Shaped by Play: How Play Types Impact Development

landscape structures®

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How Play Types Impact Development

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INTRODUCTION: THE IMPORTANCE OF PLAY

As summarized in the whitepaper "Shaped by Play: The Formative Role of Play and Playgrounds," research suggests that children's play provides a context for practicing key cognitive, social and physical skills.[1],[2] Relatively few studies, however, have examined patterns of play on playground equipment to assess how these play spaces might shape children's development. The observational project addresses this question with respect to Landscape Structures playground equipment. The goal was to characterize how children use Landscape Structures' equipment, and to determine whether certain types of developmentally significant play are best supported by certain components from Landscape Structures' collection.

METHOD

Data for this project were collected at four Landscape Structures playgrounds in and around the Twin Cities metro area. Two were large destination parks that include a water play area and other amenities (Central Park and Madison's Place), and the other two were smaller neighborhood playgrounds (Windom Park and Triangle Park). Together with Landscape Structures, seven to nine play components were identified for observation at each playground (see below).

Central Park	Windom Park	Madison's Place	Triangle Park
			Bobble Rider®
	Boogie Board™		
Cozy Dome®		Cozy Dome	
Custom climber			
Oodle® Swing			
	Netplex® playstructure		
OmniSpin® spinner		OmniSpin spinner	OmniSpin spinner
	Overhead ladders	Overhead ladder	
Rock Area			
Rope Climber			
Slides			
Motion	Motion		
		Sway Fun® glider	
	Traditional Swings	Traditional Swings	Traditional Swings
	We-saw™	We-Saw	
	ZipKrooz®	ZipKrooz	ZipKrooz
		Age 5-12 Structure *(section)*	Age 5-12 Structure
Age 2-5 Play Area			Age 2-5 Play Area

Four observations were conducted at each park over the course of five weeks, between mid-July and mid-August 2017.[1] Each park was observed twice in the middle of the day (starting between 10:30 a.m. and Noon) and twice in the late afternoon/evening (starting between 3:30 and 5 p.m.),

[1] Windom Park was observed five times, but only four of the observations were analyzed. We chose to exclude and replace the first observation due to unpleasant weather, a low number of visitors, and the presence of an unfamiliar adult male who began playing on the swings and disrupted children's normal play.

with one exception: due to weather and scheduling constraints, Triangle Park was observed once in the middle of the day and three times in the evening. Each observation lasted for 1 to 2 hours, with a 20-minute segment dedicated to each component. If a full 20-minute segment could not be completed—either due to weather or because no children were present on the playground—the time was made up on a subsequent day to ensure that every component was observed for a total of 80 minutes. At each playground visit, components were observed in a random order.

Observation of each component proceeded as follows. An observer approached and found a place to sit that was close enough to see the component, but far enough to avoid making children or parents uncomfortable. The observer waited for the next child to arrive at the component, and began recording his/her behavior using a time sampling method—observe the child for 10 seconds, take 10 seconds to record their behavior, observe for 10 seconds, etc. During each 10-second interval, the observer recorded: 1) whether the child interacted with one or more peers, 2) whether the tone of the interaction was positive or negative, 3) the quality of the child's interaction with their accompanying adult, and 4) what type of play they primarily engaged in (dramatic/imaginative play, games with rules, gross motor play, other play or non-play). For more detail, see the enclosed observation sheet and key. Once per minute, the observer also recorded the number of children on the component and on the playground. Each child was observed for five minutes or until they left the equipment for 30 consecutive seconds, whichever came first. After this, the observer waited for the next child to approach the equipment and repeated the observation procedure.

Observations were conducted by two child psychology students from the University of Minnesota. To ensure that observers were consistent in their recording of behavior, 18 percent of the 20-minute observation intervals were randomly selected as a reliability check. During these intervals, both researchers observed the same component and their results were compared. Observers' judgments of child characteristics and behavior were reasonably consistent, with at least 80 percent agreement for all categories (details available upon request). For each reliability interval, one observer's results were randomly chosen for analysis.

To supplement the observations, brief interviews were also conducted with 16 adults who were at the playground accompanying children (four at Madison's Place and Central Park, three at Windom Park and five at Triangle Park). Adults were asked the following questions:

1) **Why did you choose this particular playground to come to today?**
2) **What are some things that you like about this playground?**
3) **Are there particular areas of the playground or pieces of equipment that your child(ren) play(s) on the most? Why do you think that is?**
4) **How often do you come to this playground, and how far do you travel to get here?**
5) **While playing on this playground, do you ever see your child(ren) exhibiting skills like creativity, collaboration, persistence, or problem-solving? In what way?**

RESULTS

Age and Equipment Use

Figure 1, found in the appendix, shows the age distribution of children observed on each component.[2] Compared to the average age distribution across all components, six of the components (highlighted in Figure 1) particularly stand out: The custom climber, rope climber, and overhead ladders were especially likely to be visited by children ages 6 and up, while the age 2 to 5 play areas and Motion playstructures were primarily visited by children ages 5 and younger.

These patterns suggest that children and parents' choice of where to play was influenced to some degree by the child's developmental level. The Motion and age 2 to 5 areas—designed to be accessible to young children—did, indeed, mainly attract this age group. In contrast, the custom climber, rope climber, and overhead ladders—which require a good deal of strength and dexterity—mainly attracted older children. These findings parallel the adult interviews, where availability of age-appropriate equipment for varied age groups emerged as a key reason why adults like/visit Landscape Structures' playgrounds (see Adult Interviews section). Surprisingly, several other components that seem to require considerable physical skill (e.g., the Netplex playstructure and age 5 to 12 structures) did not mainly attract older children. There may be several reasons for this. First, these components may have attracted a number of young children accompanied by adults who helped them climb the equipment. Second, some of these components have easily accessible elements as well as opportunities for greater physical challenge. The age 5 to 12 structure at Triangle Park, for instance, has stairs and platforms that provide an appropriate challenge for young children, as well as rope climbers and overhead ladders that are more appropriate for older children. Finally, because the ages of all children were not recorded—only those chosen for observation—results may not accurately represent the age distribution on all components.

Older children experimented with ways to make the equipment designed for 2- to 5-year-olds more challenging.

It is also interesting to note that areas designed for children under age 5 were not used exclusively by this age group. Across the age 2 to 5 areas and Motion, for instance, approximately 20 percent of observed children appeared to be ages 6 and up. In some cases, these children used the equipment as was intended (climbing steps, sliding down slides, etc.). In other cases, they experimented with ways of making it more challenging—for instance, several older children were observed climbing on the roof of the Motion playstructure.

[2] For components observed at multiple parks, data were combined across parks unless the pattern differed significantly.

Duration of Play

In observations, three types of "visits" to a component were noted: 1) sometimes children visited briefly (< 1 minute), trying out the component and then moving on; 2) sometimes they engaged in sustained play (1 to 5 minutes); and 3) sometimes they stayed for an extra-long time—at least the full five minutes allotted for observation. Figure 2, found in the appendix, shows the distribution of these visit types by component.[2] When compared to the average distribution, several components (highlighted in Figure 2) stand out as having particularly short visits—the Cozy Dome, the overhead ladders, the Sway Fun, and the age 5 to 12 structure section at Madison's Place. In contrast, several components (also highlighted) had an especially high frequency of sustained visits—the 5 to 12 structure at Triangle Park[3], the age 2 to 5 areas, the ZipKrooz, the traditional swings, the Motion at Windom Park, and the We-Saw.

Duration of play is likely influenced by many factors, but observations highlight a few that may be especially important. Equipment size and variety, in particular, seem to matter. Components like the Sway Fun and overhead bars, which have one main purpose (swaying or climbing hand-over-hand, respectively) tended to have short visits. In contrast, larger components with multiple parts that facilitate different activities (such as the age 5 to 12 structure at Triangle Park, and the age 2 to 5 areas) had more sustained visits. The traditional swings, We-Saw and ZipKrooz were notable exceptions to this rule—they are designed for one main activity, but had an above-average frequency of long visits. Anecdotal observations suggest that other factors may have extended children's play on these components. Children's visits to the ZipKrooz were often prolonged by the need to wait for a turn to ride it. On the swings and We-Saw, in turn, many children were seen being pushed by adults—an activity that is pleasant but not strenuous, and thus likely to remain enjoyable for long periods of time. Finally, especially for young children, duration of play on these components was often dictated by adults: an adult would set a young child in the swing/We-Saw, and proceed to swing them until they (the adult) decided that it was time to move on.

Kids participated in collaborative activities like pushing one another on the swings or working together to spin the OmniSpin spinner.

Peer Engagement

The majority of peer interactions observed in this study (98 percent) were positive. As a result, we chose not to compare the frequency of positive vs. negative interactions and focused on the frequency of peer engagement. The interactions observed took many different forms. Sometimes children engaged in group games (e.g., tag) or simply talked to one another as they played (e.g., while swinging side-by-side). Other times, they participated in collaborative activities like pushing one another on the swings or working together to spin on the OmniSpin spinner. We also noted several instances of older children helping younger ones navigate the equipment, both physically (e.g., lifting them onto the OmniSpin spinner) and psychologically (e.g., reassuring them that they didn't need to be scared). Interestingly, these types of mixed-age interactions were also highlighted in the adult interviews as a medium through which children can learn new skills (see Adult Interviews section).

[3] Note that visit duration differed across the two age 5-12 structures, with the structure at Madison's Place having unusually short visits and the structure at Triangle Park having unusually long visits. This likely occurred because at Madison's Place we limited observations to one section of the structure, and children frequently just ran through this section on their way to the rest of the structure.

To examine the frequency of peer engagement on each component, the proportion of 10-second intervals that children spent interacting with one or more peers was calculated. As shown in Figure 3, found in the appendix, the OmniSpin spinner, age 5 to 12 structures, slides, Cozy Dome and Oodle Swings had significantly above-average rates of peer play. In contrast, the age 2 to 5 areas, Bobble Rider, rope climber, ZipKrooz, traditional swings, Motion, We-saw and overhead ladders had below-average rates of peer play.

Some of these observed differences in peer engagement may have to do with children's developmental level. As noted above, the age 2 to 5 areas and Motion playstructure were primarily visited by children younger than 5—a stage when social skills are still developing, and children's social play tends to be less frequent and sophisticated than in later childhood.[3] In other cases, the structure of the equipment may have affected opportunities for social interaction. All of the components with high levels of peer play have spaces that can accommodate three or more children, while several of the components with low levels of peer play (namely the ZipKrooz, Bobble Rider and traditional swings) only have space for one or two. While low capacity does not preclude the opportunity for children to practice social skills (the ZipKrooz, for instance, provided an opportunity to practice self-control and turn-taking), it seems that components with multi-child spaces may be more likely to facilitate sustained social play. Additionally, several of the components with high levels of peer play appeared to facilitate social engagement because they were fundamentally collaborative—easier and more fun to operate as a group. The OmniSpin spinner, for instance, seemed to provide more variety and excitement when used by two or more children together. Several cases of children taking turns pushing and riding because they wanted to experience both activities were noted—an opportunity that would not have been available had they been playing alone.

Components with multi-child spaces may be more likely to facilitate sustained social play.

Adult Engagement

As with peer interactions, many different patterns of interaction between children and adults were observed. Sometimes the adult was an active, equal participant in the child's play. For instance, a child and parent navigating an age 5 to 12 climbing structure together as if it were an obstacle course was seen. Also noted were multiple instances of scaffolding—adults supporting children to help them do something slightly beyond their ability level. This could be verbal (e.g., an adult who talked a child through strategies for climbing down from a net climber) or physical (e.g., an adult who boosted up a child as they attempted to climb a climbing wall). Finally, multiple cases of adults helping to regulate children's social behavior were observed—facilitating turn-taking and/or explaining why another child deserved a turn.

To examine the frequency of adult engagement on each component, the proportion of 10-second intervals when children's parents/supervisors actively engaged with them were calculated. Engagement could be physical (lifting a child to reach the overhead ladders) or verbal (encouraging a child as they climbed). As shown in Figure 4, found in the appendix, the OmniSpin spinner, age 2 to 5 areas, Bobble Rider, traditional swings, We-saw, and Sway Fun had significantly above-average rates of adult engagement. In contrast, the custom climber, rope climber, rock area, slides, Cozy Dome, Motion and overhead ladders all had below-average rates of active adult engagement.

Similar to the peer interaction findings, some of the observed differences in adult engagement

may be due to children's developmental stage. Older children are more capable of navigating play equipment independently, and no longer need adults to help them with its physical challenges (ladders, stairs, etc.). This may explain why the three components that primarily attracted older visitors (custom climber, rope climber, and overhead ladders) had below-average levels of adult engagement, while one of the components that mainly attracted young visitors (age 2 to 5 area) had above-average levels. Five of the six components with above-average adult engagement (OmniSpin spinner, Bobble Rider, traditional swings, We-saw, and Sway Fun) also share a key structural feature: a child can sit and be swung or rocked by an adult. Although how adults engaged with children was not systematically recorded, observation notes suggest that the high frequency of adult engagement on these components was mainly due to adults pushing/rocking children.

Play Patterns

Each type of play that we set out to observe in this project—gross motor, dramatic and rule-based—appeared at least once in observations. Most frequently, children spent their time running, jumping, climbing and generally engaging in playful gross motor activity. Dramatic and rule-based play were also apparent, though much less frequent—children pretended that the Sway Fun was a rocket ship, and chased one another around the Netplex playstructure. Finally, even when not engaging in any of these specific play types, children demonstrated other playful behaviors—swinging/rocking while someone else pushed them, or playfully manipulating the environment (e.g., pouring sand through a Cozy Dome).

Figure 5, found in the appendix, shows the distribution of observed play activities for each component—the proportion of 10-second intervals that children spent engaging in each type of play (see observation key for descriptions). Results for each play type are summarized below.

Gross Motor Play. It is clear from our results that Landscape Structures' equipment was especially effective at facilitating gross motor play. Not only was this the main activity for 12 of the 18 components, but overall it comprised nearly 50 percent of observed behavior. Seven components showed an above-average proportion of gross motor play: the age 5 to 12 and age 2 to 5 areas, custom climber, rope climber, overhead ladders, rock area and slides. This is unsurprising, as these components provide relatively few opportunities for inactive play. Engaging with them virtually requires gross motor activity, in contrast to components that are designed to encourage sensory exploration (e.g., the Motion playstructure) or that allow children to sit while someone else operates the equipment (e.g., the swings or We-saw).

Dramatic/Imaginative Play. Although the overall frequency of dramatic play was low (only 2.4 percent of observed behavior), three components showed above-average rates of imaginative activity: the Sway Fun, age 5 to 12 structures and rock area. It is unclear which characteristics of these components facilitated pretend play. Perhaps the Sway Fun encouraged imagination because it provided a partly enclosed space that resembled a vehicle (two of the imaginative episodes observed there involved children pretending that it was a boat or a rocket). However, without further study, this is just speculation.

Games. Games with rules (tag, hide-and-seek, etc.) made up less than one percent of observed behavior, with only the Motion and Netplex playstructures having more than one 10-second period of game play. Given the low frequency, these results should be treated with caution—it is possible that we observed more frequent game play on these components simply by chance, not because they systematically encourage more involvement in games.

Other Play. This category included any playful activity that did not fall into the previous categories. This mainly included times when children were swung/rocked on a component but not physically active themselves, or when they manipulated aspects of a component without engaging in large muscle movement (e.g., pouring sand on the Cozy Dome). Unsurprisingly, this type of play was most common on components that allowed children to sit still while someone else swung/rocked them: the OmniSpin spinner, traditional swings, Oodle Swing, We-saw, and Sway Fun. Other play was also fairly common in the Cozy Dome, where children were often seen playing with sand (at Central Park, where the Cozy Dome was located in a sand pit), poking their heads out of the holes or sitting on top. The Cozy Dome, however, was difficult to observe due to its partial enclosure (researchers could not fully see and hear what children did inside). Thus, some dramatic play or non-play may have been misclassified as other, and over-estimated the frequency of this type of activity.

Non-Play. On every component, there were times when children sat, stood or wandered aimlessly, engaging in activity that was clearly not playful. This type of activity was especially common on the ZipKrooz, where just over 40 percent of children's time was spent in non-play. Although it was not systematically recorded what children did when not playing, anecdotal notes suggest that the ZipKrooz showed a high proportion of non-play activity because (especially on busy days) children spent a good portion of their time waiting in line.

ADULT INTERVIEWS

The information gathered from the interviews complements observations with a more qualitative look at how adults perceive the role of playgrounds in children's lives.

Perceptions of Play Space. When adults were asked why they visit Landscape Structures' playgrounds and what they like about them, three main themes emerged: 1) safety, 2) accessibility and age-appropriateness, and 3) size and variety. Of the 16 adults, 10 mentioned safety as a key consideration with eight of them stating a preference for Landscape Structures' rubber ground cover over gravel, sand or wood chips. Ten of the adults also mentioned the accessibility or age-appropriateness of Landscape Structures' equipment as a reason why they visit and like the playground. Several emphasized that they come to the park with children of multiple ages, and like that each of them can find something to do. Others mentioned liking the fact that their child can find an age-appropriate area to play—younger children can find accessible equipment (specifically the Motion playstructure and age 2 to 5 structures) while older children can find a sufficient challenge. Accessibility for children with special needs was also noted as a positive characteristic at Central Park. Finally, nine of the parents listed size and/or variety as a reason for visiting or liking Landscape Structures' playgrounds.

At Madison's Place, three of the four adults mentioned the appeal of having both a playground and a water play area. At the other parks, adults repeatedly commented that the playgrounds provide many different activities, and enough space for children to run and play actively.

Child Behavior. When asked which playground area(s) their child uses the most, adults overwhelmingly named the ZipKrooz. This was listed as a favorite area by nine of the adults, with two of them noting that the presence of a ZipKrooz affects which playgrounds they choose to visit. These comments parallel our observation that the ZipKrooz tended to attract large groups of children who were willing to wait in line to ride it. It is unclear from our findings what makes this component so appealing. One adult observed that the ZipKrooz is unique, implying that novelty may be a factor. Another noted that riding the ZipKrooz provides a greater thrill than young children are likely to find anywhere else. Both ideas are plausible, but without further study it is difficult to say if one is more accurate.

The presence of ZipKrooz affects which playgrounds kids and their families choose to visit.

In response to a final question, all but four adults gave examples of children displaying one or more of the following skills: creativity, collaboration, problem-solving or persistence.

Creativity. Several adults noted that their children use Landscape Structures playground equipment as the basis for imaginative games (e.g., rocket ship, sea monsters) or for other unusual activities (e.g., creating an obstacle course, climbing on the outside of a structure instead of the inside).

Collaboration. Collaboration was often mentioned with reference to specific components that encourage children to work together. The Netplex playstructure was noted as an area that requires turn-taking and communication, because there is just one main way to get up and down; similar comments were made about the slide. The OmniSpin spinner and We-saw were also highlighted as areas of collaboration because children can operate them as a team (some sit and some push). Notably, multiple adults highlighted the importance of children of different ages learning from and helping one another. Several noted that their child copies or learns from older children on the playground, and one specifically described seeing an older child teach younger children how to navigate the overhead "pizza spinner" rings at Madison's Place. These comments parallel many of the researchers own observations. Although not systematically recorded, anecdotal notes indicate multiple instances of older children helping younger children—boosting them up while they were climbing,

helping them on and off the equipment, and offering to help them down from the top of a tall structure. Together, this suggests that mixed-age social interactions are an important part of children's social experiences on the playground.

Mixed-age social interactions are an important part of children's social experiences on the playground.

Problem-solving. Problem-solving was typically spoken about in terms of climbing—children figuring out how to physically navigate a piece of equipment, especially one that is new to them. The tall stairs on Triangle Park's age 2 to 5 playstructure were noted as an example.

Persistence. Multiple adults reported seeing their child persist at playground activities that were difficult for them. One adult in particular described a child's persistence in navigating the suspension bridge on the age 5 to 12 structure at Triangle Park. On a previous visit the child had been too afraid to cross, but after finally conquering her fear she showed a sense of pride in the new achievement. This anecdote also highlights another theme that appeared across several of the interviews—the importance of mastery, or the sense of pride that children feel when they have worked to master something difficult.

NOTES FOR CONSIDERATION

Before concluding, it is important to highlight a few caveats to the study results. First, because a limited number of children on a limited number of days were observed, findings may not fully portray how children play on Landscape Structures playground equipment. They are better thought of as a "snapshot" of what we witnessed on four specific days than a description of what always happens on Landscape Structures' playgrounds. This is especially true for less busy components and components only observed in one park (see Table 1, in the appendix, for the number of children observed per component). Second, despite efforts to observe all playgrounds under similar conditions, it possible that some of the differences witnessed in children's behavior across components were due to idiosyncratic events rather than qualities of the equipment. Weather was an issue, with some days being more conducive to outdoor play than others. Additionally, three of the parks hosted day camps during some observations, which may have affected age distribution and adult engagement findings (especially since camp counselors are unlikely to engage with children the same way parents would).

It is also important to keep in mind that observation categories may not reveal the full complexity of children's behavior. In some cases, the components provided opportunities for children to practice key skills in ways that are not apparent from the results. On the ZipKrooz, for instance, there seems to be a large proportion of inactive, non-play time because children often had to wait in line. However, even waiting in line involves practicing turn-taking and self-regulation—from a developmental perspective, this time may be as valuable as active play. In other cases, because the primary activity occurring during each 10-second interval was coded, some nuances of children's behavior (e.g., brief interactions) may have been missed.

Waiting in line involves practicing turn-taking and self-regulation, which may be as valuable active play.

CONCLUSION

The results of this study clearly show that Landscape Structures playground equipment supports each type of play whose developmental significance is highlighted in the whitepaper "Shaped by Play: The Formative Role of Play and Playgrounds." As summarized above, many cases of social play with adults, including instances of teaching and scaffolding—adults helping children engage in activities slightly beyond their ability level—were observed. Social play with peers was also frequently observed, and included both collaborative group play and instances of older children helping younger ones. As outlined in "Shaped by Play," these types of social play interactions may be important for multiple

areas of development, including language, perspective-taking and social skills.[1,4] The study also found a high frequency of physically active gross motor play on Landscape Structures' playgrounds—play that may contribute to children's physical development, refinement of gross motor skills and maintenance of a healthy body weight.5,6 Finally—especially on certain components—children were observed engaging in imaginative pretend play, which has been linked to children's language development, social competence and self-regulation abilities1,7 (for more detail, see "Shaped by Play").

This study suggest Landscape Structures' playground equipment enhances children's social, physical and cognitive development.

This project has implications for thinking about playgrounds as contexts for development. First, it suggests that different playground components may facilitate different patterns of developmentally significant play. In the study, some components—like the overhead ladders and more complex rope climbers—seemed to attract older children and facilitate independent gross motor play. Others (including the OmniSpin spinner, We-Saw, swings and Sway Fun) seemed to encourage high rates of adult engagement but relatively low rates of physical activity, while still others (including the Oodle Swing, OmniSpin spinner and age 5 to 12 structures) appeared especially likely to facilitate peer play. Together, these patterns highlight the importance of providing a variety of playstructures to encourage a variety of play behaviors. Furthermore, both observations and interviews point to the importance of play equipment providing an age-appropriate challenge. Not only was it observed that children often gravitated toward areas designed for their developmental level, but multiple adults commented positively on the age-appropriateness of Landscape Structures' equipment. Ultimately, our study suggests that the variety of Landscape Structures' playground equipment—both its overall variety and the fact that it provides appropriate play areas for children of many ages and ability levels—enhances the quality of its playgrounds as contexts for children's social, physical and cognitive development.

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APPENDIX

Figure 1: Age Breakdown by Component

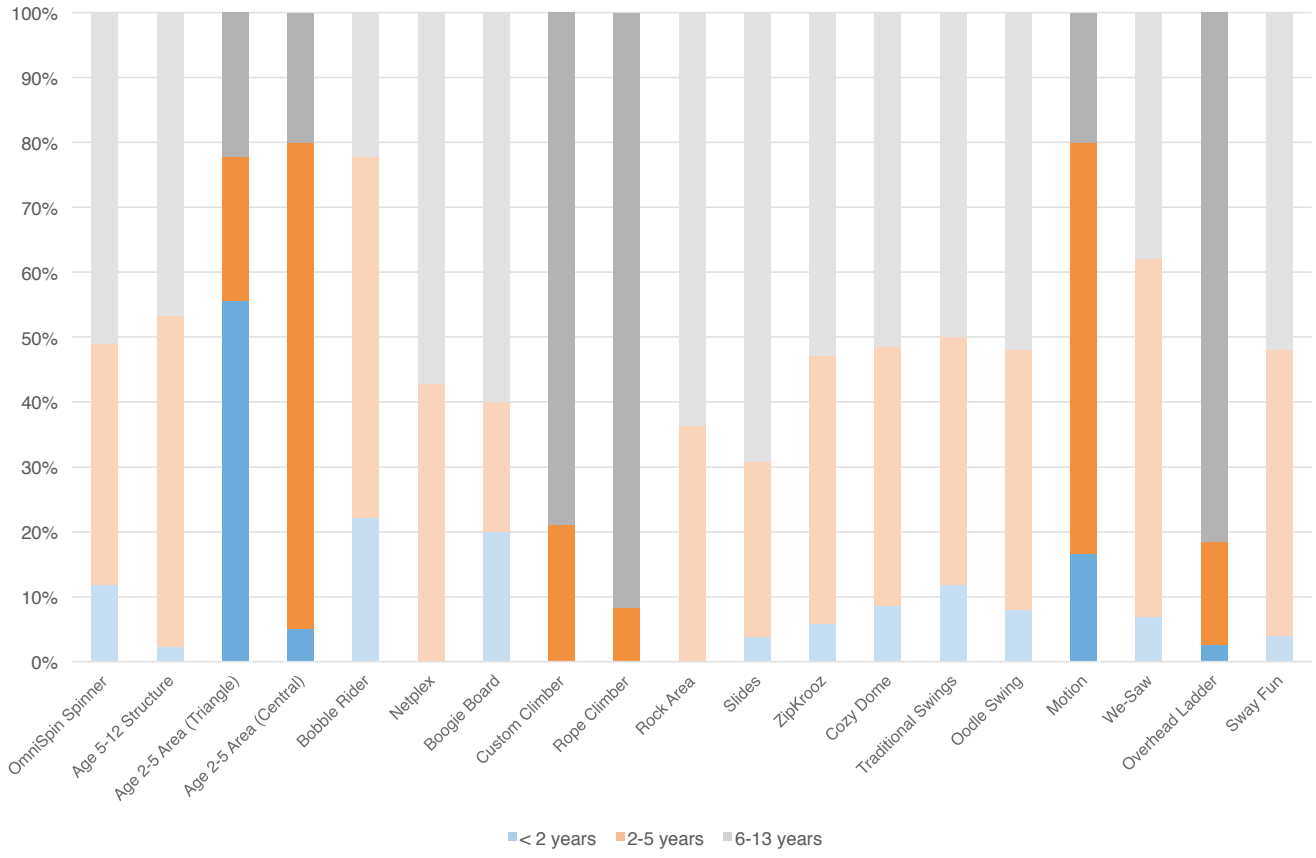

Figure 2: Length of Stay by Component

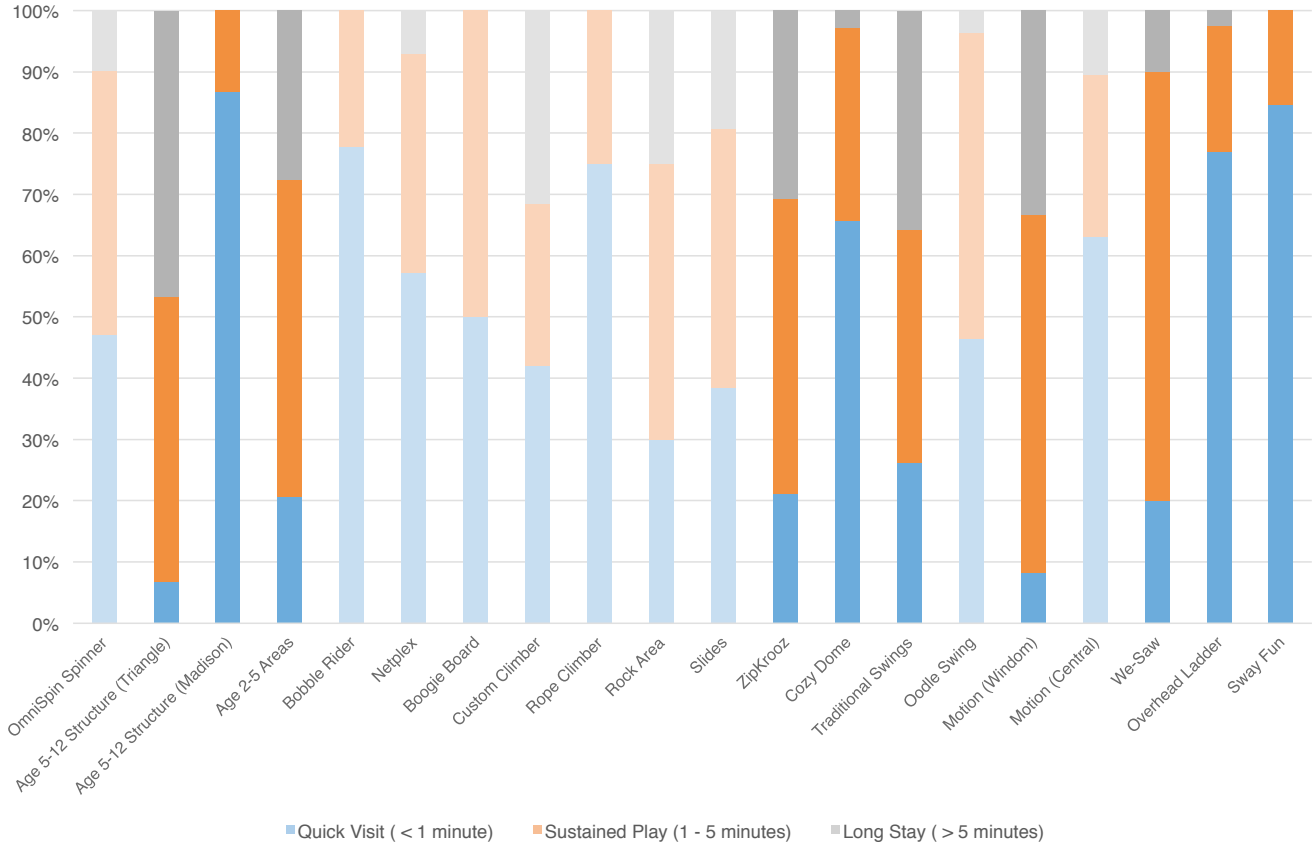

Figure 3: Frequency of Peer Play by Component

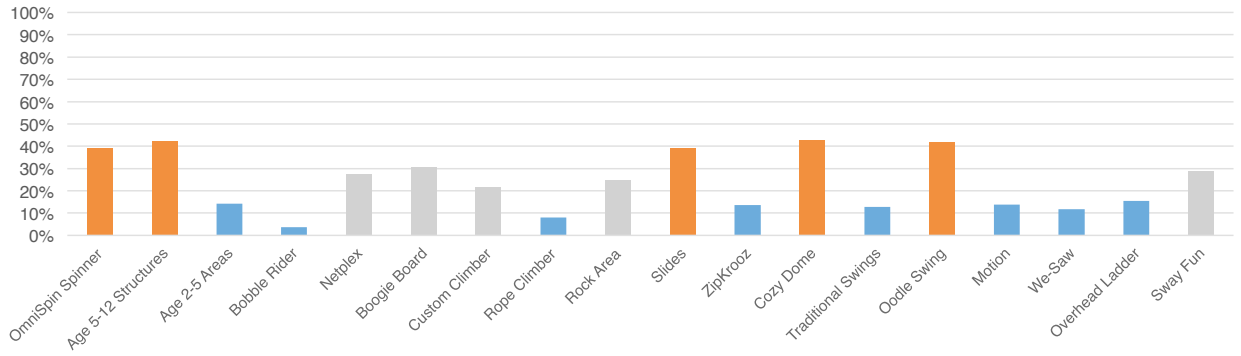

Figure 4: Frequency of Active Adult Engagement by Component

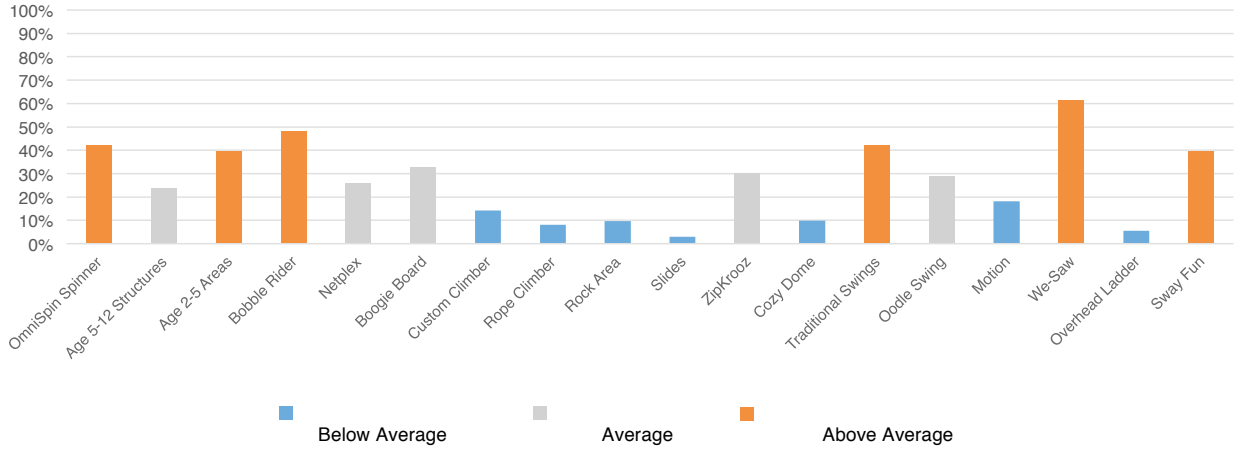

Figure 5: Play Activity Distribution by Component

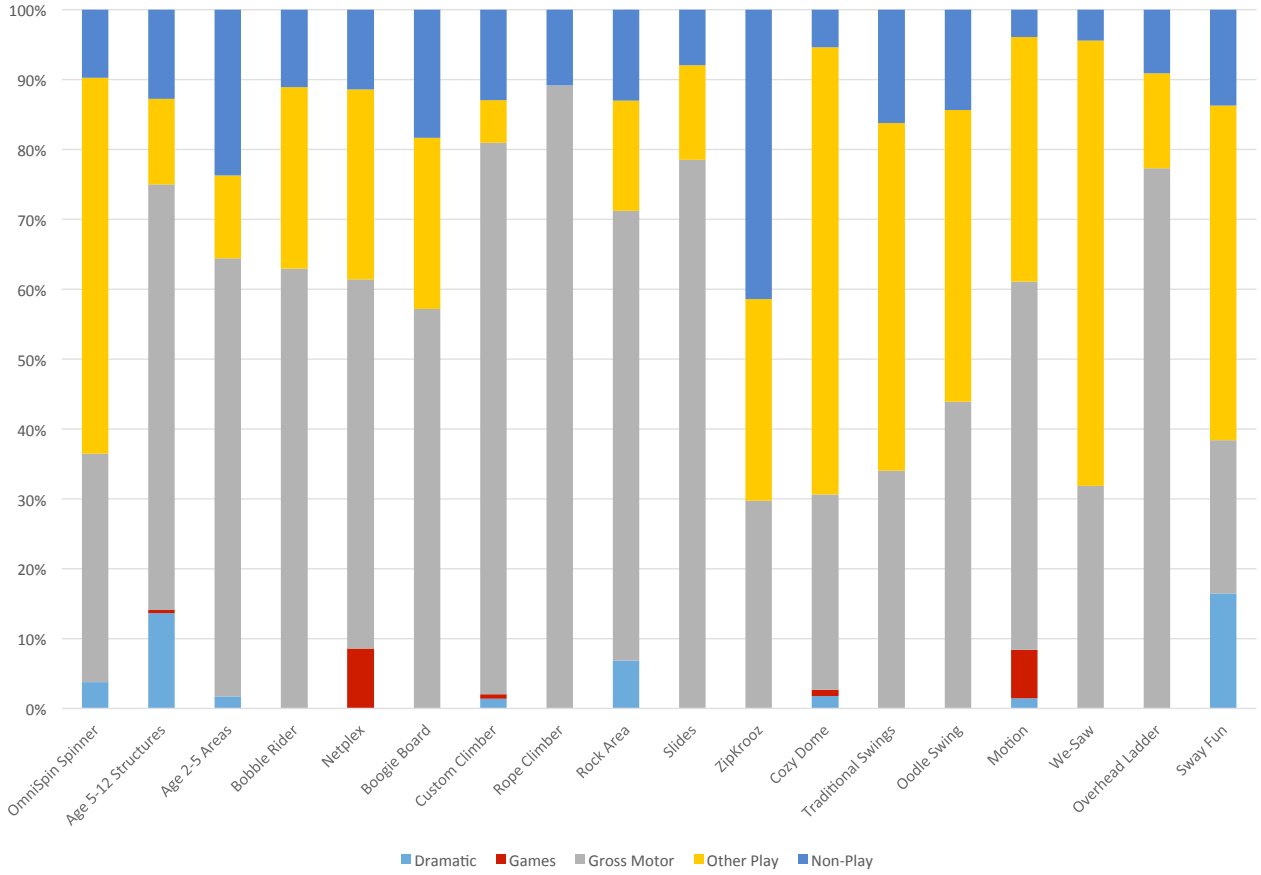

Table 1: Number of Children and Intervals Observed by Component

Component	Number of Children Observed	Number of 10 sec Intervals Recorded
OmniSpin Spinner	51	266
Age 5-12 Structures	45	220
Age 2-5 Areas	29	236
Bobble Rider	9	27
Netplex	14	70
Boogie Board	10	49
Custom Climber	19	147
Rope Climber	12	37
Rock Area	22	146
Slides	26	163
ZipKrooz	52	454
Cozy Dome	35	112
Traditional Swings	42	370
Oodle Swing	28	139
Motion	31	203
We-Saw	30	204
Overhead Ladder	39	110
Sway Fun	26	73

Note: These numbers should not be interpreted as an index of component popularity, because they depend on overa park attendance which varied greatly across the four playgrounds.

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