
A Behavioral Investigation of Preference in a Newly Designed New Zealand Playground



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Playgrounds with spaces that attract children increase the likelihood children will use them, the authors note, and playgrounds offer an opportunity for children to experience the risks of outdoor play. The authors used natural observation to study the children at play in a newly built New Zealand playground where such an important kind of behavioral learning was possible. In five-minute intervals over 615 minutes, they observed children of various ages and genders using the playground equipment. They discovered that swinging, spinning, and climbing—all at speeds and heights that made them risky—were the most popular activities overall for children. They discuss the important implications of these and their other findings for playground designers and for those worried about the decreasing time children spend playing outdoors. **Key words:** children, children's play preferences; playgrounds, safe play, risky play

OUTDOOR PLAY OFFERS children unique physical, psychological, and social development opportunities (Clements 2004; Little and Eager 2010). The special equipment and open space available on outdoor playgrounds permit active play (Stephenson 2002; Trawick-Smith 2010), which has benefits for children's health and well-being. Children who attend schools with larger outdoor areas have lower body-mass indexes than those whose outdoor areas are smaller (Ozdemir and Yilmaz 2008). Being physically active outdoors increases oxygen intake, which aids the growth of muscles and neuromuscular coordination and assists sleep and relaxation (Adesina 2012).

Additionally, outdoor play fosters more interaction with peers than indoor play (Trawick-Smith 2010). Playgrounds provide a meeting space open to all children. It is easier for children to join groups outdoors, which makes the groups in general bigger and more fluid (Stephenson 2002). Outdoor areas present

opportunities for greater variability, unpredictability, and open-endedness in children's play, giving them a sense of freedom (Stephenson 2002). Opportunities to "swing, climb, slide, run . . . provide a satisfying range of physical challenges" (Stephenson 2003, 40). Once learned, many of the benefits of outdoor play, such as physical risk taking and learning to accept challenges, generalize to indoor settings (Little and Wyver 2008).

Children's participation in safe outdoor play proves particularly important in urbanized areas (Clements 2004; Little and Eager 2010). Mothers from sixteen different countries reported that, although their children spent most of their free time watching television, they were happiest when playing outside at playgrounds or parks (Singer et al. 2009).

To design playgrounds that attract children, we must determine the kinds of play children prefer, yet rarely do we consult them (Thomson 2007), despite the fact that we know children have different views about the spaces they inhabit than do adults (Matthews 1998). In our study, therefore, we investigate whether the play provided by a newly built playground in a small town in North Island, New Zealand, attracted the children for whom it was built.

One aspect of public playgrounds that may attract children is the potential for risk. Risk occurs when individuals make choices about behaviors with uncertain outcomes (Little and Eager 2010), such as engaging in play that may result in injury (Stephenson, 2003). In fact, Sandseter (2009) defines risky play for children as "thrilling and exciting forms of play that involve a risk of physical injury" (3). Others distinguish risk from hazard, a situation involving a source of harm that has a high probability of causing serious injury or death (Little and Eager 2010; Stephenson 2003). A playground may present both risks and hazards. For example, a slide affords a risk represented by height that children may choose to take. A slide may also present a hazard, for example from overheating, that a child cannot easily choose to avoid. Thus, children understand a risk, which they may choose or not, but they have difficulty assessing a hazard, which will almost certainly lead to injury (Greenfield 2003).

Little and Eager (2010) suggest that viewing risk as something children should avoid implies that risk cannot coexist with safety. Instead, they argue for a distinction between risk and hazards to afford children an opportunity to experience healthy, well-managed, risk-taking play. Plumert (1995) states that to make appropriate decisions about risk, children need past experiences of successes and failures. She found that eight-year-old children who were given experience with physical tasks more accurately assessed their ability to perform

the tasks than when they had no prior experience, regardless of whether they succeeded or failed on the practice tasks. Plumert's (1995) finding suggests that, at least for eight-year-old children, experience with physical activities leads them to more accurate assessments of their physical abilities, and therefore, better risk-assessment skills. Sandseter and Kennair (2011) argue that risk taking by children serves an evolutionary purpose, that is, it helps children learn important survival skills. They also posit that the children who fail to engage in risky play may continue to be anxious about activities they should have the physical ability to perform. Thus, playgrounds that afford risk while minimizing hazards provide important learning opportunities for children.

Also, children are likely to find playgrounds that offer no opportunities for risk unappealing and, consequently, may avoid them (Ball 2004). Parents of preschool children interviewed by Little, Wyver, and Gibson (2011) perceived playgrounds as "uninviting and lacking in challenge" (127) compared to their own experiences in childhood. Children are innovative, and they adapt playground equipment for other purposes (Thomson 2007). Consequently, children may use play equipment devoid of risk in ways that increase it (Hart 2002; Stephenson 2003). In fact, children who played in playgrounds in Cardiff between 1992 and 1993 were just as likely to sustain fractures when playing on barked versus concrete surfaces (Mott et al. 1994), possibly because "children take more risks on bark surface" (330). Children are less likely to take risks when they think an activity involves a high level of danger and can cause injury (Lasenby-Lessard, Morrongiello, and Barrie 2013). When children perceive that an activity is "safe," they engage in risk compensation, that is, they take greater risks. For example, children using bicycles or rollerblades take more risks when wearing safety equipment than when they are not wearing safety equipment (Lasenby-Lessard and Morrongiello 2011).

According to Sandseter (2007), the risky play of children can be categorized into play that involves height or speed, harmful tools, dangerous elements, rough and tumble, or locations where children can become lost. Children do seek play that involves height and speed (Little and Eager 2010). Height represents a risk to children because falls are the major cause of play-related injuries (Lam, Ross, and Cass 1999; Mowat et al. 1998). Of all injury claims made in New Zealand between July 2012 and June 2013, in places of sport or recreation, for children under fifteen years old, 45.8 percent were due to falls (Accident Compensation Corporation 2014). While we were unable to find recent statistics that focus only on playground injuries, in an Australian population, the hospitalization

rate of children under fifteen years old from playground falls was 125 in 100,000 during 2002 and 2003 (Mitchell, Cavanagh, and Eager 2006). Vollman and colleagues (2008) reported that, of all injuries in playgrounds of children treated in emergency departments in the United States between 1996 and 2005, 36 percent occurred on climbing equipment. Falls from playground equipment higher than 1.5 meters are more likely to result in injury than falls from lower equipment (Chalmers et al. 1996; Macarthur et al. 2000).

Children experience speed in playgrounds by swinging, sliding, or spinning—or by riding bicycles in the playground (Sandseter 2007). An American study conducted during 1999 found that swings caused the most injuries in public playgrounds, followed by slides (Petridou et al. 2002). Swings and slides were the second (29.5 percent) and third (20.4 percent) highest cause of childhood playground injuries in the United States between 1996 and 2005 (Vollman et al. 2008). In a Canadian study, the top five items implicated in injuries to children (monkey bars, slides, gliders, swings, and climbers) during 2007 and 2008 all involved height, speed, or both (Branson et al. 2012). However, children most preferred playground equipment and spaces that provide opportunities to experience height and speed (Sandseter 2009; Staempfli 2009). In their studies of fifty-six New Zealand playgrounds, Sargisson and McLean (2012, 2013) observed the play behavior of children to determine their play preferences in terms of frequency of use of available play activities. Consistently, children most preferred swinging, spinning, and climbing types of play (Sargisson and McLean 2013).

Research into children's preferences for risky playground equipment has typically involved preschool-aged children (Little and Eager 2010; Sandseter 2007) or playgrounds that pose little risk (Little and Eager 2010; Sandseter 2009). Additionally, an expressed desire for risky playground equipment (Little and Eager 2010) may not translate to actual use of such equipment (Little and Eager 2010; Little et al. 2011), because self-reported preferences do not always match behavior.

When we design playgrounds to meet the needs of children, we also need to consider whether girls and boys seek similar kinds of play. There is evidence to suggest that, in a playground, boys will prefer sporting opportunities (Holmes 2012), but girls will be more likely to use the fixed-play equipment (Lucas and Dymont 2010) or engage in more sedentary activities, such as socializing (Holmes 2012). Evidence also suggests that boys engage in more risk taking than girls (Lasenby-Lessard and Morrongiello 2011; Lasenby-Lessard et al. 2013). Rowe and Maughan (2009) reported, however, that although boys scored higher

on a questionnaire measuring risk taking, the number of minor injuries they sustained did not differ from that of girls.

We aimed to measure the frequency with which children used the play areas and equipment available in a newly constructed playground as a measure of children's play preferences. We used a naturalistic observation method (Sargison and McLean 2013) to measure instances of play by boys and girls present during playground visits. We hypothesized that we would observe a greater number of instances of play by children using playground items that afforded higher levels of risk and that girls' play choices would differ from those of boys. Because one area of the playground had been designed specifically for teenagers, we aimed to determine whether the age group for which it was designed actually used this area.

Method

Playground

The playground, located in a small town of North Island, New Zealand, officially opened during December 2012. Play equipment and spaces were divided into three areas labelled A, B, and C, according to the proximity of equipment and play spaces (figure 1). Each of the three areas contained six play items or spaces. Area A included a horizontal track ride, monkey bars, black balancer, blue climbing frame, chain wall, and stepping poles (figure 2). A garden separated Area A from Area C. Area B contained a concrete basketball court, winding concrete paths, several grassed sporting areas, and a stepped concrete retaining wall on which children could sit. Area C (figures 3 and 4) contained a unique eagle's nest climber and another climbing frame, as well as a double slide, seesaw, roundabout, and three swings (one infant, one child, and a large-basket swing). We did not include play choices outside the outer boundary shown in figure 1.

Participants

The participants included all children (under fifteen years) using the playground during observations. The researchers did not know most of the participants, but Tina M. Bourke's children (aged one, nine, and eleven) were occasionally present, and—as a member of the community—Bourke occasionally recognized some of the children. We made fourteen separate behavior observations from April 29,

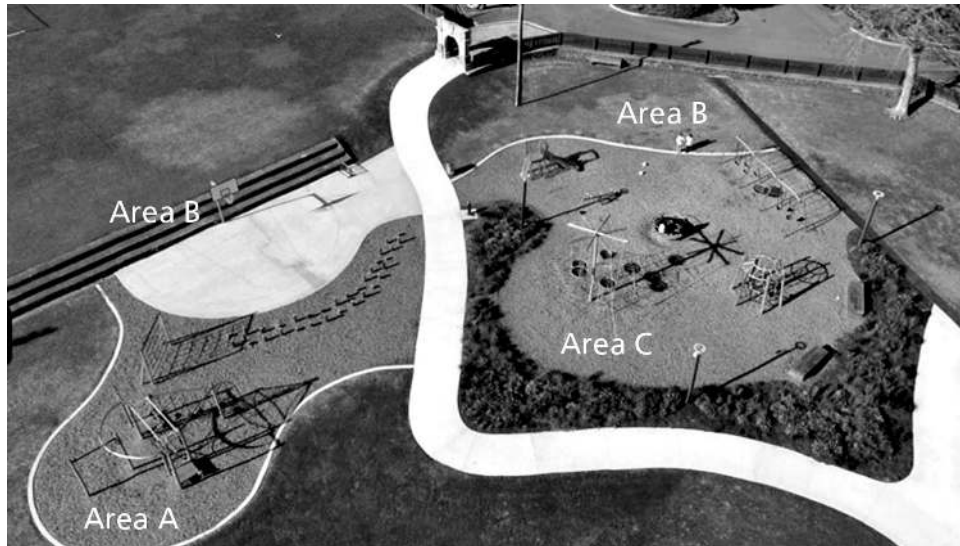


Figure 1. Three areas of playground space and equipment

2013, to July 18, 2013, totalling 10.25 hours (615 minutes). Bourke recorded all data, estimated all genders and ages, allocated all codes, operated all equipment, and took all photographs. In situations where we took photographs of children other than the Bourkes, we took care to protect their identities in accordance with the conditions set by the Psychology Research and Ethics Committee of the University of Waikato (#13:05).

Bourke conducted two interviews with a manager involved in the playground development from the district council and the chairperson of the community ward board.

Apparatus

We used a Fuji FinePix S500 digital camera for the photographs. At the beginning of each observation, we set a stopwatch on autorepeat to count five-minute periods, and it sounded a beeping alarm at the beginning of each period. We recorded interviews on an Olympus WS-750M Digital Voice Recorder that Bourke then transcribed.

We recorded data using pencil and preprinted recording sheets and entered it onto dated Excel spread sheets as soon as possible.



Figure 2. Area A of the playground with horizontal slide, monkey bars, balancer, climbing frame, and wooden stepping poles

Behavioral Sampling

Behavior observations lasted from thirty to sixty-five minutes, divided into the five-minute periods. We used the sampling method of Sargisson and McLean (2012). At the start of each period, Bourke recorded gender, approximate age, and the play equipment or space area used by each child in a predetermined sequence beginning with Area A, followed by Area B, and finally by Area C (refer to figure 1). For example, if a girl of about four years used the slide, Bourke recorded “G4” under the heading “Slide.”

Bourke, who was familiar with children of different ages because of her own children, estimated the children’s ages. That is, Bourke, as part of the local community, recognized some of the children from her own children’s classes and could use those children as benchmarks for estimating the ages of others. She also used their heights and her general knowledge of devel-



Figure 3. Area C of the playground with swings, climbing frame, roundabout, seesaw, eagle's nest, and slide

opmental stages to gauge approximate ages.

Bourke recorded only the play space being used by each child, not the type of play in which the child was engaged. She made exceptions only for the use of paths, where she recorded walking, sitting, riding bicycles or scooters, and ball play; stepping poles, where she recorded sitting and stepping; and platforms associated with the horizontal track ride and monkey bars, where she recorded sitting or standing.

Ten of the fourteen observations fell outside school hours. We made no attempt to manipulate participant numbers or behavior choices. While sampling, Bourke carried a clipboard and often a camera, which she did not hide from participants. If approached by any person, she provided a short written summary of the research goals and experimenter contact information.



Figure 4. Eagle's nest climbing equipment in Area C

Results

We tallied the total instances of play by children in Areas A, B, and C ($n = 1534$) and found very similar numbers of instances of play by girls ($n = 771$) and boys ($n = 763$; $\chi^2(1) = .04, p = .84$) recorded over a total of 615 minutes.

Use of Playground by Area

We grouped instances of play by age in three-year increments; 0–2, 3–5, 6–8, 9–11, and 12–14 years. Of these five age groups, children aged 3–5 years were the greatest users of the playground (433 instances of play), followed by children aged 6–8 years ($n = 342$), 9–11 and 12–14 years ($n = 296$ and 295), and 0–2 years ($n = 168$; $\chi^2(4) = 119.58, p < .001$).

Figure 5 shows that girls engaged in fewer instances of play by the children under 2 years ($n = 42$) than did boys ($n = 126$; $\chi^2(1) = 42.00, p < .001$). Both girls and boys under 2 years avoided Area A but used Areas B and C approximately equally. We made more observations of girls aged between 3 and 5 years ($n = 255$) than of boys ($n = 178$; $\chi^2(1) = 13.69, p < .001$). We saw these girls mostly in Area C, but boys of this age group only marginally preferred Area C to Area B. We observed equal numbers of boys ($n = 164$) and girls ($n = 178$; $\chi^2(1) = 0.57, p = .45$) aged 6 to 8 years, with the number of both boys and girls increasing from Area A to Area B to Area C. We made more observations of boys ($n = 172$) than girls ($n = 124$; $\chi^2(1) = 7.78, p = .005$) aged 9 to 11 years, with girls of this age group showing a strong preference for Area C over both other areas. Boys aged 9 to 11, however, played in areas B and C but avoided Area A. We made more observations of girls ($n = 172$) than boys ($n = 123$; $\chi^2(1) = 8.14, p = .004$) aged 12 to 14, with boys of this age group preferring Area B over the other two areas and girls slightly preferring Area C over Area B.

Area C was the most preferred area overall (59.78 percent of the total instances of play), followed by Area B (33.31 percent). Children of either gender of any age rarely used Area A (6.91 percent). We recorded the same number of play instances of girls ($n = 59$) and boys ($n = 47$) in Area A ($\chi^2(1) = 1.36, p = .24$). However, we made significantly more observations of girls ($n = 535$) than boys ($n = 382$) in Area C ($\chi^2(1) = 25.53, p < .001$), and of boys ($n = 334$) than girls ($n = 177$) in Area B ($\chi^2(1) = 48.24, p < .001$).

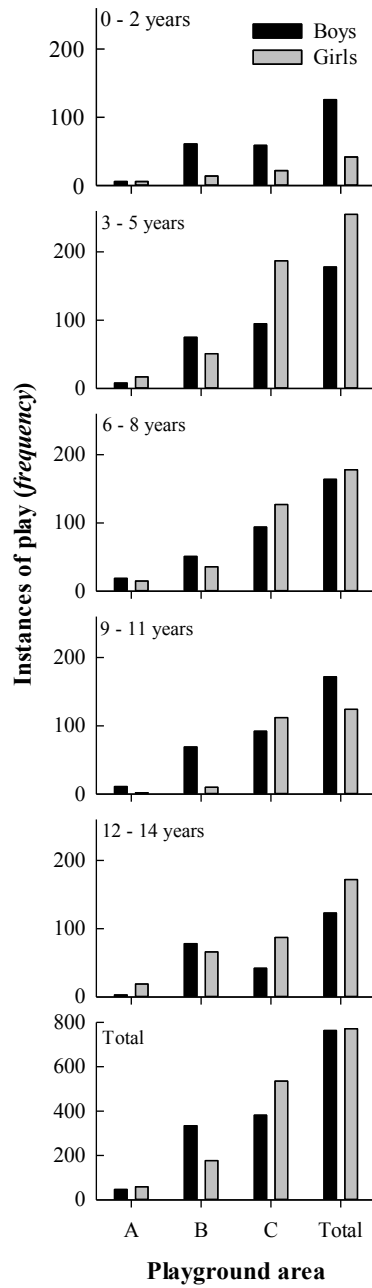


Figure 5. Instances of play by area, age, and gender

Use of Playground by Play Type and Area

We grouped individual play items and spaces into play categories that best described the nature of play afforded by those play items and spaces. Figure 6 shows the ten play categories, in order of popularity, with the percentage of play instances observed for each play category, and a description of the individual items in each play category and their location in the playground (in terms of area). Figure 6 shows that the three most popular activities were swinging (17.60 percent of total instances of play), spinning (17.34 percent), and climbing (16.56 percent). All play items in these three categories were located in Area C, except for two of the climbers, located in Area A, which were infrequently used (72.83 percent of climbing occurred on the Eagle’s nest and 20.08 percent on the other climber in Area C. Only 3.15 and 3.94 percent of the climbing occurred on equipment in Area A). The roundabout in Area C was the only source of spinning available.

Children spent 12.78 percent of their time in recreation activities, including sitting on benches and the stone wall, and walking or sitting on paths, 11.15 percent using the grassed or treed areas, and 10.17 percent playing basketball, riding bikes, or playing with balls on the concrete paths. They spent less time on the seesaw (5.61 percent), slides (3.85 percent), monkey bars or horizontal slide (3.06 percent), or using equipment for balance and coordination (1.89 percent).

Play category	Individual items/spaces	Percentage of overall use (%)
Swinging	Large-basket swing, infant and child swing (C)	17.60
Spinning	Roundabout (C)	17.34
Climbing	Eagle’s nest (C), 3 x smaller climbing frames (C, A, A)	16.56
Recreation	Benches, stone wall, paths for walking and sitting (B)	12.78
Natural	Grass and trees (B)	11.15
Sporting	Basketball court, bikes and balls on paths (B)	10.17
See-saw	Seesaw (C)	5.61
Sliding	2 x small plastic slides (C)	3.85
Hanging	Horizontal slide, monkey bars (A)	3.06
Balance and coordination	Stepping poles, black balancer (A)	1.89

Figure 6. Percentage of overall use of individual items and spaces grouped into play categories (and the area the items are located in), in order of preference

Although children used Area A infrequently, when they did play there, they used the stepping poles most (34.91 percent of the time spent in Area A). Boys and girls used stepping poles with similar frequencies ($\chi^2(1) = 0.19$, $p = .66$), but, of the instances of children using stepping poles, 48 percent involved children sitting on the poles rather than stepping. In Area A, they used the horizontal track ride 23.58 percent of the time and monkey bars 20.75 percent. However, in more than half (51.06 percent) of the instances of play recorded on the horizontal track ride or monkey bars, children sat or stood on the platforms associated with these items rather than using the equipment. They used the two climbers infrequently (see above), and used the black balancer least of all (3.77 percent of the time)—in fact, we never observed boys using this item.

Area B was the second-most popular area (figure 5). Three activities, involving playing with grass and trees (29.75 percent), followed by the basketball court (23.68 percent), and stone walls (18.20 percent), characterized the majority (71.62 percent) of Area B's total use. Children used footpaths for riding bikes and scooters and for playing (6.85 percent of the instances of play in Area B), as well as for walking (5.48 percent). Boys were 2.11 times more likely than girls ($\chi^2(1) = 4.69$, $p = .03$) to use the concrete spaces provided by the basketball court for playing basketball and 2.21 times more likely than girls ($\chi^2(1) = 12.66$, $p < .001$) to use footpaths for sporting-related activities.

Area C was the most popular area and contained all three of the children's most-favored items of play, including the roundabout (29.01 percent of total instances of play in Area C), eagle's nest (20.17 percent), and large-basket swing (19.63 percent). The large-basket swing was more popular than both the infant (3.38 percent of instances of play in Area C) and child (6.43 percent) swings. The seesaw (9.38 percent), slide (6.43 percent), and chain climber (5.56 percent) were not very popular play items in Area C. Of the 382 instances of play by boys and 535 instances by girls in Area C, the roundabout was used equally often by boys ($n = 114$) and girls ($n = 152$; $\chi^2(1) = 0.16$, $p = .69$), as was the eagle's nest ($n = 73$ and 112 ; $\chi^2(1) = 0.37$, $p = .54$). Girls more often used the large-basket swing ($n = 119$) than boys ($n = 61$; $\chi^2(1) = 4.47$, $p = .03$).

Discussion

Swinging, spinning, and climbing typified children's preferred types of playground activity, as Sargisson and McLean also found (2013) in their study of

children's use of fifty-six New Zealand playgrounds. The roundabout (spinning), eagle's nest (climbing), and large-basket swing (swinging) were the most-used individual play items.

The most-popular play items involved height and speed and could reasonably be categorized as risky play options (see categories described in Sandseter 2007). The eagle's nest (figure 4), at four meters high, affords risk taking with height, the large-basket swing with height and speed, and the roundabout affords considerable potential for speed. The preference we found for these play items supports claims that children desire risky play (Little and Eager 2010; Staempfli 2009). Previous researchers have found that girls choose risky play less than boys (e.g. Lasenby-Lessard and Morrongiello 2011; Lasenby-Lessard et al. 2013). For example, Lasenby-Lessard and colleagues found that young girls were less likely to take risks in a task involving walking along a balance beam at different heights than boys. In contrast, we found that girls were just as likely as boys to use risky playground items.

In our study, the children preferred playing most with the roundabout. The fact that parents and park officials perceive roundabouts as risky (Veitch et al. 2006), perhaps due to the speed their spinning encourages, helps explain why New Zealand playgrounds have, according to Sargisson and McLean (2013), reduced their availability. But both in their study—and in our own—children preferred spinning second-most overall as a type of play. Sandseter (2007; 2009) found height and speed were vital components in playground provisions because they offer the risky play children seek. Our results support Sandseter and provide a strong indication that playgrounds should allow greater levels of risk (Little and Eager, 2010; Sandseter 2009; Staempfli 2009). Providing children with ample opportunity to experience the types of risky play they prefer might better attract them to playgrounds and help sustain their use. As others have argued (Plumert 1995; Sandseter and Kennair 2011) offering children the opportunity to take risks enables them to learn important risk-assessment skills and to take responsibility for their own safety (Christensen and Mikkelsen 2008).

Sandseter (2007; 2009) thought both the environment and the individual characteristics of children's play affected the chance children could be injured in play. Insufficient environmental risk may lead children to use play equipment more recklessly than intended (Hart, 2002; Stephenson 2003). Ironically, attempts to decrease this environmental risk (for example, by reducing fall heights and opportunity for speed) may also encourage children to use play equipment in other ways that increase risk. For example, Sargisson and McLean

(2013) observed children riding skateboards down slides, climbing on the outside of tubular slides, and walking across metal bars from which swings were suspended. Some playgrounds have introduced bark surfaces in an attempt to mitigate injuries, but Mott and colleagues (1994) found no difference between the accident rates of children playing on barked surfaces compared to those playing on concrete surfaces, which suggests that children playing in playgrounds that appear safe take greater risks. This supports Lasenby-Lessard and colleagues (2013) in their findings that children are less likely to take risks when they perceive an activity to be dangerous.

During one visit, we observed a group of children using the seesaw as a prop in a game they called Handle (figure 7). The game involved two children standing and pushing their end of the seesaw down while the third child sat on the other end of the seesaw holding his feet up, at which point the two released



Figure 7. Children using the see-saw in a game they called Handle

the seesaw so that the third child landed heavily on the hard black seesaw stoppers. This game demonstrated that children use play equipment in creative ways outside its intended use, proffering anecdotal evidence that children typically take risks during play. As an example of risk taking, the game illustrates that playground design and adherence to current safety standards cannot remove all risk. Removing all risk is not only unobtainable, it is something children do not want (Little and Eager 2010; Staempfli 2009).

We found that the three most popular play items accommodated more than one child per turn or could be operated alone, which meant that the presence—or absence—of other children at the playground did not restrict children from choosing these play items. The sociability of these pieces of equipment may be another part of their popularity. Freeman, Henderson, and Kettle (1999) found that, with the decline in family size in recent years, town planners need to give careful thought to supplying children with more opportunities to socialize with other children outside the home. The “nests” in the eagle’s nest (figure 4) and large-basket swing (figure 3) provide places to sit, lie, or engage in make-believe play.

The eagle’s nest and large-basket swing are also unique items of play for the children in the community we studied. It may be that the children in our study used these items because of their novelty, in preference to other, more familiar playground items on offer. Novel equipment can stimulate interest in a playground, but this interest may not generate regular use (Jansson 2010). Another way to offer novel play equipment is to include natural elements in a playground (Sargisson and McLean 2012). Built play equipment often affords only a limited range of play behavior, but natural elements, such as trees, offer a more diverse array of play opportunities. They also change through the seasons, providing ongoing novelty (Sargisson and McLean 2012). Future research might investigate ways to introduce novelty into playgrounds, including using the kind of natural elements and environments that have additional benefits for children, such as encouraging creativity and exploration (Dyment and Bell 2008; Faber Taylor et al. 1998) or promoting improved cognitive functioning (Wells 2000) and cognitive restoration (Korpela, Kytta, and Hartig 2002).

Our results showed that Area A, which was designed for use by older children, was unpopular among all age groups. In fact, the children who used Area A the most were between six and eight years old. We often observed these children sitting or standing on platforms beside horizontal track ride and monkey bars because they were unable to reach the equipment. We also observed girls

between twelve and fourteen years sitting on the platforms and chatting or texting but not actually using the equipment. Our findings highlight the importance of evidence-based decision making with regards to playground design. Local high school children were consulted in the designing of the playground but not younger children. However, although the reported play preferences of children eight and nine years old have been found to be reasonably consistent with their actual play behavior (Peterson et al. 1973), self-report measures generally have low validity when used with children younger than ten years (Kohl, Fulton, and Caspersen 2000). Evidence suggests that direct observation of playground behavior “is especially useful for studies of young children” (Kohl et al. 2000, S56). Thus, behavioral observation of playgrounds probably provides a better sense of the types of play young children prefer than asking them directly.

Our findings offer insights into gendered outdoor play behaviors. Although the children used Area A infrequently, we found that those children present in this area were attracted to its stepping poles more than its horizontal track ride and its horizontal track ride more than its monkey bars. Of the instances of boys using stepping poles, 44.44 percent sat on the poles as opposed to stepping on them, compared to 21.05 percent of the girls. Due to the closeness of the stepping poles to the basketball court, some boys likely used them to watch basketball games. In contrast, girls were primarily stepping, indicating their attraction to balance and coordination activities. Older girls (twelve to fourteen years) used the platforms of the horizontal track ride and monkey bars in Area A for sitting, chatting, and texting, but boys almost never used these items.

Considerably more boys, across all age ranges, used Area B than girls. Lucas and Dymont (2010) also found that boys showed a strong preference for sporting activities overall and tended to dominate concrete play spaces. Concrete spaces are potentially more risky than impact-attenuating surfaces, perhaps providing support to the finding that boys seek riskier activities than girls (Lasenby-Lessard et al. 2013; Rowe and Maughan 2009).

At our playground (figure 6), as in Sargisson and McLean’s research (2013), sliding was unpopular. Peterson and colleagues (1973), however, found sliding to be one of children’s three most-preferred types of play activities. Sargisson and McLean (2013) suggested that the temperature of slides in summer—and lack of adequate shading—restricted children’s use of slides. However, we conducted our observations during winter months but not on rainy days, so it seems unlikely that environmental restrictions account for the low preference for sliding. Peterson and colleagues’ examination of playground use was conducted forty years

ago, and playground provisions in their study did not include the range of play options available to the children in our study. Children's decreased use of slides may therefore be due to the availability of more interesting and risky play equipment, or the lack of height and speed presented by the slides in our study. The slide in our playground, at a height of 1.50 meters, was considerably lower than other play items available—for example the eagle's nest at four meters high. Our findings, along with Sargisson and McLean's, however, suggest that children no longer choose slides if swinging, spinning, and climbing options are available.

Children's play preferences in our study may have been limited by practical considerations. For example, children may have wanted to use the monkey bars but were unable to reach them unassisted. Likewise, children may have wanted to use the seesaw but were unable to do so without another person to operate this equipment. Little recent research appears to consider whether children's self-reported play preferences translate into actual use. Research that combines behavioral observation with qualitative input from children regarding their play preferences, for example using photo elicitation, may provide further understandings of what influences children's outdoor play choices.

Our research adds to knowledge about risk in playgrounds and contributes to the current understandings of children's play preferences, particularly in New Zealand playgrounds. Our research also questions whether nonserious injuries are something that should be avoided at all costs, or if they are an indispensable part of the appeal and excitement of play for children. By establishing children's play preferences based on actual use of play spaces, we can gain insights useful to playground designers and those concerned with attracting and motivating children to visit playgrounds more regularly and to stay longer. In our study, an area designed specifically for teenagers (twelve to fourteen years old) was rarely used by children of that age group. But we observed younger children, who were unable to use the equipment offered, attempting to play in the teens' space. The items in Area A were selected to cater to children over eleven years because adults assumed that children that age would enjoy the strength-based activities offered there (Williams, personal communication, August 20, 2013). However, as Sargisson and McLean (2013) also found, boys of this age group preferred the sporting activities afforded by Area B, which included the basketball court specifically designed for teenagers (Williams, personal communication, August 20, 2013). Girls over eleven years avoided both Area A and B in preference to Area C.

Incorporating risky outdoor play, particularly those play items that involve height and speed, may attract children to outdoor pursuits and encourage use of

playgrounds. Boys sought sporting opportunities, particularly those involving concrete spaces for play, while girls did not. Girls were just as likely to use the playground items associated with risk as boys, perhaps in part due to the social aspects of these items. Older girls used playground equipment to sit and chat or text, perhaps highlighting a need for research on ways to involve older girls in physical activity in playgrounds.

In conclusion, our findings highlight the need for playground designers to incorporate more risk into playgrounds. Incorporating the play preferences of children in the design of playgrounds may help ensure that children's need for risk, such as experiences of height and speed, are met. Designing playgrounds that are safe but that are not used by children waste public resources. Playground designers can reduce hazards while increasing positive risk-taking experiences (Little and Wyver 2008), which will maximize the benefits of playgrounds in terms of children's development of risk-assessment skills. The provision of playgrounds that afford risk-taking behaviors is one way to ensure that children have an opportunity to develop these skills.

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