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# Seven Cs for Tweens: Design Principles for Children Aged 10-13 in the Urban Landscape

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## Abstract

*Outdoor play is critical for the wellbeing of children. In cities, access to unsupervised outdoor play is limited by a host of obstacles. Many of these limiting factors can be mitigated by environmental design. The following identifies seven design principles for urban public landscapes that support play for "tweens" (children 10 to 13 years old). We developed these principles using a mixed methodology that included a literature review, an analysis of qualitive interview transcripts with tweens, and a precedent study of playable urban landscapes. The Seven Cs for Tweens principles include: connectivity, community, cues, character, child agency, challenge, and comfort.*

**Keywords:** landscape design, outdoor play, children, youth, tweens, neighborhood environment

## Background

### The Erosion of Unsupervised Outdoor Free Play

Unsupervised outdoor free play, once a beloved, daily childhood occurrence (Thomson & Philo, 2004), has been dwindling. Playgrounds emerged as an element of city planning in North America nearly a century ago to protect children from the dangers and immoral influence of the streets, and the streets from the hooliganism of wild children (Hart, 2002). In an effort to protect the wellbeing of children from a constellation of real and perceived threats, including injury, traffic accidents, and "stranger danger," the developed world has since accelerated the surveillance and restriction of children's outdoor play (O'Brien et al., 2000). The result has been the decline of children's free outdoor play (Gray, 2011; Holt et al., 2016) and independent mobility (Karsten, 2005; Shaw et al., 2015). This trend imposes many of its own harms on children: outdoor play is crucial for children's health and development (Brussoni et al., 2015; Gray et al., 2015), and is often preferred over indoor play by children themselves (Glenn et al., 2013; Gray, 2011). Research has shown that the quality of the built environment and design of public space have a significant effect on both adults' and children's attitudes towards outdoor play, and in turn, its prevalence (Prezza et al., 2001; Schoeppe et al., 2014). However, children's needs are commonly marginalized in urban planning and design processes (Bishop & Corkery, 2017).

### Developmental Considerations for Tweens

"Tweens," described here as children between the ages of 10 and 13, have needs distinct from younger children and older adolescents. Though tweens enjoy many of the play behaviors as their younger peers, they are also experiencing rapid developmental change. Coordination, independence, cognitive capacity, and deepening social relationships are important areas of growth for tweens, and this is reflected in their play (Masiulanis & Cummins, 2017). Masiulanis and Cummins (2017) describe this age as one of both "launching" and "retreating" (p. 253), whereby children alternate new skills and ideas with familiar, comforting activities.

### Play

"Play" is an endlessly diverse set of behaviors that are crucial to children's learning, development, and wellbeing. For the purposes of this paper, play is defined as child-initiated, without end goal or purpose, undertaken spontaneously and without adult direction (Santer et al., 2007). Children themselves describe play as something that provides fun, pleasure, and freedom (Cummins, 2017). The environment has a profound effect on children's play. The ubiquitous playgrounds described by Woolley (2008) as KFC (kit-fence-carpet playgrounds) provide a limited and prescriptive menu: slides are for sliding, and the design of the structure attempts to exclude any other action (Herrington & Brussoni, 2015). By contrast, Gibson (1979) describes how environments may *afford* a variety of different opportunities for play. These "affordances" are possibilities, not prescriptions, and their availability varies based on the user's ability, interest, and inventiveness. For instance, a tree affords a toddler the opportunity to play peek-a- boo; the same tree affords a tween a chance to climb. The best play environments are rich in affordances, not prescriptions.

We sought to develop a set of principles to guide the design of playable urban spaces for tweens. This paper describes the research process, details the emergent design principles, and provides examples of built precedents. Intended for designers, landscape architects, planners, and community initiatives, these guidelines are useful for small- and large-scale projects. Building upon the Seven C's guide for children's outdoor play space design (Herrington, Lesmeister, Nicholls, & Stefiuk, 2007; Herrington & Lesmeister, 2006), Seven Cs for Tweens combines research in health, children's geography, design, and play to identify design principles for playable urban spaces for children aged 10-13 years.

## Methods

To establish a set of environmental considerations that designers can employ to create tween-friendly urban spaces, we sought insights from multiple sources to facilitate data triangulation and increase confidence in our findings. We reviewed relevant literature from multiple disciplines, listened to children's voices through supplementary analysis of existing data on children's perspectives of their neighborhoods, and examined landscape design precedents that supported play outdoors for the 10-13-year age group.

### Literature Review

The first author conducted the literature review, which encompassed multiple disciplines: child development, play, public health, children's geography, child-friendly cities, landscape architecture, and design. In her Google Scholar search, the term "play" was used alone and in combination with the terms "child," "middle childhood," "environment," and "city." The review was limited to work that included children within the ages of 10 and 13, and that described play interactions with the environment or children's preferences for playable environments. Relevant citations from work captured in the search were also reviewed.

### Children's Data

The authors reviewed qualitative interview transcripts collected for the *Playability* study conducted by the Brussoni Lab at the University of British Columbia. This data collection occurred between 2016 and 2018. In this study, 105 children ages 10-13 living in three municipalities in Metro Vancouver, Canada, including a primarily urban area, a suburban area with primarily multi-family dwellings and abundant natural environments, and a suburban area with primarily single-family homes and cul-de-sacs. We recruited children to the study primarily via social media advertisements and snowball sampling. We did not impose eligibility criteria that would have limited children with any disabilities, as long as they were physically mobile. Purposeful sampling ensured equal numbers of boys and girls and participants from each municipality. Most children (65%) identified as Caucasian and only a small number (>5) identified to us that they had a disability. Children took researchers on go-along interviews of their neighborhoods, identifying places they did or did not like to go and elements of their neighborhood they appreciated or wanted to change.

Detailed data collection and analyses procedures for the study can be seen in (Han et al. (2018). Study team members analyzed the data to identify the factors that

facilitate or impede children's outdoor play (Brussoni et al., 2020). For the purpose of this paper, we reviewed the study transcripts describing how children use urban outdoor spaces for play and children's uses, dislikes, and preferences that related to the design of the environment.

**Data Analyses**

Combining the review of the literature and the children's data, we compiled a set of variables determining the "playability" of urban space. Factors identified in the children's interview data (Brussoni et al., 2020; Han et al., 2018) (including safety, sociability, feeling welcome, creative agency, and independent mobility) as well as the Seven Cs guidelines (character, context, connectivity, chance, change, clarity, and challenge) developed by Herrington and colleagues (Herrington, Lesmeister, Nicholls, & Stefiuk, 2007; Herrington & Lesmeister, 2006) provided the initial themes by which the literature review was structured. The literature review was used to assess the significance and validity of the initial themes. Additional themes were created as the literature was analyzed. A theme's connection to the design of the built environment provided the criterion for its inclusion in the literature review. For example, the aesthetic tastes of tweens have clear implications for the way physical space is designed; conversely, tweens' strong preference for friends living within walking distance cannot be addressed through landscape design.

We compiled the most recurring and notable trends into seven design principles. The number seven was chosen in reference to the Seven Cs guidelines to ensure an appropriate level of detail and conciseness. Though the original "7 Cs" were used as a starting point, the substance of the design principles outlined here emerged from the children's data and literature review. While some of the original principles remained relevant for older children, these required adapting to tweens' more sophisticated approach to play based on the data reviewed. The themes derived from the children's data were all incorporated into the final principles.

**Precedent Study**

After identifying the final seven principles, we undertook a precedent study to identify spatial and material strategies that could support each principle in the design of urban landscapes. We searched online design publications (including *Landezine*, *Dezeen*, and *ArchDaily*) using the terms "play" and "child." We identified firms, collectives, and events specializing in outdoor play in the urban environment, and we reviewed their project portfolios. Sites that were not appropriate for 10-13-year-olds were disqualified (for example, play spaces that were clearly intended for younger children), as were sites that were too prescriptive (for example, an outdoor climbing wall that affords little other use) or that contradicted the Seven Cs principles. Sites that strongly demonstrated a single principle were analyzed for the ways that the site's design expressed the principles. We chose a selection of these for inclusion in the finished publication to illustrate each principle.

## Results and Discussion

The literature review and the children's data highlighted the importance of non-prescriptive, appropriately challenging play opportunities for tweens in the city (Masiulanis & Cummins, 2017; Moore et al., 1997). The data also revealed the

overarching importance of social life and an environment that encourages independent mobility (Sustrans, 2009; Wheway & Millward, 1997), critical factors for tweens in accessing play opportunities. The precedent study yielded a diversity of strategies to translate the themes in the data and literature review into landscape design principles.

Seven Cs emerged to provide design principles that would address the needs and preferences of tweens, as well as the obstacles to play posed by the environment: connectivity, community, cues, character, child agency, challenge, and comfort. The Seven Cs informational guide to children's outdoor play spaces (Herrington, Lesmeister, Nicholls, & Stefiuk, 2007; Herrington & Lesmeister, 2006) provided a useful mnemonic and the basis for this research while considering that as children age, many play behaviors from earlier childhood persist in more sophisticated, challenging forms (Masiulanis & Cummins, 2017). "Connectivity" offers strategies to support movement and independent mobility. "Community" describes ways to satisfy tweens' need for sociability. "Cues" examines the mores implicit in urban spaces and suggests strategies to broadcast the message that play is welcome. "Character" explores the importance of place-making. "Child Agency" proposes ways to offer tweens creative control over space. "Challenge" describes ways to provide experiences of challenge and risk. "Comfort" addresses physical and psychological wellbeing. Each C is described in detail below, with the relevant literature and study findings cited to support the results.

These principles are overlapping and may be used to reinforce one another. For instance, providing "child agency" within a space will help satisfy the need for "cues." As a group these principles will be present in any given play space in varying proportions, and one or more may be absent altogether, depending on the priorities and constraints of the community. Frank and colleagues (2007) found that having a diverse menu of spaces to choose from was more important than the size of the spaces. When designing play provision using these principles, it may be helpful to think of a neighborhood as a constellation of spaces that together fulfill the principles rather than assessing each play space in isolation. Table 1 summarizes the key elements subsumed within each design principle, as well as guiding questions for designers to consider.

**Table 1. Seven Cs design principles: Key elements and questions for designers**

| PRINCIPLE | KEY ELEMENTS | QUESTIONS FOR DESIGNERS |
|---|---|---|
| **Connectivity** | • Linear spaces: sidewalks, streets, alleys, pathways<br>• Play opportunities within 1km of home<br>• Barrier-free<br>• Embedded within existing pedestrian / active transportation networks<br>• Diversity over size<br>• Safety from traffic<br>• Passing-by play: playable street furnishings and other small interventions | • Where are tweens coming from, and where are they going? What routes are they taking?<br>• What other locations of interest are nearby?<br>• How are they travelling (on foot, by bike, skateboard, scooter)?<br>• What physical and psychological barriers might they encounter?<br>• Are routes and sites populated?<br>• **What are possibilities for creative movement?** |
| **Community** | • Social play can be quiet and private; "just hanging out," people-watching; or louder, performative, active<br>• Informal supervision<br>• Appeals to a diversity of ages,<br>• Prospect and refuge: tween retreats that are private but connected<br>• Opportunity for cooperative play between children<br>• Opportunity for safe interaction with strangers<br>• Accommodate groups of different sizes<br>• Spaces for retreat | • What is the quality of the circulation near and through the site? Is the site populated?<br>• How many people can it comfortably accommodate at once?<br>• Is there a hierarchy of social space (places for pairs, places for groups, highly visible spaces for performance, and private refuges)?<br>• **Are there opportunities for cooperative play between children?** |

| PRINCIPLE | KEY ELEMENTS | QUESTIONS FOR DESIGNERS |
|---|---|---|
| **Cues** | • Use of site is possible within social context<br>• Novel and unexpected elements<br>• Cues work to validate tweens' presence and play<br>• Tween contribution: hand painted signs, built elements, gardens<br>• Cues and affordances match | • Who currently uses the site, and what are the desires and expectations that these users might have?<br>• What does the existing site communicate about play?<br>• What messages need to be changed, added, or eliminated?<br>• What activities are welcomed, and which feel transgressive?<br>• What can design do to normalize healthy play behaviors that are subject to censure?<br>• What play activities are already taking place that designers can legitimize in the built environment?<br>• **What are the best ways to communicate with each of the site's user groups?** |
| **Character** | • Distinct and recognizable<br>• Good maintenance practices<br>• Avoids condescension<br>• Culturally relevant<br>• Acknowledges character of context and site<br>• Complexity within orderly frames<br>• Multiple senses<br>• Seasonal change<br>• Beauty | • What are the existing aesthetic, tactile, and auditory qualities of the site? What is the cultural and physical context of the site?<br>• How can the design concept be expressed through the site's sensory experiences?<br>• How does the character of the site differ from space to space within the site?<br>• What are the thresholds, transitions, or overlaps between them?<br>• **Who will use the site, and how might the character of the site be interpreted or experienced differently?** |

| PRINCIPLE | KEY ELEMENTS | QUESTIONS FOR DESIGNERS |
|---|---|---|
| **Child Agency** | • Open-ended<br>• Loose parts and the freedom to use them<br>• Meaningful participation in design / construction process | • Are there opportunities to meaningfully engage tweens in the design and build process?<br>• What are the hard social and physical limits of the site? Can the context accommodate an adventure playground; a graffiti wall; a temporary interactive light installation; or a hardy, playable planting design?<br>• What elements of the site could be appropriated for other uses? How can design support additional uses of the space?<br>• What kind of loose parts (and how many) are appropriate for this site? Consider storage, cleaning, replacement, and potential hazards.<br>• What kinds of specific uses are designed into the site?<br>• **What opportunities exist for tweens to manipulate the site?** |
| **Challenge** | • Challenge and risk are healthy<br>• Legibility is the difference between risk and hazard<br>• Hierarchy of challenges, risks, scales<br>• Avoid equipment that restricts use<br>• Opportunities to assess and choose from challenges / risks<br>• Risks: height, speed, dangerous elements, tools, rough-and-tumble, chance of disappearing / getting lost<br>• Challenges: reaching, jumping, climbing, sliding, balancing, cooperative, cognitive | • What kinds of intrinsic challenges do the elements of the site offer (hopping from rock to rock, climbing atop a planter, rolling down a hill)?<br>• Are there ways to pull and push these elements to provide more / less / different challenges?<br>• Are there different intensities of challenge and risk available?<br>• What risks are present? How legible are they?<br>• Do challenging elements of the site change / disappear over time? (e.g., a big puddle in spring becomes a slippery surface in winter.)<br>• Are there bottlenecks around risks or challenges?<br>• **How can the site's challenges remain compelling for tweens over time?** |

| PRINCIPLE | KEY ELEMENTS | QUESTIONS FOR DESIGNERS |
|---|---|---|
| **Comfort** | • Location<br>• Felt safety<br>• Informal surveillance<br>• Visually connected to surroundings<br>• Prospect and refuge<br>• Management of microclimates and sensory stimuli<br>• Biological needs: water, bathrooms<br>• Design with children's smaller size in mind for sightlines, furnishings<br>• Wifi, charging stations, speakers | • How does the site sound, feel, smell, and look? Do these qualities change over the course of a day, a season, a year? What is it like in the sun, the rain, the snow, the wind? What is it like at night?<br>• Does the site feel safe? Why or why not?<br>• Where are the nearest washrooms, drinking water, charging stations, accessible indoor space?<br>• What are the circulation patterns through and around the site? Is it busy? Empty? Isolated?<br>• How does this change through the course of a day, a season, a year?<br>• **What is it like to be in the site?** |

## Principles

### *1. Connectivity*

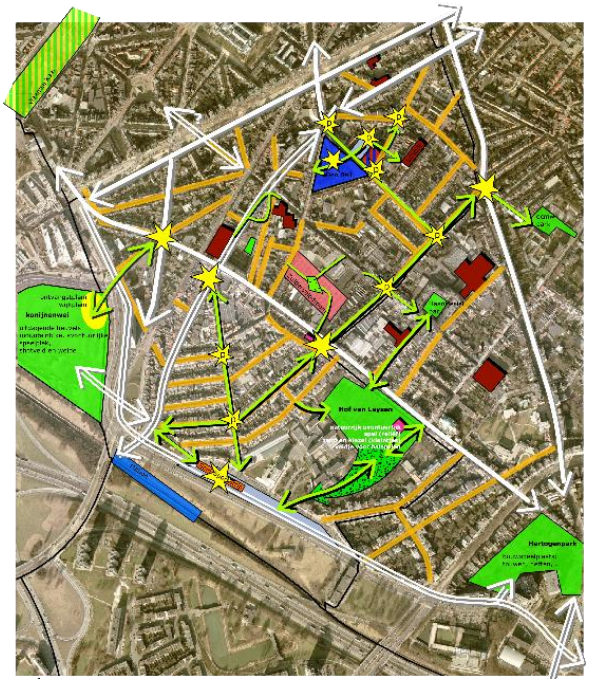
Connectivity supports independent mobility and movement as a critical element of play. For tweens, independent mobility is both a developmental imperative and an important dimension of play (Sustrans, 2009; Wheway & Millward, 1997). It is also closely associated with social life: tweens who must rely on a caregiver's schedule in order to socialize have less interaction with friends and neighbors (Page et al., 2010; Prezza & Pacilli, 2007; Wheway, 2015). For a play space to be used, it must be within walking distance and easily accessible on foot (Brussoni et al., 2020), or within a tween's "home territory" (Kurka et al., 2015; Sanson et al., 2012). Children stressed the importance of feeling safe on that journey, particularly from (Brussoni et al., 2020). Frank and colleagues (2007) found that recreational spaces within one kilometer of home were the greatest predictor of walking among children.

Connective play landscapes can support independent mobility by retrofitting existing networks of streets, paths, and sidewalks, to "playify" the act of travelling from one place to another. Playable benches, bike racks, planters, and other street furnishings promote momentary, unplanned pauses for play that Back and colleagues (2018) call "passing-by play" (p. 8). Interventions can be as simple as painted patterns on the sidewalk that suggest movement (Cummins, 2017).

**Precedents.** The *SpeelWeefselplan* (roughly translated as "play space web") is a planning and design concept adopted by the Belgian cities of Ghent and Antwerp (Figure 1). Planners mapped the routes and destinations used by children, implemented mobility-boosting tools such as crossings and separated bike lanes, and embedded play affordances into the streetscape. "It can be something like a

concrete stepping stone, not even a play device... But when children find it on their route they know that it's fun, that they can sit on it, lie on it, jump on and off of it—it makes the route more attractive and more child-friendly" (Antwerp planner Wim Seghers quoted in Darabi, 2018).

**Figure 1. Speelweefsel © City of Antwerp**



*Tiny WPA* (Tiny WPA, n.d.) is a non-profit organization that trains and supports communities to design and build projects in their neighborhoods in Philadelphia, Pennsylvania in the United States. Their projects include low-budget interventions that retrofit the existing urban fabric, including playable benches, bike racks, and planters (Figures 2-4).

**Figure 2. Playable bike rack ©Tiny WPA**


**Figure 3. Stair slide ©Tiny WPA**

**Figure 4. Speed bump ©Tiny WPA**

### *2. Community*

Community is about the social dimension of play. The importance of social play is hard to overstate (Cummins & Masiulanis, 2017; Lester & Russell, 2008; Sanson et al., 2012). Social play encompasses a diverse set of behaviors, appearing boisterous and active, imaginative and immersive, cooperative or competitive, performative, observant, or secretive. Tweens are in the process of identity formation, drawing primarily upon social influences rather than parents or other adult caretakers (O'Brien et al., 2000). Friends are deeply important to this age group. The availability of nearby friends influences children's desire and motivation to go outside (Brussoni et al., 2020). Tweens need neighborhood spaces that facilitate chance meetings with friends (David & Weinstein, 1987; Moore, 1986).

Tweens have an acute sense of safety that impacts how they feel and where they go (Arup, 2017; Titman, 1994); feeling safe is a condition for venturing outside (Brussoni et al., 2020). Familiar adults, busy spaces, and informal supervision contribute to a felt sense of safety and belonging (Brussoni et al, 2020; Cunningham & Jones, 2006; Frank et al., 2007). Children are also very adept animators of underused public spaces (Kate Bishop, personal communication, June 13, 2019). Children prefer playing in places where there is the possibility for interaction with others, where they can feel they are a part of things (Arup, 2017; Forman, 2017). Whyte's (1980) theory of "triangulation" describes how novel, attractive, or compelling features of the landscape can facilitate connection between strangers who interact with them; for example, an unusual fountain or a street performance. These elements can prompt communication among strangers and provide a shared experience.

Tweens enjoy the presence of children of other ages, too. Age groups are often separated by design, and this is exacerbated when play spaces are not challenging enough to interest older children (Cunningham & Jones, 2006). Play provision that appeals to multiple age groups is an important element of community (Derr, 2015).

Tweens are drawn to highly animated, socially active places, but often position themselves at a slight remove (Masiulanis & Cummins, 2017; Sanson et al., 2012). This preference is described by Appleton's "prospect and refuge" theory (Appleton, 1975), which describes a profound aspect of psychological comfort derived from landscape. "Prospect" is defined as the ability to see one's surroundings, while "refuge" is the ability to hide. Prospect can vary from a peephole to a vista, while refuge is created by variables like light and dark, shelter, or places with multiple exits (Stamps, 2008). These can occur together or separately. Ideal tween spaces are retreats connected to busy places that offer both prospect and refuge. The spaces can be elevated, partially enclosed, and/or aesthetically distinct. These semi-private places can function as social spaces or as solitary retreats, places of refuge to daydream and reflect (Masiulanis & Cummins, 2017; Moore, 1986; Raith, 2018; Titman, 1994).

**Precedents.** *Musical Swings* is a nine-person swing set designed by Montreal, Canada collective Daily tous les jours (Daily tous les jours, 2011; Figure 5). The swings are installed seasonally in Montreal. The movement of each swing generates

a musical tone based on the height of the swinger's arc, allowing users to manipulate sound as a loose part using their entire bodies. Users can synchronize their movements to create melodies, improvised free jazz, or joyful cacophony. The swings are collaborative, and enjoyed by children and people of all ages, offering the possibility of social connection and play.

**Figure 5. Musical swings. ©Daily tous les jours**

### *3. Cues*

Cues are communication devices that facilitate the sharing of public space, helping children and adults feel comfortable with play. Cities are full of messages, both explicit and implicit, encoded in social, environmental, and textual cues. Unaccompanied children are often cast as victim or vandal, and society leans towards disapproval as children enter adolescence (Matthews, 2003; Valentine, 1996). Hostility to youth culture is expressed in the built environment in many ways, such as skate stoppers, auditory repellents, and the spatial segregation of playgrounds (Armborst et al., 2017). The result is that play is not an expected use of public space, and this expectation affects how and where children play (Matthews, 2003). The presence of even a few unfriendly neighbors leads children to experience the culture of their neighborhood differently (Brussoni et al., 2020). Cues alone cannot change social convention, but they can shift expectations about what can happen in a space (Sanson et al., 2012).

Disruption and novelty within familiar settings are potent cues for play. Rearranging or distorting expected forms, repetition, proportions, order, or spatial relationships can dramatically change the messages a site conveys. Material, texture, durability, and perceived safety all communicate about what kinds of activities are fun, possible, and appropriate in a site. Novelty is a powerful stimulator of play, curiosity, and exploration (Higgins, 2002; Moore et al., 1997). Ephemeral installations or loose parts can be powerful stimulators of play because they are new and unexpected.

Participatory design processes are a concrete way of validating tweens' use of public space (Bishop & Corkery, 2017). Tween-designed or built installations can

range from homemade painted signs to interventions like public art, street furniture, play structures, and gardening projects. Simple interventions like signage can include written and visual messages about what a space is for. Cues can also function as landmarks, providing informal wayfinding, a place to meet, and information about other relationships in the space (Moore et al., 1997).

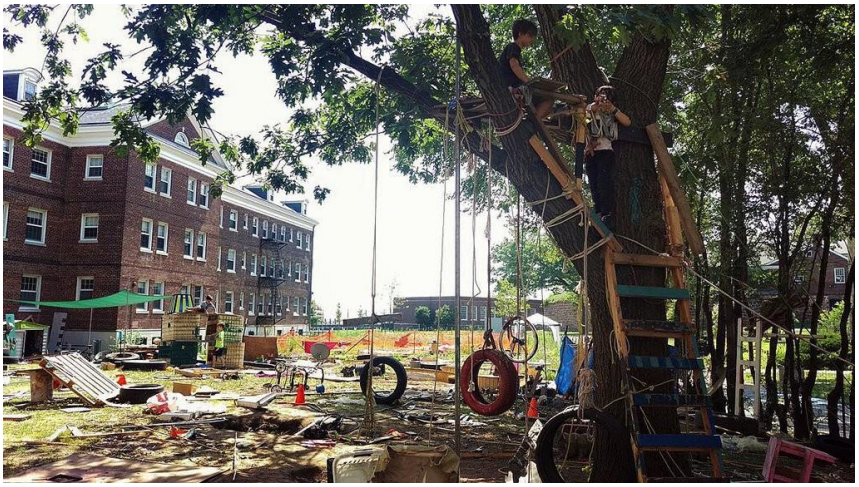
Cues speak to children about what kind of activities are possible. They can overlap with affordances, and care should be taken that these are not contradictory (Titman, 1994). Some healthy play behaviors may contradict adult sensibility or other latent messaging within a site. For example, play that manipulates the environment may be interpreted as destruction or vandalism in the context of a carefully manicured garden (Cunningham & Jones, 2006; Lester & Russell, 2008; Shell, 1994). Cues can help prevent conflicts, but only within the particular limits of each context.

**Precedents.** *Delirious Frites* by Quebec, Canada design collective Les Astronauts provides a temporary intervention so unexpected, delightful, and tactile that it totally disrupts expectations (Howarth, 2014). An urban alleyway in Quebec City is transformed with thousands of pink and orange pool noodles sprouting from the walls (Rawlinson & Guaralda, 2012; Figure 6).

**Figure 6. Delirious Frites**

*Governor's Island Adventure Playground* in New York City in the United States bursts with endless, thrilling affordances (Governors Island, n.d.; Figure 7). Imaginative possibility is advertised everywhere in the fertile disorder of tools, materials, and child-built structures, encouraged by adult playworkers and protected by a fenced boundary: no parents allowed. Adult intrusions are explicitly addressed by outward-facing hand-painted signs: "your children are fine without advice or suggestions."

**Figure 7. The Yard at Governor's Island ©play:groundNYC**



***4. Character***

Character is the impression of a place gathered from all the senses. Part of the process of identity formation in tweens is the development of aesthetic preferences (Cummins & Masiulanis, 2017). The character of a site made for tweens—its quality, aesthetic character, thoughtfulness, maintenance—communicates that youth are valued by their community. The inverse is also true: children whose play environments are unattractive or poorly maintained are left with the feeling that they are not cared for (Titman, 1994). Children have a keen awareness of beauty, and overtly childish aesthetics are often perceived as "babyish" or condescending (Titman, 1994) to tweens. The character of a place is particularly important when children are exposed to the same places day after day (Kate Bishop, personal communication, June 13, 2019; Titman, 1994).

Character is the intentional product of a design team's vision combined with the innate qualities of the site (Herrington & Lesmeister, 2006). Character turns generic "space" into a distinct and recognizable "place," but playgrounds are often lamentably bad at this (Solomon, 2014). "Today, walking on a children's playground is like exiting the interstate. Regardless of where you are, you see the exact same thing" (Day, quoted in Solomon, 2014, p. 22). However, *distinct* is not synonymous with *unprecedented*. Character can reference other places or be culturally specific; for example, youth living in the United States with roots in Latin America requested fountains in public spaces, reminiscent of a common plaza feature in that part of the world (Derr, 2015). Playable spaces for tweens can make the urban fabric richer, more vibrant and varied.

Complexity is an important dimension of a site's character. Children across all age groups are attracted to complex play environments (Cunningham & Jones, 2006). Moore (1986) captures the complexity of a particularly wonderful park in his book *Childhood's Domain* using words like juxtaposition, richness, diversity, variety, and "intermingling of forms." Though complexity is an exciting quality in a play space, it can also be experienced as chaos and disorder by adults (Lester & Russell, 2008). Nassauer's (1995) concept of "messy ecosystems, orderly frames" is a valuable

approach that can mediate the effect of complexity on adults. Nassauer identifies a pattern of "cues to care" (Nassauer, 1995, p. 167), including selective mowing; flowering plants and trees; wildlife feeders; orderly planting designs; and art, ornaments, or architectural features. Messy and chaotic complexity can be contained within familiar, tidy frames that signal to others that this is a space that is valued.

Character transcends the visual. It can involve multiple senses, employing light and shade, movement, sound, tactility, and scent (Haider & Kaplan, 2004). The use of "natural" features is an impactful way of developing a site's character and creating play affordances (Bourke & Sargisson, 2014; Herrington & Lesmeister, 2006; Woolley & Lowe, 2013). Research has demonstrated that natural spaces are consistently preferred by children (Dunnett et al., 2002; Sargisson & McLean, 2012; Titman, 1994). Natural features provide seasonal change, complexity, and mystery, are conceptually open-ended, and supply a renewable collection of loose parts (Herrington & Lesmeister, 2006).

**Precedents.** *Quartier Générale* is a play area in a Bordeaux, France apartment complex designed by BASE (BASE Landscape Architecture, n.d.; Figures 8 and 9). The play space is surrounded by a ring of modern residential towers. Externally, the play structure is spare and rigidly geometric, in keeping with its built context. Inside, a variety of slides, openings, lookouts, nets, ladders, and perches offer exciting complexity, affordances, prospect, and refuge. A large, reflective steel dome is a durable, modernist, tactile play object. This is an example of a landscape with carefully designed character that does not rely on explicitly childlike aesthetics.

**Figure 8. Quartier Générale ©BASE.nl**

**Figure 9. Quartier Générale, underside view ©BASE.nl**

ASPECT Studio's *Ian Potter Wild Play Garden* in Sydney Australia's Centennial Gardens uses planting, a simple palette of natural materials, and landform to create a complex, beautiful, and immersive spatial experience (ASPECT Studios, 2017; Figures 10 and 11). Mounds and dense plantings create a diverse hierarchy of spaces connected by winding pathways, and explorers are treated to a series of distinct experiences, generating a sense of mystery and adventure. The landscape provides a variety of sensory experiences using water, plantings, diverse surfaces and textures, multiple levels, and a range of motor challenges.

**Figure 10. Water play at Wild Play Garden ©Brett Boardman, ASPECT Studios**

**Figure 11. Climbing structure at Wild Play Garden ©Brett Boardman, ASPECT Studios**

### *5. Child Agency*

> "Playgrounds have everything already built but it's funner to build whatever you want" (Joey Gunderson, 11, quoted in Schiffman, 2019, para 5).

Child agency is "the degree to which the environment or space permits personalization and territorial claim" (Haider & Kaplan, 2004, p. 3). It is reliant upon creativity and autonomy, two essential dimensions of play. Child agency is exercised through play, artistic production, and social expression, the result of loose parts and the freedom to manipulate them at will (Hart, 1982). As tweens begin to assemble their sense of self, creativity is an important way of developing and articulating identity. Tweens are also developing critical and abstract thinking, and refining their capacities for logic, planning, and organizing. This developmental stage equips them with the cognitive tools for complex making, building, and planning (Cummins & Masiulanis, 2017).

Play is inherently creative and appropriative, and often transcends a designer's intent. It is very difficult for adults to predict exactly how children will use an environment for play (Masiulanis & Cummins, 2017). As Moore and colleagues express, "the idea of play is to explore and maximize the potential of any play setting," both physically and conceptually (1997, p. xii).

Play environments should be places where "meanings are kept open" (Moss & Petrie, 2005, p. 177). As Masiulanis and Cummins describe, their task as designers of play spaces was not to anticipate exactly how children might play in a space, "but instead to build a knowledge of what spaces or materials would encourage the greatest number of creative and playful outcomes" (Shaw, 2017, p. 189).

Nicholson's (1972) influential *theory of loose parts* describes a quintessentially

versatile element of creative agency. There are almost endless possibilities for what counts as a loose part: material objects like logs, balls, boxes, construction materials, or paint; media like water or fire; intangibles like sound, music, ideas, or stories; collaborators like plants, animals, and other people; and phenomena like gravity or magnetism (Nicholson, 1972). Loose parts allow for continual manipulation and reinvention of a place, which is considered by many to be the mark of a successful play space (Percival, 2014).

Participatory design offers tangible ways for tweens to exercise their creative agency and participate in community processes. The right of every citizen to contribute to the ongoing shaping and re-shaping of their environment is a key to developing vibrant cities, and children should be included in this right (Robbé, 2017). Nicholson (1972) describes a progression from loose parts play to contribution to planning and design: "We can discern a natural evolution from creative play and participation with wood, hammers, ropes, nails and fire, to creative play and participation with the total process of design and planning of regions in cities" (p. 8). Both the experiences and outcomes of participatory design are valuable for tweens (Bishop & Corkery, 2017). Mares and Stephenson (1988) identified a host of skills developed by children during the design process, including empathy, negotiation, cooperation, perseverance, and compromise. As Robbé (2017) observes, children's contributions to design processes are rarely excessive or unrealistic but often valuable and easy to incorporate into design. Importantly, success is contingent upon authentic participation rather than token involvement as the garnish on top of an adult design (Hart, 1992). Involving children early in the process can bypass this kind of failure. At the "fuzzy front end" (Sanders & Stappers, 2008, p. 9) of the design process, possibilities are wide open and the quick, creative thinking at which children excel is most valuable (Robbé, 2017).

**Precedents.** *Upcycled Urbanism* was a collaboration in Vancouver, Canada between the Museum of Vancouver, Happy City, the University of British Columbia's School of Architecture and Landscape Architecture, the Vancouver Public Space Network, Vancouver Maker Faire and *Spacing Magazine* (Happy City, n.d.; Figure 12). Discarded polystyrene blocks were gathered from a local construction site and processed into three interlock-able shapes. Dozens of these pieces were deposited onto a busy commercial street, temporarily closed to traffic, and the public was invited to build at will. This project transformed a familiar space using a simple set of loose parts.

**Figure 12. Upcycled Urbanism ©Bill Pechet**

*Block by Block* is a nonprofit that has developed a method for community-driven planning and design (Block by Block, 2020; Figures 13 and 14). Using the popular computer game Minecraft as an accessible tool for communication and visualization, community members can design and propose changes to their neighborhoods. At a workshop in Maputo, Mozambique, girls used mobile phones to map their neighborhoods and document their favorite places. Another project saw a waterfront marketplace in Pristina, Kosovo designed by over 70 community members, including tweens. "I came up with the skate park idea and some trees surrounding the park. Something I worked on is being made in real life!" (Lian Loxha, age 12; Block by Block, 2020).

**Figure 13. Block by Block workshop in Maputo, Mozambique ©Block by Block**

**Figure 14. 3D Minecraft model of community-designed public space in Pristina, Kosovo ©Block by Block**

***6. Challenge***

Challenge is an intrinsically motivated, highly compelling process of testing boundaries and developing ability. Challenges are opportunities for growth (Masiulanis & Cummins, 2017). For tweens, challenge is implicated in identity formation, development of competence and confidence, and reliance on peers (Masiulanis & Cummins, 2017). Both challenge and risk must be present for a play space to be compelling and developmentally appropriate for tweens (Brussoni et al., 2015; Brussoni et al., 2012), but these are often banished from play environments as a result of the adult desire to eliminate danger and liability (Herrington & Nicholls, 2007). Children described play equipment as "like for the babies" and expressed their frustration at the limited challenges available in their neighborhoods (Brussoni et al., 2020). Inadequate challenge is a primary reason that tweens are underserved by many conventional playgrounds, though they try their best to adapt, often by "misusing" prescriptive play equipment (Hart, 2002; Masiulanis & Cummins, 2017), or by seeking out challenge in unconventional and banned places (Brussoni et al., 2020). As Moore and colleagues (1997) argue, "a risk-free play area is neither possible nor desirable" (p.10).

Risk is a dimension of challenge that is sought after by children of all ages but may be particularly important for tweens (Masiulanis & Cummins, 2017). Risk refers to the perception rather than the presence of actual danger: a six-inch drop into a shallow puddle from a balance beam is a motivating consequence posing very little danger. Healthy risk is fun and developmentally necessary (Smith, 1998; Sutton-Smith, 2001). Crucially, beneficial risk is distinguished by the child's ability to identify, assess, and respond by choice (Moore et al., 1997). Conversely, risks

become hazards when they are illegible or pose unacceptable consequences (Moore et al., 1997).

Tweens are a highly diverse group: their interests, abilities, and developmental stages vary widely. Children of this age are generally highly coordinated and have mastery over a variety of fine motor skills (Masiulanis & Cummins, 2017), but not since infancy have tweens experienced such rapid physical growth, disrupting ability and coordination (Manning, 1993). For these reasons, children of this age group benefit from a hierarchy of graduated challenges that allow them to start wherever they are comfortable but that remain compelling as they grow (Moore et al., 1997). Providing these choices also allows tweens to exercise both physical ability and risk assessment (Moore et al., 1997). The option to back out easily at the last moment is another important consideration. This can be achieved with a physical layout that avoids bottlenecks and provides multiple exits (Moore et al., 1997).

Sandseter (2007) identified six types of risky play: play at great heights; with high speed; with dangerous tools; near dangerous elements; rough-and-tumble play; and play where the children can disappear/get lost. The sensations of height and speed are popular thrills (Bourke & Sargisson, 2014; Sandseter, 2009). Perennially popular risky play activities include swinging, climbing, and spinning (Masiulanis & Cummins, 2017; Talarowski et al., 2019). Physical challenges involve reaching, jumping, climbing, sliding, and balancing. Challenge and risk can have a social dimension when they require or accommodate multiple people (Moore, 1986). Challenge can become cognitive by including elements of problem-solving. Loose parts provide fodder for children to contrive their own challenges (Herrington & Lesmeister, 2006).

**Precedents.** *PlayIslands* in the Amsterdam Forest in the Netherlands is a refurbishment project by Carve (Carve, 2014; Figures 15 and 16). Floating play islands in an urban lake can be accessed by a wet or dry route, allowing kids to choose their level of challenge. The wet route features balancing on logs, swinging, and hopping over the water. The riskiness of this journey hinges on the obvious consequence of getting wet. This is so dramatic that it remains compelling for a range of age groups, even once the challenge has been mastered.

**Figure 15. PlayIslands ©Carve.nl**

**Figure 16. PlayIslands ©Carve.nl**

*The Rampart Wave* by BASE Landscape Architecture is a play installation in a public square in Lyon, France (BASE Landscape Architecture, 2016). The 50-meter-long by 7-meter-high wooden play structure was designed with risk and challenge in mind. It offers a diverse range of challenges and risks, from the variable slope of the wall to the climbing holds, ropes, slides, and tunnels.

**Figure 17. The Rampart Wave ©BASE Landscape Architecture**

***7. Comfort***

Comfort refers to both physical and psychological wellbeing. Comfortable landscapes avoid or mitigate hazards that contribute to discomfort: busy streets, air and noise pollution, microclimates, or a hostile social environment. The perception that a place is safe is the underpinning of comfort. Location is an important determinant of both physical and psychological comfort (Haider & Kaplan, 2004; Sanson et al., 2012; Wheway & Millward, 1997). Busy places with informal surveillance fulfill both tweens' social need and perceived safety need (Forman, 2017). Deserted places will feel unsafe almost as a rule. Other elements that felt unsafe to children include bullies, unfriendly animals, and traffic volume (Brussoni et al., 2020).

Appleton's (1975) prospect and refuge theory identifies psychologically comfortable spaces. In cities, refuge can provide a sense of privacy, enclosure, or shelter from the intense stimuli that occur in cities. Prospect can incorporate sightlines that provide a feeling of safety or offer opportunities for people-watching.

Comfortable public spaces are pleasant for children and adults. Climate change requires public spaces to function under a widening spectrum of conditions (Sanson et al., 2012). Microclimates (hyperlocal extremes of heat and cold, shade and exposure, wind and shelter) can be managed with trees and plantings; sheltering structures like pavilions, shade roofs, or walls; water features; topography; and thoughtful use of surface material. These elements can also calm the soundscape of a site by muffling noise or providing an auditory backdrop. Comfort also requires support for biological needs like drinking fountains and toilets, and attention to the smaller body sizes and sightlines of children. It can also include amenities like

charging stations, wi-fi, and wireless speakers. Technology is a feature of life for many tweens (Mascheroni & Ólafsson, 2016; The Nielsen Company, 2017) and maintaining this link to family and friends is an aspect of comfort (Mascheroni & Cuman, 2014).

**Precedents.** *The Goods Line* by ASPECT Studios is a linear public space in Sydney, Australia's most densely populated neighborhood (ASPECT Studios, 2015; Figure 18). This space offers benches, bleachers, tables, and lawns on which to sit or sprawl to watch passersby; play space; wi-fi; sun and shade; and access to water fountains. This is a lively space with ample passive surveillance.

**Figure 18. The Goods Line ©ASPECT Studios**

*Fareground* by DWG is an example of a site successfully managing microclimate and other sensory bombardments for comfort (DWG, n.d.; Figure 19). Located in downtown Austin, Texas, this plaza is located below street level, mitigating the noise and visual stimulus of car traffic. The tree canopy and shade pavilion provide visual shelter and privacy from the monolithic scale of neighboring buildings. Intense heat and light are softened by a grove of mature oaks, areas of lawn and plantings, a shade structure, and misting water feature.

**Figure 19. Dappled light and misting water feature at Fareground by DWG ©Leonid Furmansky**

## Limitations and Next Steps

Our research examined the literature and included research and built precedents geared to children that did not have differential abilities or disabilities. It is critical to ensure that all children feel welcome and able to play in their neighborhoods and cities. Disability as a category is extremely diverse, as is the category of "children" or "tweens." There is no reason to think that as a population, children with disabilities want or need different experiences in play than non-disabled children, but too often an inaccessible built environment means that those experiences are out of reach. While it is true that a child with disabilities may not benefit strongly from one or more of the 7Cs principles based on their individual needs and desires, this is also true of all children. These design principles may require modification or elaboration either in substance or in application to ensure inclusion of all children with differential abilities or disabilities within their cityscapes. Future research must examine the opportunities and barriers to play faced by children with disabilities in the urban environment, and determine how to deliver exciting, diverse, and abundant play opportunities that are compelling and accessible to all children.

## Conclusion

Unstructured outdoor play is a critically important activity for children, and this continues to be true for tweens (Valentine & McKendrick, 1997). For urban children, this outdoor play must take place in cities, within walking distance of home (Frank et al., 2007), but cities are not often designed with children's needs in mind (Bishop & Corkery, 2017). This has consequences for independent mobility, play, and children's social lives (Frank et al., 2007; Page et al., 2010; Prezza & Pacilli, 2007; Wheway, 2015). Further challenges are present for children with different abilities or disabilities. The principles presented here suggest ways to carve out space within cities for play, broadening the scope of what a play space might look like beyond the islands of kit-fence-carpet playgrounds (Woolley, 2008). There is an enormous diversity of aesthetics, approaches and affordances that might be embedded or

retrofitted into the existing urban fabric. Children do not only need places dedicated to their use, but also places of belonging in the public realm.

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