formal Operational Stage, full coordination is established. It is not until this phase that a child produces a route as "a coherent whole" with all the landmarks placed in relationship to each other.

Circulation within apartment buildings challenge young children's mental mapping ability because of its vertical component. The stacking of space requires children to find their way within a three-dimensional space. Children must remember spatial differences within the floor and every other floor in order to get to its desired location. Unfortunately, the apartment floors lack three elements, diversity in paths (variation in circulation), landmarks (spatial characteristic), and public amenities (social gathering places). Case studies in research Section 1 demonstrates successful applications of these elements.

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)

Focusing on children between the ages of 12 and 18, is extremely important that their built environment encourages their peer social skills. Positive peer relationships help establish strong sense of identity and confidence. Transitioning into their teen years, it is common to find children's interests and personalities change as well. Sometimes these changes affect children's peer relationships requiring them to create new friendships. In order to establish peer relationships, children must find commonalities between peers. Similarities in traits and personalities are commonly found in school activities and after school. However, as they become older, children no longer need places to play to establish relationships but places to maintain and strengthen existing relationships. Unfortunately, this will suffer if apartment buildings already lack social spaces for children.

As children's interests change and mature, it is common for them to want to be treated like adults and not small kids. During this stage, peer relationships are of the utmost importance in children's life and are sometimes valued higher than familial relationships. They are in constant search of the identities and often seek independence from their parent and younger siblings. To comfortably explore and socialize with peers, children commonly socialize in places without direct supervision of adults. These places are important for building social skills and meeting new people.

Children typically prefer to hang out in places that are not in direct influence by adults. They like to be in places that accept children, generally commercial spaces during non peak adult use times. Based on these common peer meeting places, children are limited from socializing in places that require a lot of money. At this stage, children either have small part time jobs or rely on parents for allowance. Therefore, children often hang out are places that require little money such as the mall, ice cream parlors, affordable restaurants, and cafes. Children that hang out in places that require no money, but need to be easily accessible by either walking or public transportation. These places include parks, volleyball courts, basketball courts, tennis courts, bike rise, rollerblading, library, and churches.

According to the Hugh study¹⁴, the street is one of the few places where children can be together in a high-rise context, seemingly away from adult gaze. Unlike adults, who have many social opportunities available to them to mix and meet with friends, for example through their clubs, restaurants, and residences, children have fewer opportunities, access or obvious rights to such settings. For many children the street is the only place

¹⁴ Matthews, Hugh., 2003, The street as a liminal space The barded spaces of childhood

where they can meet informally. They are spaces that are temporarily outside of adult influence, particularly with the withdrawal of adults at particular times of the day. For example, children are more likely to socialize with peers immediately after school ends when parents are still at work. Within these in between spaces children can express feeling of belonging and of being apart and celebrate a developing sense of self-hood.

Young people like to hangout where adults are not commonly found, in this study children regularly congregated in back alleys, on neglected land, around lock-up garages, at the rear of shopping parades, in pockets of green space within neighboring scrub woodland, in essence within the forgotten and redundant spaces of the adult world.

Jones' suggestion¹⁵ that spaces commonly comprise several types is useful when considering adult responses to the visibility of children in the public spaces. First there are monomorphic spaces, sites frequently dominated by a particular use that exclude the possibility of other uses. Then there are polymorphic spaces, "which are in use within adult structures but which can also accommodate subordinate 'other' uses." Lastly there are disordered spaces, places that can be in some way be modifiable, "in that children can use and reconstruct them without incurring the outright hostility and opposition of adults." For example, a shopping mall is a monomorphic space, where the visible presence of young people who are neither shopping nor spending money means that their behavior is beyond the pale.¹⁶ Similarly, when children are near a local parade of shops, a convenient and well-lit meeting point, shopkeepers frequently move these children on. However, when the same group reassembled on nearby deserted spaces, a place largely abandoned by adults, although they were still visible and doing nothing different, their presence was tolerated.

For a majority of children, their occupancy of the public spaces is not a deliberate attempt to provoke watchful adults. According to Corrigan¹⁷, rule breaking acts are not the normality of hangout. Instead young people simply hang out in the street as there was nowhere else to go and nothing else to do. According to the studies, adults do not value certain public outdoor spaces such as streets, thus allowing children to take part in activities that would not normally take place.

¹⁵ Jones O., 2000, "Melting geography: purity, disorder, childhood and space". In S.L. Holloway and G. Valentine (eds). *Children's Geographies: Playing, Living, Learning* (London Routledge)

¹⁶ Matthews, H., Taylor, M., Percy-Smith, B. and Limb, M., 2000b, 'The unacceptable flaneur: the shopping mall as a teenage hangout'. *Childhood*, 7(3), 279-94.

¹⁷ Corrigan, P., 1979 *Schooling the Smash Street Kids* (Basingstoke: Macmillan).

REDESIGNING THE APARTMENT HIGH-RISE THROUGH A CHILD'S PERSPECTIVE
REDESIGNING THE APARTMENT BUILDING - Piaget's Formal-Operational Stage (12+years)

To accommodate the child's lack on economic independence, social places within or near the apartment building should not require money. Places that do require money should be geared towards affordable and conducive places such as cafes where children can work together on school project and purchase food for less than five dollars. In addition to encourage children's increased need for privacy and indirect influence within social space, there should be a teen zone created. This sub social space will allow children the proper social setting while being open to adult use. Social spaces for both adults and children should be integrated into the high-rise setting, but specific nooks within these spatial programs should allow for peer privacy.

SOCIAL SPACES THAT DO NOT NEED MONEY		
PARENTS use	SPACES	CHILDREN use
Grow their own food and prepare meals for family	Garden Spaces	hang out and learn how to take care of things
Work on reports or research items on line	Technology Rooms	hang out and learn how to use computers and to work on virtual collaboration
Maintain healthy active lifestyle	Exercise/Jogging path	Development of active lifestyle
Maintain physical fitness & Team work	Basketball court, soccer field, tennis court, football field, etc	Development of physical skills
Strengthening relationship children	Gym/ Park	Strengthening Peer Relationship building
N/A	Game room	Learn to handle virtual problems+ team work
Cooking a healthy meal	Community Kitchen	Learn to cook a healthy meal themselves
N/A	Clubhouse	Strengthening Peer Relationship building
Research/ Leisurely reading	Outdoor nooks/ Library	Expanding their knowledge and interests
N/A	School	Taking part in organized activities. Place where parents are not supervising them.
learn morals, create peer relationships, and practice their faith	Church	learn morals, create peer relationships, and practice their faith.
SOCIAL SPACES THAT NEED MONEY		
Café/ restaurants, Malls/ stores/ grocery stores, Activity oriented- bowling alley, water park, movies		

PART 3: SPATIAL SOLUTION

Social Circulation in Apartment Building

The way children use public spaces varies with age. For those ages 7 and under public spaces is a setting for games, play, and adventure. By the age of 12, public spaces is a social haven, a place for meeting with friends, hanging out and “where things happen”. For older teenagers, public spaces offer opportunities “to get away from it” sites that offer the freedom and excitement of separation away from the routine of daily life. To encourage social circulation for children of all ages within the apartment building there must be a distinguishable means of circulation –route and a reason to circulate. Chapter three proposes a conceptual neighborhood that addresses both internal and external social circulation. Addressing the internal circulation, all apartment high-rises will consist of a path composed of series of external stairs and ramps linked by social programs such as mini gardens, seating areas, movies, etc away from private apartment units. This path will be continuous loop creating a constant pedestrian pathway. Varying in volumes and spatial characteristics such as color and activities, young children should have an easier time finding their way within the high-rise. As for the external circulation, this study creates public spaces for children that encourage peer socialization without the influence of watchful adults. The concept is to allow children to use these nearby peer hangouts without traveling too far from the apartment unit.

The study consists of two external social links differing in users. The first focuses on “teen spaces”. Located around a high-school, four apartment high-rises are connected to this social hub through pedestrian bridges. Being that high-school children have the most independence and rarely need accompanying adults allow them to walk to school, these pedestrian bridges become private social areas. The second focuses on a community space linking all four high-rises together through a 1 mile jogging path to encourage a healthy and socialable lifestyle. Positioned along this path are teen zones within each of the four high-rises. These zones include activities geared towards children with limited economic resources such as ping/pong, electronic games – wii, cafés, board games, billiards, etc. To clarify, spaces that encourage parent-child relationships are extremely important. However, this spatial solution focused on teen spaces because rarely are these programmatic spaces integrated into the apartment high-rise. Teens wander and find themselves in unsafe, uninviting spaces to adjust for their need for privacy. It is important that teen spaces are created to help them develop their identity and independence.

SUMMARY

This chapter studies how the apartment building can restructure its circulation system to create more socialable and interconnected systems, which will encourage vertical circulation. By incorporating diversity in routes, landmarks, and public amenities, children are encouraged to use the apartment building as peer meeting places to strengthen their sense of identity and belonging. To create a well balanced apartment building, dispersed programmatic activities should instigate informal hangouts.

Children between the ages of 12 and 18 feel that they must be in with the right crowd in order to be accepted. Many children will have friends from different circles, but will usually spend most of their time with one specific group of friends. Peer relationships are often maintained by being involved in activities similar to their peers. For example, it is very common for a child involved in sports to hang around with other children interested in the same sport. When children form friends from activities, there will usually be a positive effect. These children will also be involved in other activities, either at school or for recreation, so there is little time for them to get into trouble. Thus, it is important the teen has access to these peer hangouts/activities.

APARTMENT BUILDING DESIGN GUIDELINES:

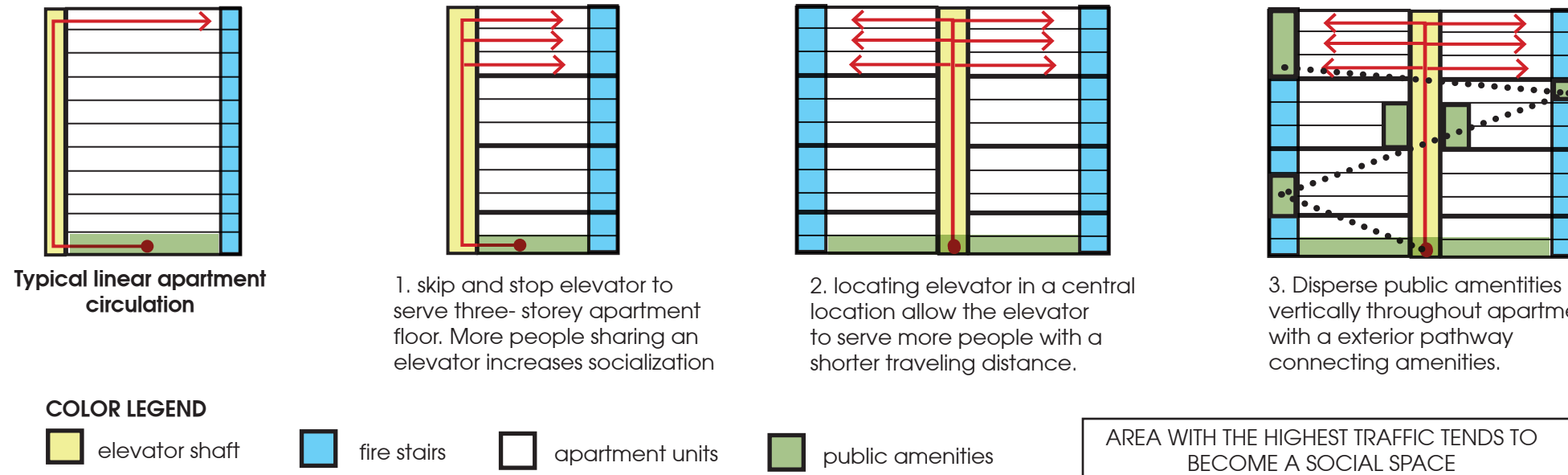
Apartment building circulation should encourage socialization and peer gathering places:

1. Apartment building should have clear pathways to help in children's wayfinding skills.
2. Apartment building should have stimulating circulation that encourages various types and reasons for socialization.
3. Apartment building should have social spaces just for peers with limited influence from adults.
4. Vertical circulation must contain social hangout spots that are not immediately adjacent and observable to apartment units.
5. The integration of a public/government owned space such as a street is a great place, because it could be manipulated to meet any child's needs. Adults are less hesitant about children's social activities on the street because the street is not their property.

SECTION: VERTICAL CIRCULATION

APARTMENT BLDG

A. DIVERSITY IN CIRCULATION



CONCEPT: SOCIAL CIRCULATION

This concept focuses creating relatable spaces with spatial markers to simplify the wayfinding process in the apartment building. By strategically placing multiple pathways that intersect each other, the probability of socialization can increase.

Spatial ideas

Model 1

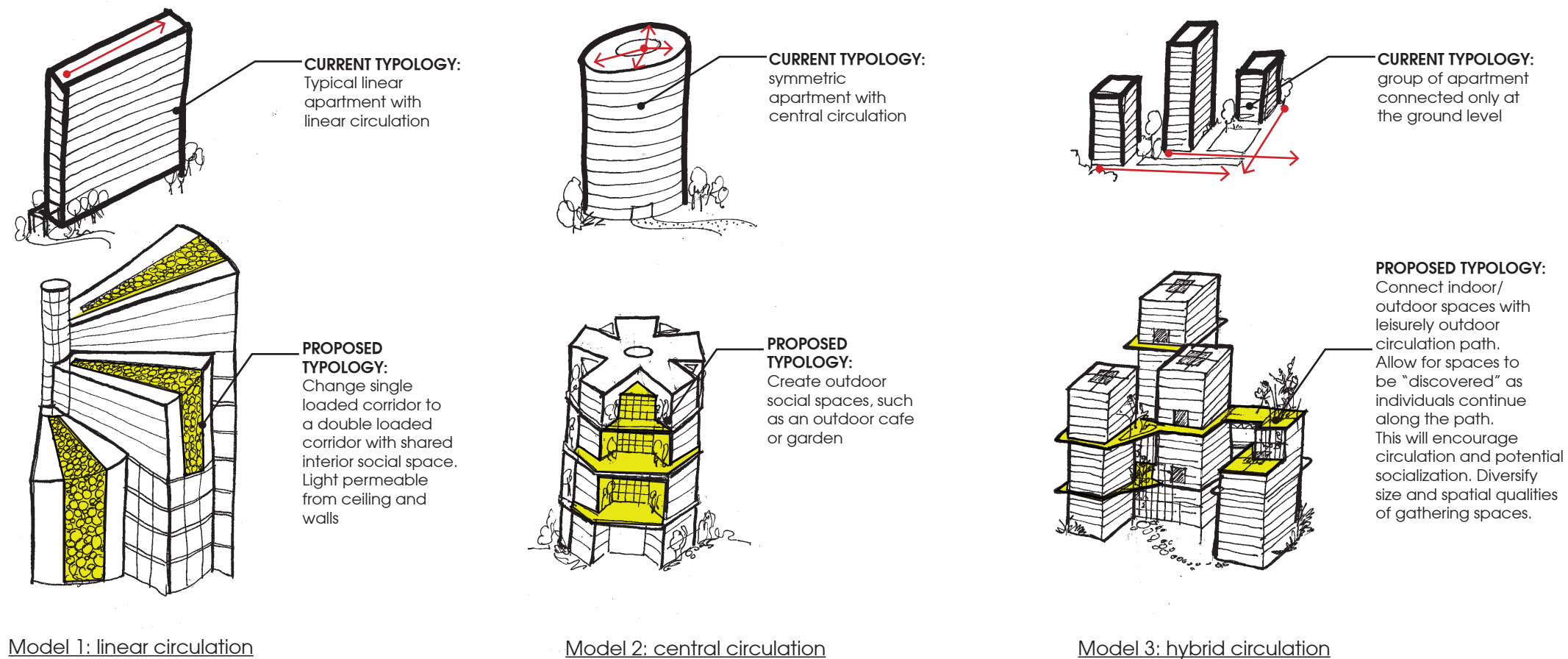
Add immediately accessible social space within apartment floor to encourage interaction with neighbors. This will strengthen the sense of community.

Model 2

Add outdoor social spaces for outdoor activities that require direct sunlight and natural ventilation. These outdoor spaces will provide views to other surrounding apartment buildings.

Model 3

Add new leisurely circulation path. In addition to the typical elevator and fire stair circulation, include a third means of circulation. This path should be continuous connecting the ground level to the top level. Path should also be clearly separated from private apartment unit space to preserve required privacy. Example: external ramping with occasional stairs will allow users to pay attention to it surroundings without worry about tripping on a steps. Ramps allow for bicycle, segway, rollerblade, etc. use.



APARTMENT BLDG

B. SPATIAL PROGRAMING FOCUSED ON PEER USE

CONCEPT: CREATING PRIVATE HANGOUT SPOTS FOR PEER USE.

Physical Characteristics

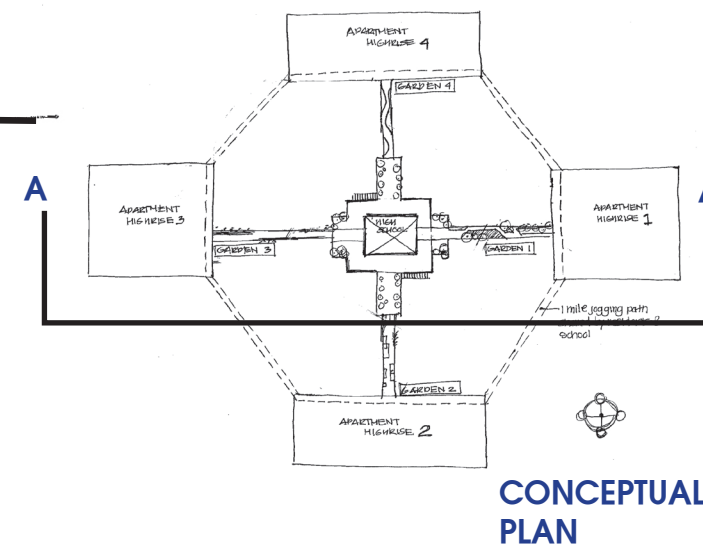
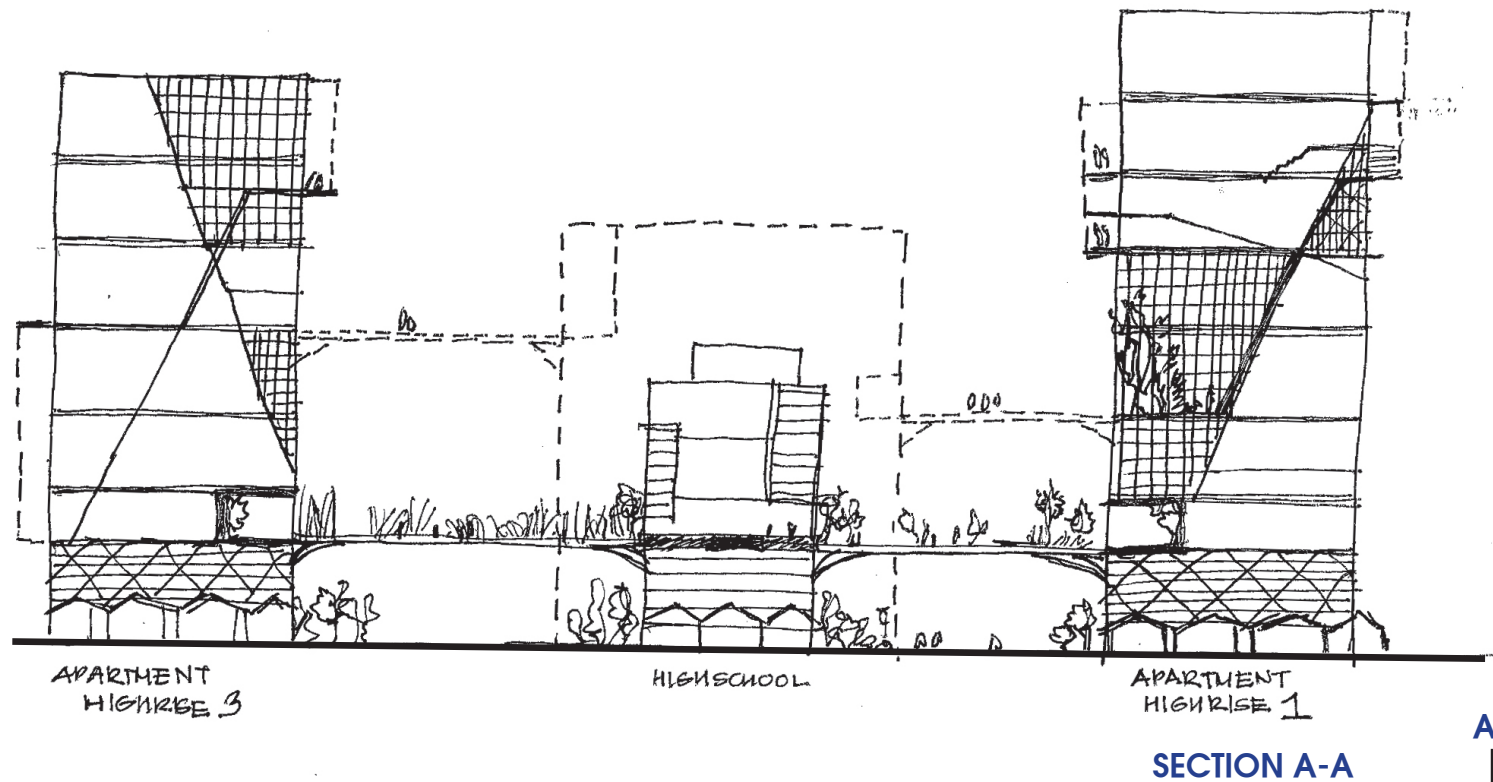
1. Hang out spots should be located away from adult gaze.
2. Hangout spots should be a place where high-activity is not present.
3. Hangout spots should vary in size and have various amount of seating to accommodate different peer group sizes.
4. Hangout spot should be near or on the path of walking to school

CONCEPT: SOCIAL CIRCULATION

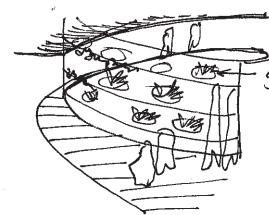
This concept focuses on create space specifically for children between ages of 12 - 18 as "hangouts"

As teens' interests change and mature, it is common for them to want to be treated like adults and not small kids. During this stage peer relationships are of the utmost importance in the teen's life and are sometimes valued higher than familial relationships. They are in constant search of the identities and often seek independence from their parent and younger siblings. To comfortably explore and socialize with peers, teens commonly socialize in places without direct supervision of adults. These places are important for building social skills, and meeting new people.

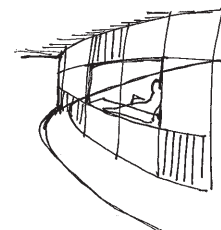
Children typically prefer to hang out in places that are not in direct influence by adults. They like to be in places that accepts children, generally commercial spaces during non peak adult use times. Based on these common peer meeting places, teens are limited from socializing in places that require a lot of money. At this stage children either have small part time jobs or rely on parents for allowance. Therefore children often hang out are places that require little money such as the mall, ice cream parlors, affordable restaurants, and cafes. Children that hang out in places that require no money, but need to be easily accessible by either walking or public transportation. These places include Parks, volley ball, basketball, tennis courts, bike rise, rollerblading, library, church



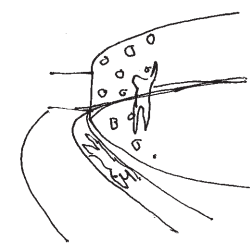
SOCIAL PEER PLACES Places to linger



garden wall next to ramp.
encourage circulation because children can help gather food.
- wall design for child's scale
Nature oriented
- bird house wall
- vine plants growing on wires
flowers, vegetables.
(ABC garden)



books next to ramp
encourage circulation because children are curious to read more books
"library gallery"



rock wall next to ramp.
encourage circulation because a key feature along the ramp is intriguing.
encouraging physical activity
Activity oriented
- sit on ramp.

CONCLUSION

Children are deeply affected by the built environment, yet they have little control over it. They have their own likes, dislikes, curiosity, and needs that are not the same as adults. As obvious as this may seem, we as designers of the new environment for children, sometimes forget that children are not “people in progress” but an entirely different end user with their own culture and complexities. The findings within this dissertation emphasizes how children’s perception of space differs with age and how apartment high-rises designed by adults do not meet their spatial needs. Lacking in diverse and purposeful social spaces, the typical apartment high-rise discourages children’s spatial use and limits their potential to create peer relationships. Spatial characteristics such as compact apartment units, anonymous apartment floors, and un-inviting vertical circulation further supports an inactive lifestyle focused on unsociable peer play. Although the spatial issues used in this dissertation are personal interpretations based off of Piaget’s childhood observations, the overriding conclusion is that children should have more influence on the design of their environment. Below are some potential implementations that may help take its course.

To encourage the future realization of child-friendly high-rises, it is important to have children involved in the design process. The traditional power structure of the “all-knowing” adult and the “all-learning” creates difficulty for children to voice their opinions when it comes to environmental design. By integrating multiple perceptions into the initial planning stage, children’s opinions are no longer looked upon as persons in progress but valid thoughts, thus boosting children’s self esteem and communication skills. Their integration of design influence not only encourages spatial use for all but also promotes children’s social competence and participation.

Secondly, after the design ideas have been set in place, there should be an economic incentive for developers to instigate construction. To offset high land and building costs, many local governments have created tax credits to allow developers to purchase historic and or worn-down properties for multi-family adaptive reuse projects. By revitalizing these areas, a new target markets can be created, potentially drawing in more revenue. To demonstrate, Vancouver, Washington had just recently adopted a 10-year property tax exemption program for multifamily residential improvement. If tax credits are not available, the design solutions offered in this dissertation can also be piecemealed and implemented in segments based on available funding. For instance, not all high-rise residents have large families or have the desire to create indoor play spaces inside of their apartment unit. The dissertation simply illustrates the concept of improved spaces for children, variations of the design and implementation may provide the same outcome.

Thirdly, to continue the research and knowledge of child-friendly environments, educational courses on environmental psychology should be incorporated into design programs such as architectural school. While architects and planners may design for the general public, sometimes those spaces are not used as intended because those designs are based on personal perceptions and not of the users. The study of environmental psychology could be a great resource for designers. Its focus on human behavior in relation to the physical environment allows for better understanding on environmental values, meanings, and preferences.

Lastly, which is probably the most difficult, is to create a standard within our local building codes. Currently the integration of public social spaces is not a requirement for urban residential design. Specifically the Land Use Ordinance in the State of Hawaii, assumes that public spaces in inner city contexts are already in place and does not require open space with private urban residential lots. In fact, open spaces are only required in new suburban divisions. By implementing a standard for social spaces in urban residential settings, a new type of lifestyle for children can emerge, encouraging an interactive, healthy, higher quality of life.

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FIGURES

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