

MAKING ROOM FOR RISK IN PLAY ENVIRONMENTS AND PLAYGROUND STANDARDS

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1 ABSTRACT

Over the past few decades, concerns about safety and liability have led to the elimination of features considered to be “risky” from many play environments. In response to this trend, some researchers are using a mix of a priori reasoning and empirical studies to make the case that risk is an integral part of challenging play, and that certain types of risky play are associated with health benefits and learning. New research and criticism of existing standards and research has encouraged the adoption of new regulatory language in the United Kingdom that acknowledges the value of risk in children’s play environments. This paper introduces the current debate over rethinking American play environments and playground standards to allow for beneficial risks. The authors presented on this topic at the Council of Educators in Landscape Architecture conference in March 2016 in an effort to engage academics and researchers in the field of landscape architecture. The paper reviews how concerns about safety and liability have and are influencing play environments in the United States. It critically examines the way that the U.S. Consumer Product Safety Commission collects data on injuries related to play environments and suggests a more holistic approach to collecting and reporting data is needed to inform regulatory and design decisions. Finally, it discusses how landscape architecture academics may contribute to policy debates about risk in play environments, through research and participatory design studios. Some opportunities for future research are discussed.

1.1 Keywords

risky play, playground standards, National Electronic Injury Surveillance System, playscapes

2 INTRODUCTION

Colorful pole and platform playground structures surrounded by safety surfacing became standard on American playgrounds during the 1990s and 2000s. Such equipment offered a greater degree of wheelchair accessibility. It was modular, so it could be adjusted based on the site, the budget, and the clients' wishes. It was also designed to have fewer risks and hazards. However, critics have argued that the removal of risks has been associated with a decline in creative, challenging, and exciting play.

In an online article for *The Washington Post*, the occupational therapist Angela Hanscom (2015) called for "Rethinking the 'ultra-safe' playgrounds" in America today, and bringing back "thrill-provoking" equipment. She recalled time spent on merry-go-rounds, teeter-totters, and taller swings, slides, and climbing structures, and argued that "we are limiting children's exposure to sensory input that actually helps children become sturdy on their feet and prepares them for learning" (Hanscom, 2015).

Similar sentiments can be found in a recent cover story in *The Atlantic*. "In the past generation, the rising preoccupation with children's safety has transformed childhood, stripping it of independence, risk-taking, and discovery," wrote the journalist Hanna Rosin. "What's been gained is unclear...What's been lost is creativity, passion and courage" (Rosin, 2014).

Lenore Skenazy, the founder of the Free-Range Kids movement, has also written extensively on the need for risk-taking on playgrounds. "A playground that gets kids moving and grooving and growing and thinking requires a frisson of adventure," wrote Skenazy for Salon in 2010. "Risk is a part of life. Minimizing it makes sense. Trying to eliminate it means eliminating play, because when kids play, there is always the possibility they could get hurt" (Skenazy, 2010).

These are just a few examples of the growing chorus of professionals, journalists, and children's advocates calling for a new way of thinking about beneficial risks within play environments. Some are looking back nostalgically at historic photos showing the more challenging play equipment of years past, "before the inspectors took over" (Hardman, 2012). Some are citing research that suggests allowing children to take risks on playgrounds is relatively safe and may have benefits for children's physical and mental health (Brussoni et al., 2015; Brussoni et al., 2014). In the United Kingdom and Canada, advocates have pushed for the government to reconsider the way it manages risk on playgrounds so that children's safety is considered more holistically and the benefits associated with risk taking are acknowledged (D.J. Ball, 2012; Brussoni et al., 2014). And they've had some success (D. J. Ball, 2012).

Meanwhile, in the U.S., some designers and playground owners are taking risks of their own on challenging and creative play environments that would have been less likely a decade ago. In Ithaca, NY's, Anarchy Zone, kids are encouraged to cover themselves with mud. The Artists at Play landscape that opened last summer near Seattle's Space Needle has a 35-foot-tall climbing net with tube slides nearly as tall (Bigelow, 2015). And on nearby Mercer Island, the local parks department has opened a new seasonal adventure playground where kids can build their own treehouses with hammers and saws.

Such examples may give one the impression that beneficial risks are becoming accepted, even in the U.S. Yet, in the very same state where kids are being given saws, the Richland School District recently announced plans to remove all swings from their playgrounds. District representative Steve Aagard told a reporter: "It's just really a safety issue... Swings have been determined to be the most unsafe of all the playground equipment" (Associated Press and KEPR-TV Staff, 2014).

This paper seeks to provide an introduction to landscape architects and landscape academics about the current discussion on beneficial risks in play environments. To participate in this debate, it is helpful to understand how playground professionals and researchers are defining risks and hazards. As the authors will explain, risky is not a synonym for dangerous. Certain hazards can be removed from play environments without diminishing their play value. However, using a mix of a priori reasoning and empirical studies, researchers are making the case that risk is an integral part of challenging and creative play, and that certain types of risky play are associated with health benefits and learning. This paper reviews historical and recent trends to show how safety and liability concerns influence play environments

in the United States. It critically examines the way that the U.S. Consumer Product Safety Commission collects data on injuries and suggests that a holistic approach to collecting and reporting data is needed.

Advocates have successfully made the case for more holistic risk management on children's play environments in the United Kingdom—which had experienced a trend of risk removal during recent decades. The authors argue for similar regulatory language at the national level in the U.S. that recognizes the complex and sometimes beneficial nature of risk-taking in children's play. The authors see many opportunities for landscape architecture academics to contribute to this effort through studios and research. Some opportunities and needs for future research are identified.

3 RISKY IS NOT A SYNONYM FOR DANGEROUS

The terms risk and hazard have been defined in numerous ways that can confuse discussions of risky play and its benefits. In common speech, the words risk and hazard often have strongly negative connotations. The first definition of risk provided by Merriam-Webster (2015) is “the possibility that something bad or unpleasant will happen.” Merriam-Webster (2015) defines hazard as “a source of danger,” and suggests it can be used interchangeably with “risk.”

However, in risk management, the two terms have different and distinct meanings. Hazards are “*potential* sources of harm” (Ball, Gill, and Spiegel, 2012, p. 27). Risk may be defined simply as the *probability* someone could be harmed by any potential source of harm. Most every feature in the environment has the potential to facilitate injury. As David Ball, Tim Gill and Bernard Spiegel (2012) have written: “People may trip over steps, slip on floors, walk into doors, or fall from climbing frames” (p. 27). Risk also may be defined as a more subjective measure that combines the probability of an adverse outcome and the seriousness of the harm that may result (Ball, Gill, and Spiegel, 2012).

Among professionals and academics writing on playgrounds, the terms risk and hazard are often used in another very specific way, differentiating between risks and hazards based on whether the child can perceive the chance for injury. In an online article for *Playground Professionals*, Ken Kutska (2013), the Executive Director of the International Playground Safety Institute, wrote that his “current definition of risk” was “a foreseen occurrence that combines the probability of occurrence of harm and the severity of that harm as perceived by the INTENDED USER.” Similarly, in a paper published last spring, Mariana Brussoni and 14 other researchers (2015) use the term “risk” to describe “a situation whereby a child can recognize and evaluate a challenge and decide on a course of action” (p. 6425). They use the term “hazard” to describe potential sources of harm “that children cannot assess for themselves and that have no clear benefit” (Brussoni, et al. 2015, p. 6425).

How playground professionals differentiate between risks and hazards aligns with the way liability for injuries is often decided in U.S. courts. The recently released *National Guidelines for Nature Play and Learning Places*, includes a chapter on risk management written by the lawyer Allen Cooper, who explains that managers have “a duty to remove dangers that are not *open and obvious* to the intended user and that present a risk of injury above what is acceptable to society” (Moore, 2014, p. 118).

4 SOME RISKS CAN BE BENEFICIAL

The way Brussoni et. al (2015) define risk highlights how risk aligns with challenge in play environments. This way of thinking is a starting point for many arguments that risk can be beneficial. It builds on J.J. Gibson's ecological paradigm and his concept of *affordance*. Affordances are “the fit between an animal's capabilities and the environmental supports and opportunities (both good and bad) that make possible a given activity” (Gibson and Pick, 2000, p. 15). Environments contain a range of “behavior settings” that provide different degrees of affordance for certain behaviors; the frequency that such affordances are activated is dependent on factors conceptualized as “antecedent conditions” (Figure 1, left column) and “filters” (Figure 1, middle column) (Gibson, 1977; Michelson, 1977).

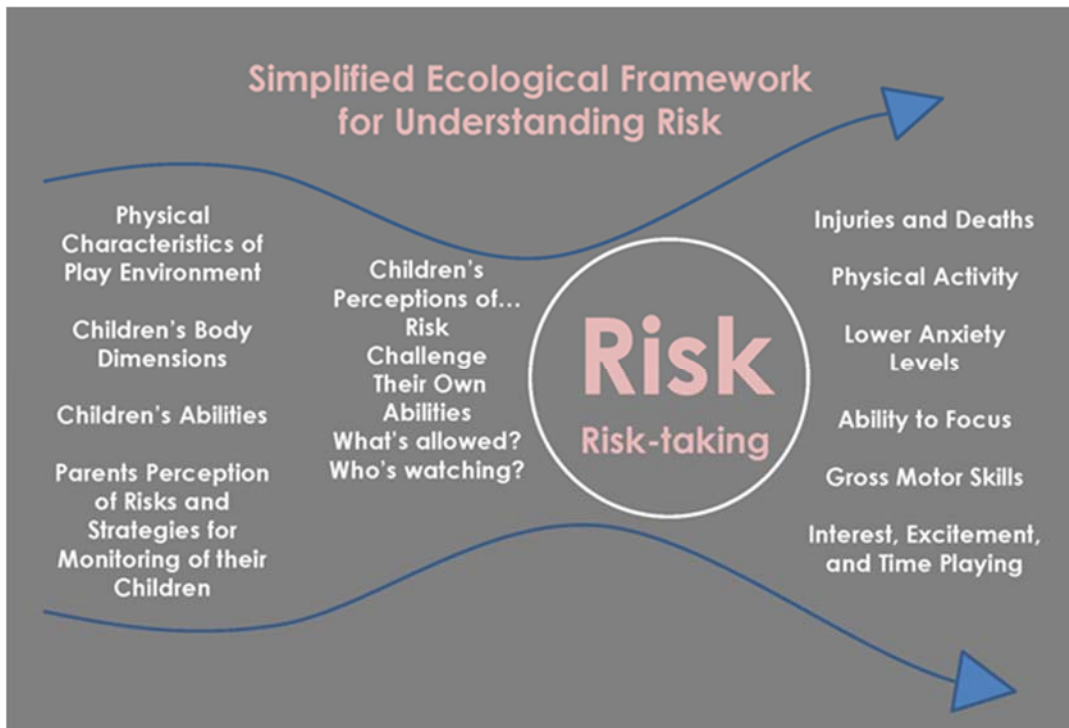


Figure 1. A simplified ecological framework for thinking about how various factors and a child's perception of them may inform whether the child takes a risk and the likelihood that risk-taking results in positive or negative outcomes (2016). Illustration by Daniel Jost.

Using the concept of affordance, one might see how the level of risk posed by any feature on a playground may depend on the child's developmental stage, physical characteristics, and/or skills the child has. Because risk is associated with body size and capability, risk is also associated with the opportunity for challenging play (Hart, 2002). For instance, a five-foot-high horizontal ladder (monkey bars) will not pose the same risk to a child that is three feet high as it would to a child that is five feet high. The moment a child becomes too tall to fall off the monkey bars, they will also lose the opportunity to swing from them with their legs extended.

An ecological theory of development also suggests risk-taking may be associated with learning gross motor skills that may actually reduce the potential of injury children face on the playground or elsewhere. Some studies have demonstrated how risk-taking is associated with learning physical skills. In a study conducted by Janice Butcher (1993), the relationships between playground skill and several variables, including parents' perception of children's risk taking, were examined. Data were collected from the parents of 64 children (24 girls and 40 boys), ages 7 to 9 years old. The study showed playground proficiency was not related to frequency of playground play or to direct parental support. But, notably, parental perceptions of a child's skill and attempts at risk-taking were significantly correlated with playground proficiency. A regression analysis of the measured variables showed that the only significant predictor of playground proficiency was a child's risk-taking attempts (Butcher, 1993). Hart (2002) has argued that in addition to obtaining physical skills, children learn to perceive risks and thus "learn to manage their own safety through appropriate risk-taking" (p. 145).

Risk-taking may also have benefits for children's mental health. The Norwegian scholars Ellen Sandseter and psychologist Leif Kennair (2011), have used the non-associative theory—a contemporary approach to understanding anxiety—to argue that risky play may have anti-phobic effects. They've warned "we may observe an increased neuroticism or psychopathology in society if children are hindered from partaking in age adequate risky play" (Sandseter & Kennair, 2011, p. 257). Sandseter and Kennair

(2011) defined risky play as “thrilling and exciting forms of play that involve a risk of physical injury” (p. 258). Later research in which Sandseter collaborated would add to this definition that “the risk can be real or perceived” (Brussoni et al., 2015, p. 6425). Sandseter (2007) has described six categories of risky play: *great heights, high speed, dangerous tools, dangerous elements, rough and tumble play, and disappear/get lost*.

Mariana Brussoni, a Canadian injury prevention specialist; Sandseter; and 13 other multi-disciplinary colleagues recently completed an extensive metadata literature review to understand what research exists on how Sandseter’s categories of risky play are associated with different health and social outcomes. They found studies related to three of the categories—disappear/get lost, play at height, and rough and tumble play. They write that their “systematic review revealed overall positive effects of risky outdoor play on a variety of health indicators and behaviours, most commonly physical activity, but also social health and behaviours, injuries, and aggression” (Brussoni et al., 2015, p. 6423). Five studies they identified showed that children who can disappear/get lost showed increases in habitual physical activity (Brussoni et al., 2015). And a study by Floyd et al. that mapped children’s behavior in 20 randomly selected parks in Durham, North Carolina showed lower levels of acute physical activity for children who were in the “presence” of a parent or another supervising adult (Floyd et al., 2011, p.258). There were no serious injuries or correlations associated with increased height and falls (Brussoni et al., 2015). Nor were there any signs of aggression reported from observed rough and tumble play (Brussoni et al., 2015).

This article’s authors are cautious about using the term risky play as a variable affecting injury and beneficial health outcomes without discretely defining the different risks at play every time—especially when a study is not directly dealing with outcomes related to conquering fear or learning a skill. It seems unlikely the decreased supervision by parents is acting through the same pathway as it facilitates active play as conquering some risky feature would if it led to the anti-phobic effects. The way these elements are combined by Brussoni et al (2015) in their abstract might be better understood as speaking to the way risk is defined in policy rather than the pathways through which the environment affords specific outcomes. Still, their paper provides a strong introduction to the subject of the benefits that can be associated with certain types of risks and the current state of understanding of those benefits.

5 INJURIES, DEATHS, AND THE CPSC

The case for removing certain risks and hazards on playgrounds has frequently been made using data from the U.S. Consumer Product Safety Commission (CPSC). Since the early 1970s, the public agency has collected data from a sample of the nation’s hospitals on what types of products are associated with injury, using a system called the National Emergency Injury Surveillance System (NEISS). That data is then used to make estimates on the number of injuries that have been associated with different types of products nationally. It is one of the most extensive data sets available on injuries that occur on playgrounds. And it tells us a great deal about how such injuries are occurring. However, using the data to assess the risks afforded by certain types of playground equipment can be highly problematic.

According to a 2001 CPSC report that is still widely cited, over 200,000 children are treated in hospital emergency rooms each year due to injuries associated with playground equipment (Tinsworth & McDonald, 2001). The CPSC estimated that 205,853 playground equipment related injuries were treated in U.S. hospital emergency rooms between November 1998 and October 1999. Just over three quarters of those injuries (75.8%) occurred on equipment designed for public use—that includes 34% that occurred in schools and 24% that occurred in public parks (Tinsworth & McDonald, 2001). The majority of public playground injuries treated in emergency rooms were fractured bones (39%); 22% were lacerations; 20% were contusions or abrasions; 11% were strains or sprains; 3% were concussions; and 2% were internal injuries (Tinsworth & McDonald, 2001). 97% of people seeking care for injuries on playgrounds were treated and released. Only 3% (around 6,200) required hospitalization (Tinsworth & McDonald, 2001).

The main cause of injury, which accounted for “all of the hospitalized injuries,” was falls. 79% of playground injuries on public playground equipment involved falls and 68% of those were falls to the surface below the playground (Tinsworth & McDonald, 2001). Similar data from earlier years was used to make the case for safety surfaces within the area surrounding play equipment (Frost & Klein, 1979), now referred to as the use zone (U.S. CPSC, 2010; ASTM, 2011). These figures suggest that understanding why current surfacing regulations are not preventing injuries and finding an economically feasible solution to the problem could potentially lead playground injuries to be reduced by 2/3, and could lead to the elimination of almost all playground injuries requiring hospitalization.

Unlike the hazard pattern data, the NEISS data on what playground equipment is associated with injuries—especially when it is used alone—is not specific enough to draw any conclusions about what might have led to the accident and where design intervention could be useful. The data categorizes playground equipment into a few broad groups, and shows how many injuries were associated with each category of playground equipment. But it is difficult to establish what sort of “swing” or “slide” led to an injury. For instance, hard metal animal swings, which are not recommended by the CPSC due to their potential for injuries caused by impacts, fall into the same category as a tire swings. This is problematic for those who would want to use the data to explore whether safety features are effective and for those who would like to make the case for revisions to equipment detailing that preserve play value—since the equipment continues to be lumped together with other equipment.

It is also impossible to establish the relationship between any specific play equipment and its surroundings using NEISS data alone. This is highly problematic given that the number one cause of injury is falls. If a child falls off a swing or slide onto the surface below, the swing or slide is associated with injury in the NEISS data. Yet, surfacing will affect whether the child sustains an injury from the fall. NEISS data is not collected in a way that acknowledges injury occurs as a result of a system of interacting variables. “Climbers,” a category that includes monkey bars, were associated with the most injuries in public parks: 53% of all injuries. However, 86% of injuries involving climbers implicated falls (Tinsworth and McDonald, 2001). The surfacing would clearly be playing a major role in this. Tinsworth and McDonald (2001) did collect some information on surfacing not typically found in the NEISS data using phone interviews, but they did not analyze equipment and surfaces together as systems.

Using NEISS data to assess risks is also problematic because the data sets include no information on the prevalence of the equipment or the amount of time children spend playing on it. Assume for a moment that all types of playground equipment had the same risk of injury. If this were the case, the most prevalent and most heavily used equipment would be associated with more injuries. It is possible that the NEISS data could be leading some decision makers to believe that certain types of equipment are more dangerous than others, when they are actually just more common or more beloved. Of course playgrounds with the fewest injuries are the ones that don't get used at all.

A confusing graphic in the 2001 CPSC report may also be creating misunderstanding among local officials. Public playground managers in Richland and elsewhere have argued that swings are the most dangerous of all playground equipment. Yet, on public playgrounds, swings were associated with just 19% of all injuries compared with the 53% of injuries associated with “climbers” (Tinsworth and McDonald, 2001, p. 9). Unfortunately, the graph the CPSC report uses to show the percentage of all playground injuries associated with each type of equipment shows home and public playground injuries together. 60% of injuries on home playgrounds involved swings (Tinsworth & McDonald, 2001). So, a quick look at the graph (Figure 2) gives the impression that swings are the most dangerous of all playground equipment—they have the highest bar on the graph. This may be responsible for some local officials misunderstanding of the data. Notably, one reason the two are not comparable is that only 9% of the homes studied had a protective surface installed in the use zone. In contrast, 80% of public playgrounds had a protective falling surface at that time (Tinsworth and McDonald, 2001).

In addition to looking at injuries, Tinsworth and McDonald (2001) also analyzed 147 deaths that had occurred on American playgrounds between January 1990 and August 2000. Only 38 of those cases

occurred on public playgrounds (Tinsworth and McDonald, 2001). Some researchers have used the small number of deaths reported by the CPSC study to try to quell concerns that playgrounds are particularly dangerous. One writer compares the 4 deaths per year known to occur on public playgrounds to other causes of death—the estimated 37 children killed per year waiting on school buses, the 20 sports-related deaths and 44 school homicides in the U.S. annually (Moore, 2006). However, the CPSC study was not a complete count of deaths on playgrounds in the U.S. during the period examined, nor was it a representative sample “[D]eaths due to falls are underreported in the Commission’s data,” according to Tinsworth and McDonald (2001, p. 21). They only collected death certificates related to falls for one or two states in all but one of the ten years studied. Efforts to obtain a more complete picture of playground deaths would be beneficial to those looking to manage the risks and hazards that lead to them, as no complete data on playground deaths appears to exist for the United States currently.

6 U.S. LEGAL ENVIRONMENT AND LIABILITY CONCERNS

Concerns about playground safety are closely linked with concerns about liability. Both have long informed playground design and management in the U.S. A book chapter by Arthur Leland from 1908 stressed playground equipment must be durable to avoid liability due to “accidents occurring from breakage” (Mero, 1908 p. 86). The attractive nuisance doctrine, which continues to be cited to this day, dates to a U.S. Supreme Court decision from 1873. It requires property owners to use “reasonable care” to protect children from dangerous constructions or agencies on their property that may attract them—even when the children are trespassing (United Zinc v. Britt, 1922).

Two major changes apparently affected liability on public playgrounds during the latter half of the 20th century. Greater latitude to sue local governments in some parts of the U.S. and the adoption of national design standards changed the legal environment, making it easier for citizens to pursue torts against manufacturers and certain municipalities for injuries on playgrounds (Mikus, 2014). Through the mid-1960s, American tort law usually protected municipalities from civil lawsuits under sovereign immunity—as long as the municipality could show it had used reasonable care. During the 1960s, the federal courts began removing sovereign immunity protections in certain circumstances, raising the likelihood that lawsuits would be allowed to proceed (Sisk, 2008).

Some states and municipalities have successfully taken action to limit liability claims related to recreation by adopting recreational use statutes. The recreational use statute in the state of Washington, RCW 4.24.210 reads, in part: “[A]ny public or private landowners or others in lawful possession and control of any lands ... who allow members of the public to use them for the purposes of outdoor recreation ... without charging a fee of any kind...shall not be liable for unintentional injuries to such users (Kozlowski, 2012, WA State Legislature). In a recent test of the statute, *Swinehart v. City of Spokane* (2008), the court found in favor of the city, based on the presence of the recreational use statute and the court’s determination that the condition that led to the plaintiff’s injury “was patent, or obvious” (Kozlowski, 2012). This may provide insight into why some experiments in risky play have occurred in Washington state.

The CPSC’s creation in 1972 was another major turning point in the way playground liability was considered. It led to the first system for generating national data on the playground equipment associated with injuries, which informed the CPSC’s *Handbook for Public Playground Safety* in 1981 (Barton, 2006). The first ASTM standards for playground surfaces would follow in 1991 and ASTM standards for playground equipment would follow in 1993 (CPSC, 2010). Both regulate children’s play structures using limited age categories that lump ages 2 to 5 and 5 to 12 together (CPSC, 2010; ASTM, 2011). In effect, this means that all playground equipment must be designed to be safe for a 5-year-old.

In the years since, some states have passed laws requiring playgrounds to meet one or both of these standards (Moore and Cooper, 2014). And even in states where they are not written into the law, they may be used to define the *standard of care* that a playground owner or designer is held to in civil court cases (Frost and Sweeney, 1995; Moore and Cooper, 2014).

Even if a local community felt that they could tolerate the risk of injury for a giant-stride, a Tarzan-like rope swing, or a trampoline on a public playground, it would face a major hurdle to erecting this equipment. These are just a few of the equipment types categorically prohibited in children's playgrounds under either the ASTM standards, the CPSC guidelines, or both (CPSC, 2010; ASTM, 2011). Even if designers could come up with design solutions that addressed the hazards created by these pieces of equipment (and some have tried), playground owners would be reluctant to install them and playground manufacturers would be reluctant to sell them in the U.S., since the way they are discussed in the standards could potentially increase the liability the owners and manufacturers would face in the event of a single injury. That is likely why American playground owners have not copied Europe's efforts to install public trampolines that minimize the major causes of injury in home trampolines by placing their beds at ground level, surrounding them with safety surfacing, and minimizing their size to discourage multiple users at once (Jost and Rottle, 2014).

The CPSC also has the authority to issue national recalls on play equipment following injuries. The first such recall occurred in 1983 and involved a metal playset designed for toddlers by Pixieland that posed an entrapment hazard to small children that would have had no play value (U.S. CPSC, 1983). A second recall from 1985 also focused on a hazard, and also shows how CPSC intervention may lead to safer play equipment. After a girl was killed due to the failure of a weld on a tire swing by Miracle Recreation failing, the company was pressured by the CPSC to voluntarily repair all the other swings of that type (U.S. CPSC, 1985). However, the recall of the slalom glider in 2012 was not the result of an imperceptible hazard but rather a risk inherent in using the equipment that also enhanced its play value and level of challenge. The feature, which was like a slide but less passive, was recalled after it was associated with 15 injuries--all to children under the age of 8 (Kutska, 2012). Most were broken arms from a fall to the safety surface below. This led Kutska to raise questions about how standards categorize equipment, and how the CPSC considers the larger systems leading to injury and the level of injury seriousness when recalling play equipment (Kutska, 2012).

While liability was a powerful force for improving product safety in some cases, whether consumers have always ended up with safer playgrounds as a result of CPSC's regulation may be questioned. A recent incident in Cabell County, West Virginia illustrates how the CPSC guidelines, playground owners' concerns about liability, and the cost of new equipment may work together to lead to the removal of play features. The board of education had a lawsuit after a child was injured on a swing. The school district there was sued twice in one year over injuries that occurred on swings, leading to a \$20,000 out-of-court settlement in one case. Wary of future settlements, it examined all its swing sets and found most did not have use zones compliant with the standards (Chambers, 2010). Faced with extensive costs to bring the equipment to meet standards, and fearing additional lawsuits, the district began removing swings from all its schools in the summer of 2010 with no plans to replace them (Chambers, 2010). Though, thanks to community outcry, there was some funding secured for updating some of these playgrounds the following year.

At least some decisions to remove risks are being made without any prodding from national standards. Neither ASTM nor CPSC prohibit swings teeter-totters, or merry-go-rounds (ASTM, 2011; CPSC 2010). The widespread decision to remove them has been made at the local level—sometimes with a poor understanding of the injury data. In 2005, the South Florida Sun-Sentinel reporter Chris Kahn wrote about plans to remove these items from Broward County, Florida's schools in an article that was picked up in many other newspapers. "They've got moving parts," said the school's Safety Director, Jerry Graziose (Kahn, 2005). "Moving parts on equipment is the No. 1 cause of injury on the playgrounds." Yet, the 2001 CPSC report stated that only 3% of all playground injuries involved impacts with moving equipment, 8% involved impacts with stationary equipment, and of course, falls were the leading cause of injury (Tinsworth and McDonald, 2001, p.29).

Another troublesome trend in recent decades has been the school districts that have chosen to remove recess from the school day entirely. For instance, Chicago did not have recess at most of its

public schools between 1991 and 2011. While concerns about academic achievement clearly played a role in many school districts' decisions, another of the reasons for this trend that educators gave to the New York Times in 1998 was "a fear of lawsuits if children become injured" (Johnson, 1998).

The difference in the liability situations faced by different playground providers makes it hard to determine how often features were removed because of real liability concerns and how often they were removed out of fear. In Denver's Public Schools (DPS), there was only one lawsuit that resulted from the entity's negligence between 1994 and 2004 (Yost, 2005). Yet, despite the low number of injuries and lawsuits, DPS also removed teeter-totters and merry-go-rounds during the mid-2000s without replacing them with modern versions of the same equipment.

As the federal government has been increasing the potential for liability associated with providing playgrounds in recent decades, it has provided few incentives to provide beneficial risks or playgrounds at all. Notably, the CPSC was not charged with regulating play equipment to provide the best possible play experiences with the fewest injuries. It was created solely to reduce injuries (Mikus, 2014).

7 TOWARDS MORE HOLISTIC RISK MANAGEMENT IN THE UK

This is not all that different than the situation in the United Kingdom, where playgrounds were regulated by the Health and Safety Executive. Like the U.S., the U.K. had seen risky play diminish in recent decades. The situation was well documented by Tim Gill (2007) in his book *No Fear: Growing up in a Risk adverse society*. But in recent years, Gill and a variety of other professionals in the U.K., including many involved in the injury prevention realm, have been making the case for more holistic risk management on playgrounds with some success.

Some roots of the turnaround in the U.K. can be found in a report authored by Karen King and David Ball in 1989, titled *A holistic approach to accident and injury prevention on children's playgrounds*. This report raised questions about the effectiveness of safety surfacing on playgrounds as a strategy for protecting children from accidents (Ball, 2012). A major step toward change came in 2002, when Ball was contracted by the country's Health and Safety Executive to examine the statistics related to playground accidents and at the same time was hired by the Play Safety Forum to help develop a position statement on managing risk in play areas (Ball, 2012).

The Play Safety Forum's 2002 position paper on risk in play environments contrasted significantly with the approach common at the time. "[P]lay provision should aim to 'manage the balance between the need to offer risk and the need to keep children safe from harm,'" it said. "While the same principles of safety management can be applied both to workplaces generally and play provision, the balance between safety and benefits is likely to be different in the two environments. In play provision, exposure to some risk is actually a benefit: it satisfies a basic human need and gives children the chance to learn about the real consequences of risk-taking." (Play Safety Forum, 2002, p. 2).

Play England oversaw the creation of a more specific "implementation guide" for managing risk in 2008. And in 2012, a policy statement was released on the national level by the Health Safety Executive, an agency that like the CPSC had previously been charged only with keeping people safe. It clarified play providers' duty was to strike a balance between injury reduction and play "focusing on controlling the most serious risks and those that are not beneficial to the play activity or foreseeable by the user" (Health Safety Executive, 2012).

The policy changes in England have inspired people to work for similar changes in Canada and the United States. In 2013, a symposium on healthy risk promotion was held the day before the Canadian Injury Prevention and Safety Promotion Conference (Brussoni et al, 2014). In the U.S., Ball, Gill, and Spiegel's work served as an inspiration to Allen Cooper's chapter on risk management in the new national guidelines for Nature Play and Learning Places (Moore and Cooper, 2014). There is also discussion underway amongst some of the members of the ASTM committee and the CPSC to move away from the equipment-based playground standard and toward a standard that is performance based, which could potentially lead to removal of some of the categorical bans on equipment.

8 POLICY RECOMMENDATION

In the United States, the CPSC should consider following the HSE's lead and acknowledge in writing that there are often benefits associated with risk in children's play environments (Mikus, 2014). While CPSC does not have the charge of looking at health in a holistic way as the HSE does, a statement acknowledging that play equipment is different than other sorts of products it regulates and that in play some risk is beneficial would not be outside the CPSC's charge. According to its website, the U.S. Consumer Product Safety Commission is charged with "protecting the public from *unreasonable* risks of injury or death" (CPSC, 2016, emphasis ours). Risks that typically result in health benefits or learning and only rarely result in injury might be considered reasonable risks.

Including such a statement in the CPSC guidelines would likely change how liability is assigned in certain situations where benefits are clear and injury is rare. It could have the added benefit of quelling some unjustified worries about liability on the part of playground owners--particularly public owners in states without recreational use statutes and private owners. However, making changes at the national level alone would not be enough to ensure that beneficial risks are included in American play environments. As the authors have shown, decisions about risk are currently being made at many different levels. Systematic change would likely require a more extensive educational campaign for owners and designers and changes to state and local laws and standards.

9 THOUGHTS ON FUTURE ADVOCACY AND EDUCATION

Landscape architecture academics educating themselves about the debate on risk-taking in play environments could be in a good position to pass on their understanding to local stakeholders about this issue through community design projects (Brink & Yost, 2004). For example, in 1998, Lois Brink, a licensed landscape architect and a University of Colorado faculty member, began working with the Denver Public School District (DPS). At first, resistance to anything not manufactured or regulated by the CPSC was the norm. After much persuasion, Stephen Finley, Risk Management Supervisor for DPS, agreed to allow boulders to be "tested" on the Garden Place Elementary School (Yost, 2005). Surprisingly, there were no injuries nor accidents associated with these "risky" play elements (Yost, 2005); and today virtually all of the DPS "Learning Landscapes" have boulders (Brink, 2013).

Landscape architecture academics may also facilitate interactions at higher levels of government to clarify policies and push for change. For example, Robin Moore and Nilda Cosco, landscape architecture faculty members, and founders of the Natural Learning Initiative (NLI) at North Carolina State University, have brought together childcare providers and state regulators over a number of years to discuss concerns about what is allowed in North Carolina's outdoor play and learning environments. This has alleviated concerns and increased understanding among childcare regulators and providers about the potential benefits of outdoor environments, leading to new interpretations of regulations at the state level. A panel from NLI's 2010 conference titled: "Myth Busters: A Panel on the Interpretation of Childcare Regulations and the Outdoors" provides an example of positive effects of creating a discourse. See: <https://mediasite.online.ncsu.edu/online/Play/dde8e5e16e2342c5ab9985e7da308ea71d>.

An area of much discussion, addressed briefly during that panel, was whether childcare centers could grow tomatoes. Tomatoes were on a list of poisonous plants that excluded their use within the licensed outdoor areas of childcare centers. Although tomato leaves and stems do have low levels of toxicity, the amount that would need to be consumed for a detrimental effect would be unrealistically high, and the Carolina Poison Center had no recorded instances of ill effects caused by tomato leaves alone in its 13 years of data (NC Cooperative Extension, 2010; Natural Learning Initiative, n.d.). A child, who had eaten 5 or 6 leaves had "no ill effects" (NC Cooperative Extension, 2010). After researching the issue, the NC Division of Child Development and Early Education published a statement that growing tomatoes in licensed childcare facilities was allowed in areas that served children 3 years and older, since these children were beyond the stage where children explore their environments with their mouths (Natural Learning Initiative, n.d.).

10 SUGGESTIONS FOR NEW RESEARCH

Landscape architecture academics of various stripes--from environmental psychologists to historians--may also contribute new research that could help to inform new standards on risk in children's play environments. Based on a review of the literature more extensive than can be noted here due to space limitations, a few suggestions for future research might be offered.

10.1 Need for Better Record Keeping and Statistical Analysis

As Yost noted in 2005, "administrators, designers, users, and policy makers continue to follow recommendations based more on fear of litigation and raising insurance rates than on accurate statistical analysis" (p. 69). The authors reiterate her argument for better recordkeeping and reporting on playground injuries, so that challenging equipment is not removed based solely on fears and anecdotes.

10.2 Need for Less Abstract Categories in Research

Research on injuries must not use categories of play equipment that are too abstract to offer useful information on how the equipment is affording injury. Not all trampolines, for instance, are created equal (Jost and Rottle, 2014). Researchers need to be aware that when they ascribe injuries to equipment abstractly, rather than considering the root causes, this can lead to abstract language in standards that may limit opportunities for designers to come up with solutions to the actual causes of injury. New research might seek to track injuries on play features using more specific categories.

10.3 Need for More Ecological or Systems Thinking in Playground Research

Very little research has evaluated play features in concert with the surrounding surfaces and the child's perception of risk related to falling on those surfaces. An ecological or systems based perspective is needed when evaluating whether injuries were caused by play features or are just associated with them. Ecological models may consider the physical environment as well as other social, cultural, political, economic, historical, and mental factors related to children's interactions at different scales. Considering children's age is especially important in any research related to injuries in play environments.

10.4 Need for New Research on Equipment that is Categorically Banned

Researchers may consider a number of the abstract categories that the CPSC has forbidden on public playgrounds categorically without offering designers a chance to intervene with design solutions—the giant stride, the trampoline, multi-person swings (other than tire swings), and ropes that are not tied down at both ends. In each of these cases, previous researchers associated abstract categories of equipment with injuries, rather than considering the direct cause of injury and how it might be designed out. More research into how equipment designed to remove risks, such as in-ground public trampolines, performs in other countries or in other environments where they are allowed might be used to assess whether existing regulations are sensible.

Historical research looking at the history of equipment design and regulation could also be instructive. For example, Jost (unpublished) has found prominent early safety guidelines for detailing playgrounds by the designer Arthur Leland recommended that giant strides "must have very hard surfaces under them or in a few weeks great holes will be worn in the ground." (Mero, 1908, p. 82). At the same time, Leland was recommending soft sand in the areas beneath jungle gyms to provide a cushion for falls (Mero, 1908). If playground owners were following his advice, that might help to explain why the giant stride went from being considered one of the safest pieces of playground equipment at the beginning of the 20th century to the piece of equipment associated with the most injuries in a 1950s study--those who fell from it may have been more likely to fall onto a hard surface (Mero, 1908; Hase, 1958).

10.5 Need for Definition and Evaluation of Injury Seriousness

When trying to understand the injuries associated with certain types of equipment, some effort should be made to understand how serious they are, and if there were dangerous affordances that are specifically associated with serious injuries. While few would argue a skull fracture was less serious than a scratch, determining the seriousness of injuries does involve a degree of subjectivity. Work with stakeholders to come to agreement on what constitutes a serious injury on a playground would be useful. Is a serious injury defined by the treatment required (e.g. hospital visit, hospitalization) or is it defined by its persistent effects? Is a broken arm the sort of serious injury designers should strive to eliminate at all costs or is it something worth risking to sustain wider benefits?

10.6 More study of benefits associated with specific risky play features:

More research is needed to see if providing certain types of risky play correlates with reductions in obesity, ADHD, clumsiness, illegal drug use, aggression, tagging, depression, and anxiety. More environment-behavior research on the benefits of risky play and risk-taking related to children and youth's physical, mental, social, and emotional development and well-being are also needed.

10.7 Need for Transdisciplinary Partnerships and Cross-Jurisdictional Data Sets

Researchers from a diverse range of disciplines are needed to address the many factors and variables. Landscape architecture academics may have familiarity with materials, construction detailing, measuring park use, and visualizing/observing how the human body moves through space. Medical researchers, on the other hand, tend to have greater knowledge of the human anatomy and injury's effects. Many studies on playground injury have been conducted with only one of these groups, often medical professionals. Waltzman et al (1999)'s study in *Pediatrics* titled "Monkeybar Injuries: Complications of Play" is an example of a study conducted solely by medical professionals that might have benefited from having collaborators knowledgeable about landscape detailing and maintenance. It found "the surface below the [playground] equipment has no influence on the type or severity of the injury" (Waltzman et al, 1999, p. 1). However, the researchers simply divided up surfaces into categories based on material: sand, woodchips, dirt, and grass (Waltzman et al, 1999) without considering that different types or depths of materials may cushion falls differently. A team with a designer would be less likely to make this mistake.

Transdisciplinary partnerships may also lead to cross-jurisdictional data sets on playground injury that combine detailed information on both injuries and the playgrounds that afforded them. Working with incident reports from schools, parks or childcare centers can be limiting because these reports do not always provide much detail on the type or severity of injury. For instance, Branson et al.'s 2012 study in *Pediatrics and Child Health*, based on school incident reports, built of of a fairly strong understanding of the physical environment (and how seasonal differences might affect it). But its information on injury is weak. It combines together minor head injuries with concussions; and fractures with dislocations and pulled muscles (Branson et al, 2012). This is likely because the injury is not fully diagnosed at the time the student leaves for a hospital. Injury severity, as discussed in the study, is based on whether or not an ambulance was called (Branson et al, 2012), which is a largely subjective measure.

Meanwhile, Waltzman et al's 1999 study, which exclusively used data collected at a hospital, had strong information on injuries and treatment required. But it lacked detailed information on the equipment-surface systems and the prevalence of these equipment-surface systems that might have been used to identify what had truly caused these injuries and how often certain systems led to injury. There would seem to be a possibility for school systems, park systems, and hospitals from the same region to work together to create new data collection systems that would address these issues. Data on other factors, such as usage, may be collected on an as needed basis through behavior mapping when there is concern about certain pieces of equipment.

11 CONCLUSION

This paper provides landscape architecture academics a brief introduction to the current debate over beneficial risks in children's play environments. We've noted that by definition, risk is associated with the potential for injury; however it is also associated with many benefits including physical and mental health benefits and improvements to gross motor skills. So, any agency that regulates it and any study that seeks to inform such regulations will need to take this into account. Even if federal regulators acknowledge that risk may be beneficial as we suggest, much more research will need to be done on specific play features, the associated risks, and the potential benefits. The authors see many opportunities for landscape architecture academics to contribute. Through partnerships with professionals more knowledgeable about injury, regulators, and community members, it will be possible to conduct more detailed research, and facilitate discussions about what risks are acceptable that incorporate research.

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2 INTRODUCTION

Colorful pole and platform playground structures surrounded by safety surfacing became standard on American playgrounds during the 1990s and 2000s. Such equipment offered a greater degree of wheelchair accessibility. It was modular, so it could be adjusted based on the site, the budget, and the clients' wishes. It was also designed to have fewer risks and hazards. However, critics have argued that the removal of risks has been associated with a decline in creative, challenging, and exciting play.

In an online article for *The Washington Post*, the occupational therapist Angela Hanscom (2015) called for "Rethinking the 'ultra-safe' playgrounds" in America today, and bringing back "thrill-provoking" equipment. She recalled time spent on merry-go-rounds, teeter-totters, and taller swings, slides, and climbing structures, and argued that "we are limiting children's exposure to sensory input that actually helps children become sturdy on their feet and prepares them for learning" (Hanscom, 2015).

Similar sentiments can be found in a recent cover story in *The Atlantic*. "In the past generation, the rising preoccupation with children's safety has transformed childhood, stripping it of independence, risk-taking, and discovery," wrote the journalist Hanna Rosin. "What's been gained is unclear...What's been lost is creativity, passion and courage" (Rosin, 2014).

Lenore Skenazy, the founder of the Free-Range Kids movement, has also written extensively on the need for risk-taking on playgrounds. "A playground that gets kids moving and grooving and growing and thinking requires a frisson of adventure," wrote Skenazy for Salon in 2010. "Risk is a part of life. Minimizing it makes sense. Trying to eliminate it means eliminating play, because when kids play, there is always the possibility they could get hurt" (Skenazy, 2010).

These are just a few examples of the growing chorus of professionals, journalists, and children's advocates calling for a new way of thinking about beneficial risks within play environments. Some are looking back nostalgically at historic photos showing the more challenging play equipment of years past, "before the inspectors took over" (Hardman, 2012). Some are citing research that suggests allowing children to take risks on playgrounds is relatively safe and may have benefits for children's physical and mental health (Brussoni et al., 2015; Brussoni et al., 2014). In the United Kingdom and Canada, advocates have pushed for the government to reconsider the way it manages risk on playgrounds so that children's safety is considered more holistically and the benefits associated with risk taking are acknowledged (D.J. Ball, 2012; Brussoni et al., 2014). And they've had some success (D. J. Ball, 2012).

Meanwhile, in the U.S., some designers and playground owners are taking risks of their own on challenging and creative play environments that would have been less likely a decade ago. In Ithaca, NY's, Anarchy Zone, kids are encouraged to cover themselves with mud. The Artists at Play landscape that opened last summer near Seattle's Space Needle has a 35-foot-tall climbing net with tube slides nearly as tall (Bigelow, 2015). And on nearby Mercer Island, the local parks department has opened a new seasonal adventure playground where kids can build their own treehouses with hammers and saws.

Such examples may give one the impression that beneficial risks are becoming accepted, even in the U.S. Yet, in the very same state where kids are being given saws, the Richland School District recently announced plans to remove all swings from their playgrounds. District representative Steve Aagard told a reporter: "It's just really a safety issue... Swings have been determined to be the most unsafe of all the playground equipment" (Associated Press and KEPR-TV Staff, 2014).

This paper seeks to provide an introduction to landscape architects and landscape academics about the current discussion on beneficial risks in play environments. To participate in this debate, it is helpful to understand how playground professionals and researchers are defining risks and hazards. As the authors will explain, risky is not a synonym for dangerous. Certain hazards can be removed from play environments without diminishing their play value. However, using a mix of a priori reasoning and empirical studies, researchers are making the case that risk is an integral part of challenging and creative play, and that certain types of risky play are associated with health benefits and learning. This paper reviews historical and recent trends to show how safety and liability concerns influence play environments

in the United States. It critically examines the way that the U.S. Consumer Product Safety Commission collects data on injuries and suggests that a holistic approach to collecting and reporting data is needed.

Advocates have successfully made the case for more holistic risk management on children's play environments in the United Kingdom—which had experienced a trend of risk removal during recent decades. The authors argue for similar regulatory language at the national level in the U.S. that recognizes the complex and sometimes beneficial nature of risk-taking in children's play. The authors see many opportunities for landscape architecture academics to contribute to this effort through studios and research. Some opportunities and needs for future research are identified.

3 RISKY IS NOT A SYNONYM FOR DANGEROUS

The terms risk and hazard have been defined in numerous ways that can confuse discussions of risky play and its benefits. In common speech, the words risk and hazard often have strongly negative connotations. The first definition of risk provided by Merriam-Webster (2015) is “the possibility that something bad or unpleasant will happen.” Merriam-Webster (2015) defines hazard as “a source of danger,” and suggests it can be used interchangeably with “risk.”

However, in risk management, the two terms have different and distinct meanings. Hazards are “*potential* sources of harm” (Ball, Gill, and Spiegel, 2012, p. 27). Risk may be defined simply as the *probability* someone could be harmed by any potential source of harm. Most every feature in the environment has the potential to facilitate injury. As David Ball, Tim Gill and Bernard Spiegel (2012) have written: “People may trip over steps, slip on floors, walk into doors, or fall from climbing frames” (p. 27). Risk also may be defined as a more subjective measure that combines the probability of an adverse outcome and the seriousness of the harm that may result (Ball, Gill, and Spiegel, 2012).

Among professionals and academics writing on playgrounds, the terms risk and hazard are often used in another very specific way, differentiating between risks and hazards based on whether the child can perceive the chance for injury. In an online article for *Playground Professionals*, Ken Kutska (2013), the Executive Director of the International Playground Safety Institute, wrote that his “current definition of risk” was “a foreseen occurrence that combines the probability of occurrence of harm and the severity of that harm as perceived by the INTENDED USER.” Similarly, in a paper published last spring, Mariana Brussoni and 14 other researchers (2015) use the term “risk” to describe “a situation whereby a child can recognize and evaluate a challenge and decide on a course of action” (p. 6425). They use the term “hazard” to describe potential sources of harm “that children cannot assess for themselves and that have no clear benefit” (Brussoni, et al. 2015, p. 6425).

How playground professionals differentiate between risks and hazards aligns with the way liability for injuries is often decided in U.S. courts. The recently released *National Guidelines for Nature Play and Learning Places*, includes a chapter on risk management written by the lawyer Allen Cooper, who explains that managers have “a duty to remove dangers that are not *open and obvious* to the intended user and that present a risk of injury above what is acceptable to society” (Moore, 2014, p. 118).

4 SOME RISKS CAN BE BENEFICIAL

The way Brussoni et. al (2015) define risk highlights how risk aligns with challenge in play environments. This way of thinking is a starting point for many arguments that risk can be beneficial. It builds on J.J. Gibson's ecological paradigm and his concept of *affordance*. Affordances are “the fit between an animal's capabilities and the environmental supports and opportunities (both good and bad) that make possible a given activity” (Gibson and Pick, 2000, p. 15). Environments contain a range of “behavior settings” that provide different degrees of affordance for certain behaviors; the frequency that such affordances are activated is dependent on factors conceptualized as “antecedent conditions” (Figure 1, left column) and “filters” (Figure 1, middle column) (Gibson, 1977; Michelson, 1977).

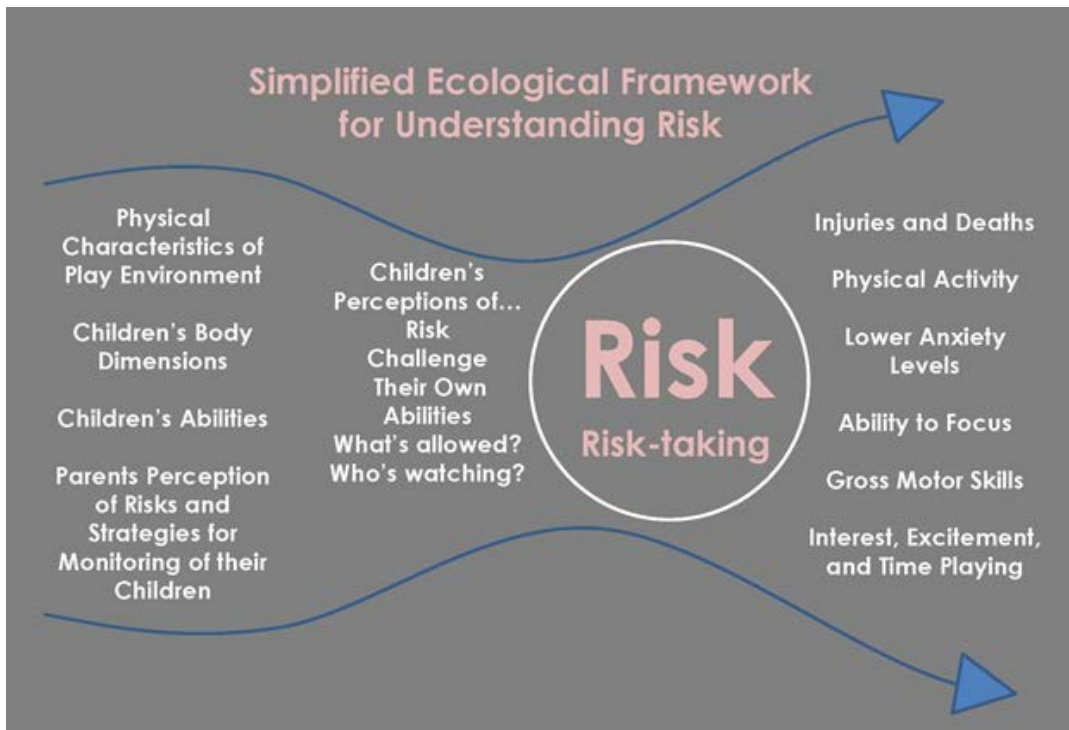


Figure 1. A simplified ecological framework for thinking about how various factors and a child's perception of them may inform whether the child takes a risk and the likelihood that risk-taking results in positive or negative outcomes (2016). Illustration by Daniel Jost.

Using the concept of affordance, one might see how the level of risk posed by any feature on a playground may depend on the child's developmental stage, physical characteristics, and/or skills the child has. Because risk is associated with body size and capability, risk is also associated with the opportunity for challenging play (Hart, 2002). For instance, a five-foot-high horizontal ladder (monkey bars) will not pose the same risk to a child that is three feet high as it would to a child that is five feet high. The moment a child becomes too tall to fall off the monkey bars, they will also lose the opportunity to swing from them with their legs extended.

An ecological theory of development also suggests risk-taking may be associated with learning gross motor skills that may actually reduce the potential of injury children face on the playground or elsewhere. Some studies have demonstrated how risk-taking is associated with learning physical skills. In a study conducted by Janice Butcher (1993), the relationships between playground skill and several variables, including parents' perception of children's risk taking, were examined. Data were collected from the parents of 64 children (24 girls and 40 boys), ages 7 to 9 years old. The study showed playground proficiency was not related to frequency of playground play or to direct parental support. But, notably, parental perceptions of a child's skill and attempts at risk-taking were significantly correlated with playground proficiency. A regression analysis of the measured variables showed that the only significant predictor of playground proficiency was a child's risk-taking attempts (Butcher, 1993). Hart (2002) has argued that in addition to obtaining physical skills, children learn to perceive risks and thus "learn to manage their own safety through appropriate risk-taking" (p. 145).

Risk-taking may also have benefits for children's mental health. The Norwegian scholars Ellen Sandseter and psychologist Leif Kennair (2011), have used the non-associative theory—a contemporary approach to understanding anxiety—to argue that risky play may have anti-phobic effects. They've warned "we may observe an increased neuroticism or psychopathology in society if children are hindered from partaking in age adequate risky play" (Sandseter & Kennair, 2011, p. 257). Sandseter and Kennair

(2011) defined risky play as “thrilling and exciting forms of play that involve a risk of physical injury” (p. 258). Later research in which Sandseter collaborated would add to this definition that “the risk can be real or perceived” (Brussoni et al., 2015, p. 6425). Sandseter (2007) has described six categories of risky play: *great heights, high speed, dangerous tools, dangerous elements, rough and tumble play, and disappear/get lost*.

Mariana Brussoni, a Canadian injury prevention specialist; Sandseter; and 13 other multi-disciplinary colleagues recently completed an extensive metadata literature review to understand what research exists on how Sandseter’s categories of risky play are associated with different health and social outcomes. They found studies related to three of the categories—disappear/get lost, play at height, and rough and tumble play. They write that their “systematic review revealed overall positive effects of risky outdoor play on a variety of health indicators and behaviours, most commonly physical activity, but also social health and behaviours, injuries, and aggression” (Brussoni et al., 2015, p. 6423). Five studies they identified showed that children who can disappear/get lost showed increases in habitual physical activity (Brussoni et al., 2015). And a study by Floyd et al. that mapped children’s behavior in 20 randomly selected parks in Durham, North Carolina showed lower levels of acute physical activity for children who were in the “presence” of a parent or another supervising adult (Floyd et al., 2011, p.258). There were no serious injuries or correlations associated with increased height and falls (Brussoni et al., 2015). Nor were there any signs of aggression reported from observed rough and tumble play (Brussoni et al., 2015).

This article’s authors are cautious about using the term risky play as a variable affecting injury and beneficial health outcomes without discretely defining the different risks at play every time—especially when a study is not directly dealing with outcomes related to conquering fear or learning a skill. It seems unlikely the decreased supervision by parents is acting through the same pathway as it facilitates active play as conquering some risky feature would if it led to the anti-phobic effects. The way these elements are combined by Brussoni et al (2015) in their abstract might be better understood as speaking to the way risk is defined in policy rather than the pathways through which the environment affords specific outcomes. Still, their paper provides a strong introduction to the subject of the benefits that can be associated with certain types of risks and the current state of understanding of those benefits.

5 INJURIES, DEATHS, AND THE CPSC

The case for removing certain risks and hazards on playgrounds has frequently been made using data from the U.S. Consumer Product Safety Commission (CPSC). Since the early 1970s, the public agency has collected data from a sample of the nation’s hospitals on what types of products are associated with injury, using a system called the National Emergency Injury Surveillance System (NEISS). That data is then used to make estimates on the number of injuries that have been associated with different types of products nationally. It is one of the most extensive data sets available on injuries that occur on playgrounds. And it tells us a great deal about how such injuries are occurring. However, using the data to assess the risks afforded by certain types of playground equipment can be highly problematic.

According to a 2001 CPSC report that is still widely cited, over 200,000 children are treated in hospital emergency rooms each year due to injuries associated with playground equipment (Tinsworth & McDonald, 2001). The CPSC estimated that 205,853 playground equipment related injuries were treated in U.S. hospital emergency rooms between November 1998 and October 1999. Just over three quarters of those injuries (75.8%) occurred on equipment designed for public use—that includes 34% that occurred in schools and 24% that occurred in public parks (Tinsworth & McDonald, 2001). The majority of public playground injuries treated in emergency rooms were fractured bones (39%); 22% were lacerations; 20% were contusions or abrasions; 11% were strains or sprains; 3% were concussions; and 2% were internal injuries (Tinsworth & McDonald, 2001). 97% of people seeking care for injuries on playgrounds were treated and released. Only 3% (around 6,200) required hospitalization (Tinsworth & McDonald, 2001).

The main cause of injury, which accounted for “all of the hospitalized injuries,” was falls. 79% of playground injuries on public playground equipment involved falls and 68% of those were falls to the surface below the playground (Tinsworth & McDonald, 2001). Similar data from earlier years was used to make the case for safety surfaces within the area surrounding play equipment (Frost & Klein, 1979), now referred to as the use zone (U.S. CPSC, 2010; ASTM, 2011). These figures suggest that understanding why current surfacing regulations are not preventing injuries and finding an economically feasible solution to the problem could potentially lead playground injuries to be reduced by 2/3, and could lead to the elimination of almost all playground injuries requiring hospitalization.

Unlike the hazard pattern data, the NEISS data on what playground equipment is associated with injuries—especially when it is used alone—is not specific enough to draw any conclusions about what might have led to the accident and where design intervention could be useful. The data categorizes playground equipment into a few broad groups, and shows how many injuries were associated with each category of playground equipment. But it is difficult to establish what sort of “swing” or “slide” led to an injury. For instance, hard metal animal swings, which are not recommended by the CPSC due to their potential for injuries caused by impacts, fall into the same category as a tire swings. This is problematic for those who would want to use the data to explore whether safety features are effective and for those who would like to make the case for revisions to equipment detailing that preserve play value—since the equipment continues to be lumped together with other equipment.

It is also impossible to establish the relationship between any specific play equipment and its surroundings using NEISS data alone. This is highly problematic given that the number one cause of injury is falls. If a child falls off a swing or slide onto the surface below, the swing or slide is associated with injury in the NEISS data. Yet, surfacing will affect whether the child sustains an injury from the fall. NEISS data is not collected in a way that acknowledges injury occurs as a result of a system of interacting variables. “Climbers,” a category that includes monkey bars, were associated with the most injuries in public parks: 53% of all injuries. However, 86% of injuries involving climbers implicated falls (Tinsworth and McDonald, 2001). The surfacing would clearly be playing a major role in this. Tinsworth and McDonald (2001) did collect some information on surfacing not typically found in the NEISS data using phone interviews, but they did not analyze equipment and surfaces together as systems.

Using NEISS data to assess risks is also problematic because the data sets include no information on the prevalence of the equipment or the amount of time children spend playing on it. Assume for a moment that all types of playground equipment had the same risk of injury. If this were the case, the most prevalent and most heavily used equipment would be associated with more injuries. It is possible that the NEISS data could be leading some decision makers to believe that certain types of equipment are more dangerous than others, when they are actually just more common or more beloved. Of course playgrounds with the fewest injuries are the ones that don’t get used at all.

A confusing graphic in the 2001 CPSC report may also be creating misunderstanding among local officials. Public playground managers in Richland and elsewhere have argued that swings are the most dangerous of all playground equipment. Yet, on public playgrounds, swings were associated with just 19% of all injuries compared with the 53% of injuries associated with “climbers” (Tinsworth and McDonald, 2001, p. 9). Unfortunately, the graph the CPSC report uses to show the percentage of all playground injuries associated with each type of equipment shows home and public playground injuries together. 60% of injuries on home playgrounds involved swings (Tinsworth & McDonald, 2001). So, a quick look at the graph (Figure 2) gives the impression that swings are the most dangerous of all playground equipment—they have the highest bar on the graph. This may be responsible for some local officials misunderstanding of the data. Notably, one reason the two are not comparable is that only 9% of the homes studied had a protective surface installed in the use zone. In contrast, 80% of public playgrounds had a protective falling surface at that time (Tinsworth and McDonald, 2001).

In addition to looking at injuries, Tinsworth and McDonald (2001) also analyzed 147 deaths that had occurred on American playgrounds between January 1990 and August 2000. Only 38 of those cases

occurred on public playgrounds (Tinsworth and McDonald, 2001). Some researchers have used the small number of deaths reported by the CPSC study to try to quell concerns that playgrounds are particularly dangerous. One writer compares the 4 deaths per year known to occur on public playgrounds to other causes of death—the estimated 37 children killed per year waiting on school buses, the 20 sports-related deaths and 44 school homicides in the U.S. annually (Moore, 2006). However, the CPSC study was not a complete count of deaths on playgrounds in the U.S. during the period examined, nor was it a representative sample “[D]eaths due to falls are underreported in the Commission’s data,” according to Tinsworth and McDonald (2001, p. 21). They only collected death certificates related to falls for one or two states in all but one of the ten years studied. Efforts to obtain a more complete picture of playground deaths would be beneficial to those looking to manage the risks and hazards that lead to them, as no complete data on playground deaths appears to exist for the United States currently.

6 U.S. LEGAL ENVIRONMENT AND LIABILITY CONCERNS

Concerns about playground safety are closely linked with concerns about liability. Both have long informed playground design and management in the U.S. A book chapter by Arthur Leland from 1908 stressed playground equipment must be durable to avoid liability due to “accidents occurring from breakage” (Mero, 1908 p. 86). The attractive nuisance doctrine, which continues to be cited to this day, dates to a U.S. Supreme Court decision from 1873. It requires property owners to use “reasonable care” to protect children from dangerous constructions or agencies on their property that may attract them—even when the children are trespassing (United Zinc v. Britt, 1922).

Two major changes apparently affected liability on public playgrounds during the latter half of the 20th century. Greater latitude to sue local governments in some parts of the U.S. and the adoption of national design standards changed the legal environment, making it easier for citizens to pursue torts against manufacturers and certain municipalities for injuries on playgrounds (Mikus, 2014). Through the mid-1960s, American tort law usually protected municipalities from civil lawsuits under sovereign immunity—as long as the municipality could show it had used reasonable care. During the 1960s, the federal courts began removing sovereign immunity protections in certain circumstances, raising the likelihood that lawsuits would be allowed to proceed (Sisk, 2008).

Some states and municipalities have successfully taken action to limit liability claims related to recreation by adopting recreational use statutes. The recreational use statute in the state of Washington, RCW 4.24.210 reads, in part: “[A]ny public or private landowners or others in lawful possession and control of any lands ... who allow members of the public to use them for the purposes of outdoor recreation ... without charging a fee of any kind...shall not be liable for unintentional injuries to such users (Kozlowski, 2012, WA State Legislature). In a recent test of the statute, *Swinehart v. City of Spokane* (2008), the court found in favor of the city, based on the presence of the recreational use statute and the court’s determination that the condition that led to the plaintiff’s injury “was patent, or obvious” (Kozlowski, 2012). This may provide insight into why some experiments in risky play have occurred in Washington State.

The CPSC’s creation in 1972 was another major turning point in the way playground liability was considered. It led to the first system for generating national data on the playground equipment associated with injuries, which informed the CPSC’s *Handbook for Public Playground Safety* in 1981 (Barton, 2006). The first ASTM standards for playground surfaces would follow in 1991 and ASTM standards for playground equipment would follow in 1993 (CPSC, 2010). Both regulate children’s play structures using limited age categories that lump ages 2 to 5 and 5 to 12 together (CPSC, 2010; ASTM, 2011). In effect, this means that all playground equipment must be designed to be safe for a 5-year-old.

In the years since, some states have passed laws requiring playgrounds to meet one or both of these standards (Moore and Cooper, 2014). And even in states where they are not written into the law, they may be used to define the *standard of care* that a playground owner or designer is held to in civil court cases (Frost and Sweeney, 1995; Moore and Cooper, 2014).

Even if a local community felt that they could tolerate the risk of injury for a giant-stride, a Tarzan-like rope swing, or a trampoline on a public playground, it would face a major hurdle to erecting this equipment. These are just a few of the equipment types categorically prohibited in children's playgrounds under either the ASTM standards, the CPSC guidelines, or both (CPSC, 2010; ASTM, 2011). Even if designers could come up with design solutions that addressed the hazards created by these pieces of equipment (and some have tried), playground owners would be reluctant to install them and playground manufacturers would be reluctant to sell them in the U.S., since the way they are discussed in the standards could potentially increase the liability the owners and manufacturers would face in the event of a single injury. That is likely why American playground owners have not copied Europe's efforts to install public trampolines that minimize the major causes of injury in home trampolines by placing their beds at ground level, surrounding them with safety surfacing, and minimizing their size to discourage multiple users at once (Jost and Rottle, 2014).

The CPSC also has the authority to issue national recalls on play equipment following injuries. The first such recall occurred in 1983 and involved a metal playset designed for toddlers by Pixieland that posed an entrapment hazard to small children that would have had no play value (U.S. CPSC, 1983). A second recall from 1985 also focused on a hazard, and also shows how CPSC intervention may lead to safer play equipment. After a girl was killed due to the failure of a weld on a tire swing by Miracle Recreation failing, the company was pressured by the CPSC to voluntarily repair all the other swings of that type (U.S. CPSC, 1985). However, the recall of the slalom glider in 2012 was not the result of an imperceptible hazard but rather a risk inherent in using the equipment that also enhanced its play value and level of challenge. The feature, which was like a slide but less passive, was recalled after it was associated with 15 injuries--all to children under the age of 8 (Kutska, 2012). Most were broken arms from a fall to the safety surface below. This led Kutska to raise questions about how standards categorize equipment, and how the CPSC considers the larger systems leading to injury and the level of injury seriousness when recalling play equipment (Kutska, 2012).

While liability was a powerful force for improving product safety in some cases, whether consumers have always ended up with safer playgrounds as a result of CPSC's regulation may be questioned. A recent incident in Cabell County, West Virginia illustrates how the CPSC guidelines, playground owners' concerns about liability, and the cost of new equipment may work together to lead to the removal of play features. The board of education had a lawsuit after a child was injured on a swing. The school district there was sued twice in one year over injuries that occurred on swings, leading to a \$20,000 out-of-court settlement in one case. Wary of future settlements, it examined all its swing sets and found most did not have use zones compliant with the standards (Chambers, 2010). Faced with extensive costs to bring the equipment to meet standards, and fearing additional lawsuits, the district began removing swings from all its schools in the summer of 2010 with no plans to replace them (Chambers, 2010). Though, thanks to community outcry, there was some funding secured for updating some of these playgrounds the following year.

At least some decisions to remove risks are being made without any prodding from national standards. Neither ASTM nor CPSC prohibit swings teeter-totters, or merry-go-rounds (ASTM, 2011; CPSC 2010). The widespread decision to remove them has been made at the local level—sometimes with a poor understanding of the injury data. In 2005, the South Florida Sun-Sentinel reporter Chris Kahn wrote about plans to remove these items from Broward County, Florida's schools in an article that was picked up in many other newspapers. "They've got moving parts," said the school's Safety Director, Jerry Graziose (Kahn, 2005). "Moving parts on equipment is the No. 1 cause of injury on the playgrounds." Yet, the 2001 CPSC report stated that only 3% of all playground injuries involved impacts with moving equipment, 8% involved impacts with stationary equipment, and of course, falls were the leading cause of injury (Tinsworth and McDonald, 2001, p.29).

Another troublesome trend in recent decades has been the school districts that have chosen to remove recess from the school day entirely. For instance, Chicago did not have recess at most of its

public schools between 1991 and 2011. While concerns about academic achievement clearly played a role in many school districts' decisions, another of the reasons for this trend that educators gave to the New York Times in 1998 was "a fear of lawsuits if children become injured" (Johnson, 1998).

The difference in the liability situations faced by different playground providers makes it hard to determine how often features were removed because of real liability concerns and how often they were removed out of fear. In Denver's Public Schools (DPS), there was only one lawsuit that resulted from the entity's negligence between 1994 and 2004 (Yost, 2005). Yet, despite the low number of injuries and lawsuits, DPS also removed teeter-totters and merry-go-rounds during the mid-2000s without replacing them with modern versions of the same equipment.

As the federal government has been increasing the potential for liability associated with providing playgrounds in recent decades, it has provided few incentives to provide beneficial risks or playgrounds at all. Notably, the CPSC was not charged with regulating play equipment to provide the best possible play experiences with the fewest injuries. It was created solely to reduce injuries (Mikus, 2014).

7 TOWARDS MORE HOLISTIC RISK MANAGEMENT IN THE UK

This is not all that different than the situation in the United Kingdom, where playgrounds were regulated by the Health and Safety Executive. Like the U.S., the U.K. had seen risky play diminish in recent decades. The situation was well documented by Tim Gill (2007) in his book *No Fear: Growing up in a Risk adverse society*. But in recent years, Gill and a variety of other professionals in the U.K., including many involved in the injury prevention realm, have been making the case for more holistic risk management on playgrounds with some success.

Some roots of the turnaround in the U.K. can be found in a report authored by Karen King and David Ball in 1989, titled *A holistic approach to accident and injury prevention on children's playgrounds*. This report raised questions about the effectiveness of safety surfacing on playgrounds as a strategy for protecting children from accidents (Ball, 2012). A major step toward change came in 2002, when Ball was contracted by the country's Health and Safety Executive to examine the statistics related to playground accidents and at the same time was hired by the Play Safety Forum to help develop a position statement on managing risk in play areas (Ball, 2012).

The Play Safety Forum's 2002 position paper on risk in play environments contrasted significantly with the approach common at the time. "[P]lay provision should aim to 'manage the balance between the need to offer risk and the need to keep children safe from harm,'" it said. "While the same principles of safety management can be applied both to workplaces generally and play provision, the balance between safety and benefits is likely to be different in the two environments. In play provision, exposure to some risk is actually a benefit: it satisfies a basic human need and gives children the chance to learn about the real consequences of risk-taking." (Play Safety Forum, 2002, p. 2).

Play England oversaw the creation of a more specific "implementation guide" for managing risk in 2008. And in 2012, a policy statement was released on the national level by the Health Safety Executive, an agency that like the CPSC had previously been charged only with keeping people safe. It clarified play providers' duty was to strike a balance between injury reduction and play "focusing on controlling the most serious risks and those that are not beneficial to the play activity or foreseeable by the user" (Health Safety Executive, 2012).

The policy changes in England have inspired people to work for similar changes in Canada and the United States. In 2013, a symposium on healthy risk promotion was held the day before the Canadian Injury Prevention and Safety Promotion Conference (Brussoni et al, 2014). In the U.S., Ball, Gill, and Spiegel's work served as an inspiration to Allen Cooper's chapter on risk management in the new national guidelines for Nature Play and Learning Places (Moore and Cooper, 2014). There is also discussion underway amongst some of the members of the ASTM committee and the CPSC to move away from the equipment-based playground standard and toward a standard that is performance based, which could potentially lead to removal of some of the categorical bans on equipment.

8 POLICY RECOMMENDATION

In the United States, the CPSC should consider following the HSE's lead and acknowledge in writing that there are often benefits associated with risk in children's play environments (Mikus, 2014). While CPSC does not have the charge of looking at health in a holistic way as the HSE does, a statement acknowledging that play equipment is different than other sorts of products it regulates and that in play some risk is beneficial would not be outside the CPSC's charge. According to its website, the U.S. Consumer Product Safety Commission is charged with "protecting the public from *unreasonable* risks of injury or death" (CPSC, 2016, emphasis ours). Risks that typically result in health benefits or learning and only rarely result in injury might be considered reasonable risks.

Including such a statement in the CPSC guidelines would likely change how liability is assigned in certain situations where benefits are clear and injury is rare. It could have the added benefit of quelling some unjustified worries about liability on the part of playground owners--particularly public owners in states without recreational use statutes and private owners. However, making changes at the national level alone would not be enough to ensure that beneficial risks are included in American play environments. As the authors have shown, decisions about risk are currently being made at many different levels. Systematic change would likely require a more extensive educational campaign for owners and designers and changes to state and local laws and standards.

9 THOUGHTS ON FUTURE ADVOCACY AND EDUCATION

Landscape architecture academics educating themselves about the debate on risk-taking in play environments could be in a good position to pass on their understanding to local stakeholders about this issue through community design projects (Brink & Yost, 2004). For example, in 1998, Lois Brink, a licensed landscape architect and a University of Colorado faculty member, began working with the Denver Public School District (DPS). At first, resistance to anything not manufactured or regulated by the CPSC was the norm. After much persuasion, Stephen Finley, Risk Management Supervisor for DPS, agreed to allow boulders to be "tested" on the Garden Place Elementary School (Yost, 2005). Surprisingly, there were no injuries nor accidents associated with these "risky" play elements (Yost, 2005); and today virtually all of the DPS "Learning Landscapes" have boulders (Brink, 2013).

Landscape architecture academics may also facilitate interactions at higher levels of government to clarify policies and push for change. For example, Robin Moore and Nilda Cosco, landscape architecture faculty members, and founders of the Natural Learning Initiative (NLI) at North Carolina State University, have brought together childcare providers and state regulators over a number of years to discuss concerns about what is allowed in North Carolina's outdoor play and learning environments. This has alleviated concerns and increased understanding among childcare regulators and providers about the potential benefits of outdoor environments, leading to new interpretations of regulations at the state level. A panel from NLI's 2010 conference titled: "Myth Busters: A Panel on the Interpretation of Childcare Regulations and the Outdoors" provides an example of positive effects of creating a discourse. See: <https://mediasite.online.ncsu.edu/online/Play/dde8e5e16e2342c5ab9985e7da308ea71d>.

An area of much discussion, addressed briefly during that panel, was whether childcare centers could grow tomatoes. Tomatoes were on a list of poisonous plants that excluded their use within the licensed outdoor areas of childcare centers. Although tomato leaves and stems do have low levels of toxicity, the amount that would need to be consumed for a detrimental effect would be unrealistically high, and the Carolina Poison Center had no recorded instances of ill effects caused by tomato leaves alone in its 13 years of data (NC Cooperative Extension, 2010; Natural Learning Initiative, n.d.). A child, who had eaten 5 or 6 leaves had "no ill effects" (NC Cooperative Extension, 2010). After researching the issue, the NC Division of Child Development and Early Education published a statement that growing tomatoes in licensed childcare facilities was allowed in areas that served children 3 years and older, since these children were beyond the stage where children explore their environments with their mouths (Natural Learning Initiative, n.d.).

10 SUGGESTIONS FOR NEW RESEARCH

Landscape architecture academics of various stripes--from environmental psychologists to historians--may also contribute new research that could help to inform new standards on risk in children's play environments. Based on a review of the literature more extensive than can be noted here due to space limitations, a few suggestions for future research might be offered.

10.1 Need for Better Record Keeping and Statistical Analysis

As Yost noted in 2005, "administrators, designers, users, and policy makers continue to follow recommendations based more on fear of litigation and raising insurance rates than on accurate statistical analysis" (p. 69). The authors reiterate her argument for better recordkeeping and reporting on playground injuries, so that challenging equipment is not removed based solely on fears and anecdotes.

10.2 Need for Less Abstract Categories in Research

Research on injuries must not use categories of play equipment that are too abstract to offer useful information on how the equipment is affording injury. Not all trampolines, for instance, are created equal (Jost and Rottle, 2014). Researchers need to be aware that when they ascribe injuries to equipment abstractly, rather than considering the root causes, this can lead to abstract language in standards that may limit opportunities for designers to come up with solutions to the actual causes of injury. New research might seek to track injuries on play features using more specific categories.

10.3 Need for More Ecological or Systems Thinking in Playground Research

Very little research has evaluated play features in concert with the surrounding surfaces and the child's perception of risk related to falling on those surfaces. An ecological or systems based perspective is needed when evaluating whether injuries were caused by play features or are just associated with them. Ecological models may consider the physical environment as well as other social, cultural, political, economic, historical, and mental factors related to children's interactions at different scales. Considering children's age is especially important in any research related to injuries in play environments.

10.4 Need for New Research on Equipment that is Categorically Banned

Researchers may consider a number of the abstract categories that the CPSC has forbidden on public playgrounds categorically without offering designers a chance to intervene with design solutions—the giant stride, the trampoline, multi-person swings (other than tire swings), and ropes that are not tied down at both ends. In each of these cases, previous researchers associated abstract categories of equipment with injuries, rather than considering the direct cause of injury and how it might be designed out. More research into how equipment designed to remove risks, such as in-ground public trampolines, performs in other countries or in other environments where they are allowed might be used to assess whether existing regulations are sensible.

Historical research looking at the history of equipment design and regulation could also be instructive. For example, Jost (unpublished) has found prominent early safety guidelines for detailing playgrounds by the designer Arthur Leland recommended that giant strides "must have very hard surfaces under them or in a few weeks great holes will be worn in the ground." (Mero, 1908, p. 82). At the same time, Leland was recommending soft sand in the areas beneath jungle gyms to provide a cushion for falls (Mero, 1908). If playground owners were following his advice, that might help to explain why the giant stride went from being considered one of the safest pieces of playground equipment at the beginning of the 20th century to the piece of equipment associated with the most injuries in a 1950s study--those who fell from it may have been more likely to fall onto a hard surface (Mero, 1908; Hase, 1958).

10.5 Need for Definition and Evaluation of Injury Seriousness

When trying to understand the injuries associated with certain types of equipment, some effort should be made to understand how serious they are, and if there were dangerous affordances that are specifically associated with serious injuries. While few would argue a skull fracture was less serious than a scratch, determining the seriousness of injuries does involve a degree of subjectivity. Work with stakeholders to come to agreement on what constitutes a serious injury on a playground would be useful. Is a serious injury defined by the treatment required (e.g. hospital visit, hospitalization) or is it defined by its persistent effects? Is a broken arm the sort of serious injury designers should strive to eliminate at all costs or is it something worth risking to sustain wider benefits?

10.6 More study of benefits associated with specific risky play features:

More research is needed to see if providing certain types of risky play correlates with reductions in obesity, ADHD, clumsiness, illegal drug use, aggression, tagging, depression, and anxiety. More environment-behavior research on the benefits of risky play and risk-taking related to children and youth's physical, mental, social, and emotional development and well-being are also needed.

10.7 Need for Transdisciplinary Partnerships and Cross-Jurisdictional Data Sets

Researchers from a diverse range of disciplines are needed to address the many factors and variables. Landscape architecture academics may have familiarity with materials, construction detailing, measuring park use, and visualizing/observing how the human body moves through space. Medical researchers, on the other hand, tend to have greater knowledge of the human anatomy and injury's effects. Many studies on playground injury have been conducted with only one of these groups, often medical professionals. Waltzman et al (1999)'s study in *Pediatrics* titled "Monkeybar Injuries: Complications of Play" is an example of a study conducted solely by medical professionals that might have benefited from having collaborators knowledgeable about landscape detailing and maintenance. It found "the surface below the [playground] equipment has no influence on the type or severity of the injury" (Waltzman et al, 1999, p. 1). However, the researchers simply divided up surfaces into categories based on material: sand, woodchips, dirt, and grass (Waltzman et al, 1999) without considering that different types or depths of materials may cushion falls differently. A team with a designer would be less likely to make this mistake.

Transdisciplinary partnerships may also lead to cross-jurisdictional data sets on playground injury that combine detailed information on both injuries and the playgrounds that afforded them. Working with incident reports from schools, parks or childcare centers can be limiting because these reports do not always provide much detail on the type or severity of injury. For instance, Branson et al.'s 2012 study in *Pediatrics and Child Health*, based on school incident reports, built of of a fairly strong understanding of the physical environment (and how seasonal differences might affect it). But its information on injury is weak. It combines together minor head injuries with concussions; and fractures with dislocations and pulled muscles (Branson et al, 2012). This is likely because the injury is not fully diagnosed at the time the student leaves for a hospital. Injury severity, as discussed in the study, is based on whether or not an ambulance was called (Branson et al, 2012), which is a largely subjective measure.

Meanwhile, Waltzman et al's 1999 study, which exclusively used data collected at a hospital, had strong information on injuries and treatment required. But it lacked detailed information on the equipment-surface systems and the prevalence of these equipment-surface systems that might have been used to identify what had truly caused these injuries and how often certain systems led to injury. There would seem to be a possibility for school systems, park systems, and hospitals from the same region to work together to create new data collection systems that would address these issues. Data on other factors, such as usage, may be collected on an as needed basis through behavior mapping when there is concern about certain pieces of equipment.

11 CONCLUSION

This paper provides landscape architecture academics a brief introduction to the current debate over beneficial risks in children's play environments. We've noted that by definition, risk is associated with the potential for injury; however it is also associated with many benefits including physical and mental health benefits and improvements to gross motor skills. So, any agency that regulates it and any study that seeks to inform such regulations will need to take this into account. Even if federal regulators acknowledge that risk may be beneficial as we suggest, much more research will need to be done on specific play features, the associated risks, and the potential benefits. The authors see many opportunities for landscape architecture academics to contribute. Through partnerships with professionals more knowledgeable about injury, regulators, and community members, it will be possible to conduct more detailed research, and facilitate discussions about what risks are acceptable that incorporate research.

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