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Research Article

# Playing outdoors: What do children do, where and with whom?

**Gerben Helleman[1], Ivan Nio[2] , Sanne I. de Vries[3]**

**Abstract**: There is an increasing interest in outdoor play, both in research and in policy. However, in (re)designing, planning and managing the public space, there is still limited attention for children's actual playing behavior. A lot of urban planning decisions are based on adults' perceptions of children's playing behavior and focus on formal play spaces, rather than on their actual behavior and on other, more informal, play places children might also use. Therefore, the purpose of this study was to explore where children play outdoors, with whom and what kind of activities they are performing there. Between February 2022 and March 2023 1,127 – mainly primary school - children were systematically observed after school in three post-war residential districts in three cities in The Netherlands. The majority of the children were between 5-8 years old (50%). Above the age of 8 years, substantially more boys (70%) than girls (30%) were playing outdoors. Most of the children (79%) were playing with other children, 8% were playing alone. The playground was the most popular play space (36% of the observed children were playing there), followed by public sports fields (14%) and sidewalks (13%). With respect to the type of activities, relaxing (21%) was the most common activity, followed by ball sports (14%), climbing or hanging (11%), swinging (10%), and riding on wheels (9%). This study showed differences in play behavior by gender, age, district and play space and stress the need for a broader definition of play, and for focusing on formal as well as informal play spaces.

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## Introduction

In 1978 Colin Ward wrote the book 'The Child in the City'. This book still has its value today. In his book, Ward examines the everyday spaces of children's lives. Through play, appropriation and imagination, children can counter adult-based intentions and interpretations of the built environment, negotiate and re-articulate the various environments they inhabit. The public space gives children freedom of choice: they can follow their own interests, set their own goals and create their own play environment (location, play form, playmates). At the same time the public space can be seen as a laboratory where children learn in multiple ways, acquire social skills and develop skills such as wayfinding. This has been confirmed in more recent research (see for an overview De Vries & Van Veenendaal, 2012; Helleman, 2018; Lester & Russell, 2008). Outdoor play has an important influence on for example the personal development of children: while playing, they can learn different motor, social, and cognitive skills (Cole-Hamilton et al., 2002). In addition, outdoor play has a positive effect on their health (Gray et al., 2015). This is partly because children are much more active outside than inside and because they get into contact with sunlight and nature. Research in fifteen European countries has also shown the positive effect of outdoor play on mental health: children who play outside every day feel happier than children who play outside less often (Gromada et al., 2020). Last but not least, playing outside is an important recreational activity. Although

[1] The Hague University of Applied Sciences, Research group Healthy Lifestyle in a Supporting Environment, The Hague, The Netherlands, e-mail: g.helleman@hhs.nl, ORCID: https://orcid.org/0000-0003-3694-5244

[2] Amsterdam University of Applied Sciences, Research group Urban Governance and Social Innovation, Amsterdam, The Netherlands, e-mail: nio@planet.nl, ORCID: https://orcid.org/0009-0005-2359-5048

[3] The Hague University of Applied Sciences, Research group Healthy Lifestyle in a Supporting Environment, The Hague, The Netherlands; Leiden University Medical Center, Department of Public Health and Primary Care, Leiden, The Netherlands, e-mail: s.i.devries@hhs.nl, ORCID: https://orcid.org/0000-0002-9032-883X

outdoor play can be educational and improve certain skills, it is also - or even more important - fun to do.

**Where and Who**

Children play in different places: in private environments (indoors, gardens), in organized environments (school, childcare, sports clubs) and in public environments (in freely accessible spaces). This article focuses on the latter category and specifically on outdoor play after school in their own living environment. We focus on child-led play, play that is initiated by children themselves with an open, unpredictable, and unstructured character (Gray, 2013; Zosh et al., 2018). This distinguishes it from guided activities and from, for example, training at a sports club where a group of children tries to improve a number of controlled movement skills every week at set times under the supervision of an adult.

When playing outside, children look - within their possibilities and wishes at that moment - for a place where they can have the most fun. For this, they can use many diverse types of play spaces. On the one hand, there are formal play areas, such as a playground, schoolyard or sports field. These are often enclosed areas that are specifically designed for certain target groups and that often also function as a meeting place. On the other hand, there are informal play areas, such as the sidewalk, shrubs, bushes, lawns and residual spaces. These unprescribed spaces are not designed as such, but are made their own by the children. Also referred to as 'shaped affordances', play areas created by children themselves (Kyttä, 2002) and identified by many children of different ages as important play areas (Brussoni et al., 2020; De Vries et al., 2010; Meire, 2020).

The extent to which children play freely in their own living environment depends on many factors, the most studied are gender and age. In general girls play outside less than boys, as research in Belgium (Meire, 2020) and the United States (Larson et al., 2011) shows. Age also plays a role in outdoor play behavior. In the years before primary school (0-4 years), parents are still physically present when the child plays outside to play with them or to supervise. In general, from primary school, children are slowly given more space to play outside alone. Initially in a very small area near or around the home and from about eight years of age, children are often allowed to play unaccompanied in their own living environment (Bouwmeester, 2006; O'Brien et al., 2000; Shaw et al., 2015). At that age most of the time they are not allowed to go further into (or leave) their district, which means that they are most dependent on their immediate living environment to play outside.

**Research on Outdoor Play**

In line with the United Nations Convention on the Rights of the Child (United Nations, 1989) and the reported benefits of outdoor play, in the last few decades, more attention is being paid to outdoor play in both policy and research. However, there is still much to gain. Most of the time cities are not planned and managed with children in mind (Churchman, 2003). Many studies on outdoor play and child-friendly cities are still based on what parents report in questionnaires about their children's outdoor play behavior. Children are also seldomly involved in the (re)design of public spaces and playgrounds (Cele & Van der Burgt, 2015; Corkery & Bishop, 2020; Skelton, 2022). And when children are involved in policy-making or research it is often difficult for children to share their experiences because they do not always have all the necessary communication skills, especially when traditional participation methods are used such as questionnaires and interviews (Derr et al., 2018; Young & Barrett, 2001). In addition, children are often asked about their behavior from the past. The question is whether children can remember this well (*recall bias*) and whether they do not give a selective answer by naming special occasions and not their regular and actual behavior (*selection bias*). These problems can be circumvented by using observations. However, most observational studies have focused on specific formal play spaces such as schoolyards or playgrounds, rather than on the entire neighbourhood, including several formal and informal play spaces (Helleman & De Visscher, 2022; Loebach et al., 2020). Informal play spaces, such as sidewalks and courtyards, or areas that are located 'in-between' seldomly find their way into research, although they can be very meaningful for children during play (Luchs, 2017). In other words, much research, policies and design in the field of outdoor play can still be characterized as adult-centric and place-led, rather than child-centric and child-led.

As a result, there is still little knowledge about the actual play behavior of children in their own neighbourhood or district. Therefore, the purpose of this study was to gain insight into children's outdoor play, defined here as: playing, exploring, and discovering by children in the outdoor environment in their free time. With this research the following questions will be answered: where do children play in residential districts? With whom do children play? What kind of activities do they employ when they are outside? And what differences are there in outdoor play behavior by gender and age? We expect informal play spaces to be as important as formal play spaces. In addition, in line with previous research we expect boys to play more outdoors than girls. We also expect to see differences in the type of activities they are employing.

## Method

To increase our understanding of children's play behavior, three districts in the Netherlands were each visited four times in the afternoon between February 2022 and March 2023, to observe children playing in (semi-)public spaces in the open air. Playing in organized and protected environments (school, childcare, sports clubs) was not included in the observations. Neither was playing in backyards (private) or indoor malls (interior).

A combination of observation tools have been used: (1) *counting*: how many and which children use a certain place (headcount); (2) *time sampling*: determine which play activity occurs on a particular short period of behavior; and (3) *mapping*: document where children play on a plan of the neighborhood (also known as behavioral mapping). These methods have been used in the past by urban sociologists, environmental psychologists, design researchers, and public life study pioneers, such as Kevin Lynch (1977), Roger Hart (1979), William H. Whyte (1980), and Jan Gehl (Gehl & Svarre, 2013).

We choose for: (1) direct observation on the spot; (2) non-participating, inconspicuously and concealed observation from an appropriate distance (a few meters); and (3) structured observation using predefined observation categories (Eelderink, 2021). The distinctive observation categories for the potential play locations and play activities were based on previous (inter)national research, pilot-tested for clarity and reliability and adjusted before the start of the data collection.

### Study Areas

The observations of children's play behavior were carried out in three districts in the Netherlands: Kolenkitbuurt / Overtoomse Veld (Amsterdam), Morgenstond (The Hague) and Tanthof (Delft) (Table 1). These districts have been selected on the basis of their similarities as postwar residential districts outside the city center, but also on their differences in layout and density in order to analyze whether the built environment plays a significant role in outdoor play behavior. In addition, the cities (Amsterdam, The Hague, and Delft) were chosen because they all have to deal with a densification task in order to meet the increasing demand for housing.

Kolenkitbuurt / Overtoomse Veld (Amsterdam) – This early post-war district is in the western part of Amsterdam, between the ring road and the embankment of the subway. In the 1950s and 1960s housing associations built many four-storey apartment blocks with communal outdoor spaces. From the moment of completion, these were child-rich parts of the city. From the 1980s, the composition of the population changed rapidly due to the arrival of residents with a migration background. The district came to symbolize the increasing social problems in the post-war city. This was one of the reasons for radically renewing the district by means of demolition-new construction and renovation. In the past twenty years, the district has become highly densified with both apartments and single-family homes. The increase in owner-occupied homes and more expensive rental homes has created a more mixed group of residents by social class. Nowadays, it is a diverse area with many different cultures. Approximately 20,000 inhabitants live in the district, 18% of whom are between zero and fifteen years old.

Morgenstond (The Hague) - This district was built in the fifties of the last century and now has approximately 20,300 inhabitants, 19% of whom are between zero and fifteen years old. The district is characterized by a grid of motorized traffic roads. Along these roads mainly elongated, four-story

apartment blocks of housing associations can be found. Between these building blocks, there are communal outdoor spaces. Over time, the area has changed considerably, both in terms of housing stock and population composition. Nowadays, it is a diverse neighborhood with many different cultures and lifestyles. There is a large stock of cheaper homes occupied by people with a modest income. In recent years, several single-family homes have been added to the housing stock, which is mainly occupied by middle-class families. These are owner-occupied homes, with private gardens and shielded parking spaces.

Tanthof (Delft) - With approximately 14,000 inhabitants and 7,000 homes, the Tanthof district is one of the largest districts in the city of Delft. It has the largest share of single-family homes and the lowest percentage of flats. One part mainly consists of houses from the late 1970s and early 1980s with gabled roofs, a winding street pattern, car-free streets and the so-called 'woonerven' (living streets). Another part of the district has a more rectilinear street pattern with more housing with flat roofs from the late eighties. It has a suburban appearance due to the many green areas, the ditches, the terraced houses/low-rise buildings, the front and back gardens, and the cars parked near the front door. Residents - mainly of Dutch descent - mainly live there for the peace, space and greenery. Due to the aging population, the number of children living in the neighborhood has decreased over the years: 13% of all residents are between zero and fifteen years old. However, they are often joined by children who stay with their grandparents after school until they are picked up by their parents who live elsewhere in the city.

**Table 1**. A number of demographic and built environment characteristics of the three districts studied

| | Kolenkitbuurt / Overtoomse Veld (Amsterdam) | Morgenstond (The Hague) | Tanthof (Delft) |
|---|---|---|---|
| Inhabitants | 20,070 | 20,300 | 14,000 |
| 0-15 years old | 18% | 19% | 13% |
| Households with children | 31% | 31% | 29% |
| Surface (in hectare) | 125 ha. | 169 ha. | 233 ha. |
| Population density | 160 inhabitants/ha | 120 inhabitants/ha | 60 inhabitants/ha |
| Building period | 1950s-1960s / 2000-2022 | 1980s / 1990s | 1950s / 1994-2017 |
| Single-family house | 5% | 11% | 58% |
| Multi-family house | 95% | 89% | 42% |

Source: Centraal Bureau voor de Statistiek, 2022

## Fieldwork Protocol

Each district was observed systematically. Due to its size, each district was divided into multiple neighborhoods that are more or less equal in terms of distance. Based on an initial exploration, a fixed walking route that takes about an hour and a half through the neighborhood was determined and drawn on a map. This fixed route prevents certain places from being visited more often than others, which could create a skewed image. The observer varied the starting point and the walking direction (left or right). In this way, places on the route are visited at different times of the afternoon. The route included all possible streets, (back) trails, sidewalks, squares, parks, schoolyards and play spaces. Each route was walked in good weather conditions four times on four different days, between 3:30 pm and 6:00 pm. Of the 72 observation rounds, ten were carried out over the weekend.

For this research, we used the GPS app 'ArcGIS Survey123', a customizable form-centric data-gathering application in which an observant can record the location of a playing child and fill in a simple questionnaire about the child and its play behavior. When the observer encountered a child, he or she stood at a suitable distance without being noticed and recorded the exact location using the GPS tool. Then the activities of the child were observed for a short period of time (approximately two minutes) and then one, two or three of the predefined and distinctive categories (Table 6) were registered in the app**.** Next, the observant also registered one of the predefined types of play location (Table 4), with whom the child was playing (alone or with other children or adults), and the absence or presence of adults (Table 3). In addition, the observers estimated the child's gender and age category (Table 2). Although a larger age range of

children was observed from zero to 18 years old, the main focus was on primary school children between the ages of four and twelve.

The fieldwork was mainly carried out by four researchers who observed individually supplemented with thirty students of the study Spatial Development (The Hague University of Applied Sciences) who worked in groups of two or three. By working with groups the reliability increased and any errors are minimized. A manual has been prepared for the observers. They also received extensive oral instruction in order to reduce the chance of interpretation differences.

### Data Analysis

Observational data was exported from ArcGIS Online into both Microsoft Excel (for Microsoft 360) and IBM SPSS Statistics 28 for quantitative analysis. Excel was used to produce crosstabs comparing all categorical variables. In SPSS relationships between categorical variables and demographic groups (gender and age) were calculated using Pearson chi-square tests of independence and these figures were further interpreted using Cramer's V (asymmetrical matrices) to provide insights into the strength of the potential relationships.

To determine whether certain places in the neighborhood were used more or less by the children, the GPS data was projected on a map in ArcGIS, creating for example district heatmaps that show where children go. By combining it with a map showing all formal play spaces, conclusions can be drawn about the use of different play areas.

## Results

### Who is Playing Outdoors?

During the walks through the three districts, 1,127 children have been observed of which 33% were in Amsterdam, 38% in The Hague, and 29% in Delft. In the rest of this manuscript, the figures will only be specified per district when there are clear differences.

The vast majority of the 1,127 children were between five and eight years old (Table 2). We hardly encountered children aged thirteen or older at the times we observed. In Amsterdam there were slightly more children between five and eight years old and in Delft we saw slightly more children between nine and twelve years old. In total, we encountered more boys (59%) than girls (41%). If we combine these findings and look at both gender and age, an interesting picture emerges. In the younger age groups - from zero to eight years - the ratio between boys and girls is about equal. However, large differences arise with age. Girls aged nine or older seem to be playing less in public spaces than their male peers. The even distribution at a young age shifts to dominance of boys in the older age groups (Table 2). We found this distinction in all three districts. However, in the suburban Tanthof (Delft) we encountered relatively more girls between the ages of nine and twelve (49%) than in the urban district of Amsterdam (19%).

**Table 2**. Who plays outside according to gender and age (in percentages and numbers)?

| | Girls<br>% (n) | Boys<br>% (n) | Total<br>% (n) |
|---|---|---|---|
| **0-4 years old** | 59 (106) | 41 (74) | 100 (180) |
| **5-8 years old** | 42 (237) | 58 (327) | 100 (564) |
| **9-12 years old** | 29 (90) | 71 (216) | 100 (306) |
| **13 years or older** | 35 (27) | 65 (50) | 100 (77) |
| **Total** | 41 (460) | 59 (667) | 100 (1,127) |

### With Whom are Children Playing Outdoors?

The children that were observed almost never played alone. In 79% of the cases, children were playing together with one or more children. 5% played with an adult and 7% played with an adult and other children. Of the children who played together, this was mainly with one (28%), two (21%) or three (13%) children. Only 8% played alone, girls slightly more often than boys.

Although a small percentage of children played with an adult, in 41% of the cases, an adult was physically nearby. This differs by age and gender (Table 3). A Cramer's V test indicated a moderate association between age and supervision (Cramer's V = 0.458; $p < 0.001$). Fewer adults were present with the older children than with the youngest. In addition, there were significant but low associations between gender and supervision (Cramer's V = 0.153; $p < 0.001$). Girls are more often supervised by an adult than boys, in all age categories. We saw less adults supervising kids in Delft (72% without adults) than in Amsterdam (52%) and The Hague (56%), especially in the age group five to twelve years.

**Table 3**. Supervision by an adult by gender and age (in percentages and numbers)

| | Girls % (n) | | Boys % (n) | | Total % (n) | |
|---|---|---|---|---|---|---|
| **Adult present?** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** |
| **0-4 years old** | 84 (89) | 16 (17) | 73 (54) | 27 (20) | 79 (143) | 21 (37) |
| **5-8 years old** | 50 (119) | 50 (118) | 44 (144) | 56 (183) | 47 (263) | 53 (301) |
| **9-12 years old** | 19 (17) | 81 (73) | 14 (31) | 86 (158) | 16 (48) | 84 (258) |
| **13 years or older** | 15 (4) | 85 (23) | 2 (1) | 86 (49) | 6 (5) | 94 (72) |
| **Total** | 52 (229) | 48 (231) | 38 (230) | 62 (437) | 41 (459) | 59 (668) |

## Where are Children Playing Outdoors?

The vast majority of children we encountered played at a playground (Table 4). Followed by the public sports fields and sidewalk. Although the formal play spaces - that are specifically designed for children - were slightly more popular (57%), a high percentage of children played in informal play spaces, places that they themselves convert into a play space (42%). This concerns for example: sidewalks, lawns, the street, and neighborhood squares.

**Table 4**. What type of play spaces do children play in, according to gender and age? (in percentages and numbers)

| | | Total % (n) | Girls % (n) | Boys % (n) | 0-4 years old % (n) | 5-8 years old % (n) | 9-12 years old % (n) | 13 years or older % (n) |
|---|---|---|---|---|---|---|---|---|
| **Formal play spaces (57%)** | Playground | 36 (407) | 52 (213) | 48 (194) | 24 (97) | 50 (203) | 20 (81) | 6 (26) |
| | Public sports field | 14 (159) | 25 (39) | 75 (120) | 1 (1) | 45 (71) | 43 (69) | 11 (18) |
| | Schoolyard | 6 (69) | 48 (33) | 52 (36) | 13 (9) | 71 (49) | 13 (9) | 3 (2) |
| | Skatepark | 1 (5) | 0 (0) | 100 (5) | 0 (0) | 100 (5) | 0 (0) | 0 (0) |
| **Informal play spaces (42%)** | Sidewalk | 13 (145) | 41 (59) | 59 (86) | 20 (29) | 50 (72) | 24 (35) | 6 (9) |
| | Lawn/grass space | 7 (79) | 28 (22) | 72 (57) | 14 (11) | 49 (39) | 29 (23) | 8 (6) |
| | Street | 5 (58) | 33 (19) | 67 (39) | 12 (7) | 26 (15) | 59 (34) | 3 (2) |
| | Neighborhood square | 5 (53) | 47 (25) | 53 (28) | 25 (13) | 42 (22) | 23 (12) | 11 (6) |
| | Courtyard | 4 (46) | 24 (11) | 76 (35) | 9 (4 ) | 61 (28) | 30 (14) | 0 (0) |
| | Parc | 4 (41) | 34 (14) | 66 (27) | 5 (2) | 61 (25) | 27 (11) | 7 (3) |
| | Bushes, shrubs | 2 (22) | 32 (7) | 68 (8) | 5 (1) | 59 (13) | 32 (7) | 5 (1) |
| | Front yard | 1 (14) | 50 (7) | 50 (7) | 21 (3) | 50 (7) | 29 (4) | 0 (0) |
| | Ditch, canal (water) | 1 (11) | 36 (4) | 64 (7) | 0 (0) | 55 (6) | 45 (5) | 0 (0) |
| | Parking lot | 1 (6) | 67 (4) | 33 (2) | 17 (1) | 17 (1) | 33 (2) | 33 (2) |
| **Other (1%)** | Other | 1 (12) | 25 (3) | 75 (9) | 17 (2) | 67 (8) | 0 (0) | 17 (2) |
| | Total | 100 (1,127) | 41 (460) | 59 (667) | 16 (180) | 50 (564) | 27 (306) | 7 (77) |

There is a statistically significant - albeit weak - association between gender and play spaces (Cramer's V = 0.236; $p < 0.001$) and between age and play spaces (Cramer's V = 0.214; $p < 0.001$). At the schoolyards, playgrounds, and on the sidewalks we observed about as many girls as boys (Table 4). This cannot be said of the public sports fields and the grass spaces. Here boys were overrepresented in three-quarters of the cases. In this research sports fields are the smaller soccer and basketball courts in residential neighborhoods that are open to the public (not to be confused with larger sports club fields for members). Looking at age, half of the children in the playgrounds are five up to and including eight years old. And almost a quarter is between zero and four years old. This is relatively high compared to the other venues. On the public sports fields and streets we encountered relatively more older children.

Looking at which place is most popular by gender (Table 5), then it turns out that most girls play in a playground (46%). Playgrounds were also the most popular place for boys, but less clearly (29%). Boys were also often found on public sports fields (18%). The sidewalk was used in 13% of the cases by both genders. We also see differences by age. Half of the children from zero to four years old played at the playground and 16% on the sidewalk. In the age category of five to eight years, only one-third play in the playground and 13% on the sidewalk. And from nine to twelve years, this is 26% and 11%, respectively. At this phase, the public sports field becomes more important than at a younger age.

**Table 5**. The most visited play places by gender and age (in percentages and numbers)

| | **Total % (n)** | **Girls % (n )** | **Boys % (n)** | **0-4 years old % (n)** | **5-8 years old % (n)** | **9-12 years old % (n)** | **13 years or older % (n)** |
|---|---|---|---|---|---|---|---|
| **Playground** | 36 (407) | 46 (213) | 29 (194) | 54 (97) | 36 (203) | 26 (81) | 34 (26) |
| **Public sports field** | 14 (159) | 8 (39) | 18 (120) | 1 (1) | 13 (71) | 23 (69) | 23 (18) |
| **Schoolyard** | 6 (69) | 7 (33) | 5 (36) | 5 (9) | 9 (49) | 3 (9) | 3) (2) |
| **Sidewalk** | 13 (145) | 13 (59) | 13 (86) | 16 (29) | 13 (72) | 11 (35) | 12 (9) |
| **Lawn/grass space** | 7 (79) | 5 (22) | 9 (57) | 6 (11) | 7 (39) | 8 (23) | 8 (6) |
| **Street** | 5 (58) | 4 (19) | 6 (39) | 4 (7) | 3 (15) | 11 (34) | 3 (2) |
| **Other categories** | 19 (210) | 17 (75) | 20 (135) | 14 (26) | 19 (115) | 18 (55) | 17 (14) |
| **Total** | 100 (1,127) | 100 (460) | 100 (667) | 100 (180) | 100 (564) | 100 (306) | 100 (77) |

When we compare the three districts, we see some differences. In Kolenkitbuurt/Overtoomse Veld, Amsterdam the children play more spread out over the different types of play spaces, with also the most children in playgrounds (28%), but less than in the other districts. An above-average number of children were playing in public sports fields (19%) and schoolyards (11%) in Amsterdam. Especially the larger play spaces near schools, consisting of playgrounds and sports fields, are used by many children. In Morgenstond, The Hague we encountered most children at playgrounds (45%). The sidewalk is relatively often used as a play space (16%). Few children were playing on a public sports field (8%) in Morgenstond. Particularly striking in Tanthof, Delft is that relatively many children play on the street (9%). Here we also observed relatively many children on sports fields (17%).

Although children often find themselves in playgrounds, not all playgrounds are equally popular. By combining the GPS location of where children played and the locations of various formal playgrounds, we see, that one location is visited more often than the other. No children were observed for example on the playgrounds in the northeast of Morgenstond, The Hague, while three other playgrounds were used intensively (figure 1). We also saw many children - often with their parents - in a neighborhood park with different kinds of play spaces. This park is in the middle of the district and near a shopping center. In Tanthof, Delft and Kolenkitbuurt/Overtoomse Veld, Amsterdam we saw that a lot of children are playing in and around the schoolyards, in general places with different play elements and sufficient other children to play with. At other places we did not encounter any children, for example on a sports field in Tanthof at the edge of the district which you only can reach if you cross a busy road.

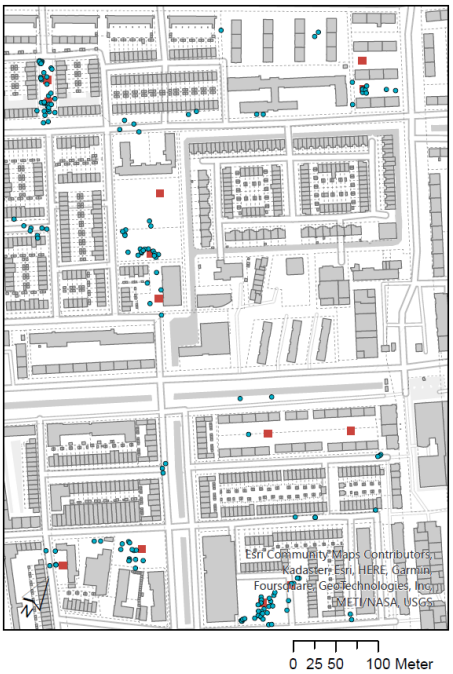


**Figure 1.** Formal play spaces (red square) and places where children play (blue dots) in a part of Morgenstond - The Hague (created using ArcGIS® software by Esri. ArcGIS® and ArcMap™, sources: Esri, DeLorme, HERE, MapmyIndia)

## What are Children Doing While Playing Outdoors?

In most cases, the children were 'relaxing' (Table 6). So instead of actively playing, they were resting, socializing, hanging out, sitting, watching or talking to other children. For example, children sitting in a swing basket without swinging but just talking or observing, children who are resting after an intense game, children who are left out and watching from a distance, children who discuss what they are going to do, teenagers exchanging stories, watching their phone, and listening to music, etcetera. This type of activity was increasingly observed with age, but was as common among girls as among boys. In absolute terms, this behavior was most commonly encountered in the playgrounds and on the sidewalk. In almost all cases (92%), children were not relaxing alone, but together with other children.

In other types of activities, there were more differences by gender. Boys were mainly involved in ball sports (19%), such as soccer and basketball and in ball games (11%), such as curb ball, dodgeball, and throwing things. Girls, on the other hand, were mainly involved in swinging or hobbling (14%) on a swing, ropes, or spring-rider. Next 14% of the girls were climbing or hanging on for example a tumble bar, ropeway, climbing frame, fence or tree. Swinging (19%), climbing (15%) and riding (14%) with a stunt scooter, bike, or roller skates were most popular among the youngest age group, from zero to four years old. From nine to twelve years old, children were mainly relaxing (29%) and playing ball sports (23%).

The predetermined activities of building, role play, hiding, and jumping were seldomly recorded. A number of play activities (6%) could not be assigned to the predetermined activities and were included in the category 'other' (not included in Table 6). This concerned children who were playing for example with toys and other attributes, such as toy cars, bubble blowers, frisbees, water guns and bottles ('bottle flip' game).

**Table 6**. Activities of children (in percentages and numbers)

| Activity | Description | Total % (n) | Girls % (n) | Boys % (n) |
|---|---|---|---|---|
| **Relaxing** | hanging around, sitting, watching, talking, socializing, etc. | 21 (359) | 20 (143) | 22 (216) |
| **Ball sport** | soccer, hockey, tennis, basketball, table tennis | 14 (231) | 6 (40) | 19 (191) |
| **Climbing, hanging** | tumble bar, ropeway, climbing frame, net, tree, fence, etc. | 11 (183) | 14 (101) | 8 (82) |
| **Swinging** | swing, rope, spring-rider | 10 (164) | 14 (101) | 6 (63) |

| | | | | |
|---|---|---|---|---|
| **Riding, on wheels** | skateboard, stunt scooter, roller skating, cycling | 9 (148) | 10 (69) | 8 (79) |
| **Running** | from A to B, up and down hill, tag, etc. | 8 (140) | 9 (62) | 8 (78) |
| **Ball game** | curb ball, dodgeball, fiddling, throwing | 8 (140) | 4 (28) | 11 (112) |
| **Balancing** | balance beam, wobbly bridge, seesaw, hula hoops, gymnastics | 5 (92) | 6 (45) | 5 (47) |
| **Investigating** | play panels, animals, plants, flowers, etc. | 4 (66) | 4 (26) | 4 (40) |
| **Sliding, rolling** | slide, sliding pole, hang glider, roll down hill, etc. | 3 (54) | 5 (33) | 2 (21) |
| **Building, creating** | building a hut/tent, playing sand, chalking, water pump, etc. | 2 (42) | 3 (21) | 2 (21) |
| **Role play** | father-mother, bakery, shop, 'fight' with water pistols | 2 (42) | 3 (23) | 2 (19) |
| **Jumping** | trampoline, hopscotch, jump rope | 1 (17) | 1 (6) | 1 (11) |
| **Hiding** | hide and seek, hide in hut/tree house/bushes/playground | 1 (15) | 1 (9) | 1 (6) |
| **Total** | | 100 (1,693) | 100 (707) | 100 (986) |

Looking at the activities at specific play spaces, we see that one-fifth of the children at the playgrounds were climbing or hanging and 19% were swinging or hobbling. On the public sports fields, children were logically mainly engaged in ball sports (55%) and ball games (23%). Relaxing was mainly observed on the sidewalk (32%). In addition, in 27% of the cases, children were riding on the sidewalk or playing a ball game (12%).

## Conclusion and Discussion

By systematically observing the outdoor play behavior of 1,127 children between 0-18 years after school, we increased our insight in children's actual outdoor play behavior and found out where they played, with whom and what they were doing in three post-war residential districts in The Netherlands. We found differences in play behavior by age, gender, district and play space. Based on our results, we propose that both future research and policy should be based on a broader definition of play and play spaces. We also zoom in a bit more on the gender differences we found and the differences between the districts.

### Broader Approach of Play

One of the most important conclusions of this research is that many children who were outside were not actively engaged in play activities all the time. One-fifth of the children we observed were relaxing, resting, chilling, talking, or watching other children. These activities are also known as 'restorative play', based on nature's restorative qualities that help to relax and cope with everyday stress (Kaplan, 1995; Wesselius, 2020). Simply being outdoors can have a similar effect. Although the term 'restorative play' may suggest otherwise, it is not only about restoration after a more intensive period of play or a phase between play activities ('on-the-way'). In our observations it was also about watching other children to learn things ('copycat'), watching another child perform preparatory work, such as hanging a rope to jump rope later ('prelude') and exchanging experiences with each other ('socializing'). Most of the time it was just about being outside with friends sitting and talking before starting a new activity (or not). This is in line with previous research among children aged between eight and nine years old in Scotland showing that 'hanging about' with friends, 'having a laugh', and gossiping is a popular activity (Thomson & Philo, 2004). Other research shows that children go to places that provide opportunities to clear their mind, pour out troubles, relief from daily hassles, relax, and feel free (Korpela et al., 2002). In such a case, the play space acts more as a place to meet and socialize than as a space to play. This therefore requires play equipment or other elements that also facilitate these sedentary activities. Attributes, such as a bench, basket swing or hammock, where you can sit together face to face, hang out, and chat.

The results of this study also show that play is a broad concept and that children do many different things when they are outside. Communication, negotiation and observing activities might not always be considered as play although these acts are of great importance in children's development, in construction, exploration and role-playing (Luchs, 2017). Even if an activity cannot be linked to a certain type of play behavior, it still matters for children as part of children's development and of being outdoors. Outdoor

play can also be purposeless. Or as Thomson and Philo (2004, p.125) point out: "The word 'play' seems to suggest something organized, stimulating, tangible and wholesome […] We would reply, however, that young people are quite often not *doing*, they are just being, simply *existing*". A broader definition of play is therefore desirable, one that also takes these sedentary and restorative activities into account. The study and elaboration of Loebach and Cox (2020) is very useful in this respect. They have expanded the traditional division of types of play from among others Joe Frost (1992), Bob Hughes (1996), and Kenneth Rubin (2001) into nine primary types with 32 sub-types. 'Restorative play' is one of the primary types including resting, retreat, reading and onlooking as sub-types. Social conversation between children is part of the primary type 'expressive play' and a non-playful movement from one space to another ('transition') is seen as 'non-play'. The latter is doubtful. When we saw children walking in their neighborhood, it was often not a formal and straightforward movement from A to B as adults know it. In most cases, their translocation also contained play elements and was accompanied by special movements, surprising walking routes, exploration and social interaction.

**Broader Approach of Play Spaces**

Seeing 'transition' as 'no play' is probably also because play observations have long been focused primarily on smaller predefined target areas, the so-called formal play spaces. As mentioned before, the informal areas that are located 'in-between' have not been studied much, while they do form an important part of the living environment of children. This is also evident from this research, i.e. 42% of all children were in the so-called informal play spaces, such as the sidewalk, courtyard, neighbourhood square, lawn, and street. A similar observational study in Belgium showed that 34% of the children played in places with multiple functions (Meire, 2020). It confirms what Colin Ward (1978, p.180) has stated before: "Children play anywhere and everywhere".

That's why it is important to look beyond standard play areas in future research and policy when we talk about children's play environments. For this, the distinction of Rasmussen (2004) between 'places for children' and 'children's places' can be helpful. The first one are institutionalized places for children, specifically designed by adults and dedicated for children consisting of the home arena, schools and recreational institutions. The second are undefined places where children have attributed special meaning and identity to it by their own actions. The first one display adults' ideas about what children *should* do, and the second display children's own ideas about what they *want* to do. The playgrounds, schoolyards and public sports fields - where 57% of the children were playing - can be accounted to the first category. However, our results also stress the importance of 'children's places'. Although these informal spaces aren't designed as such, children make it their own play spaces. For example, by playing on the curb, by chalking on the sidewalk or playing in the bushes. They reconfigure the public space into children's places.

Based on previous research (Gill, 2021; Karsten & Felder, 2016; Luchs, 2017) there may be two main reasons for the popularity of these informal play spaces. First of all, playgrounds with fixed play equipment and defined functions are often perceived less interesting after a while due to the limited playing possibilities. Children therefore look for entertainment elsewhere. Secondly, the sidewalk and courtyards are the place where - especially young - children can play freely and unaccompanied because it is close to home where parents can easily supervise. This is a finding that is in line with our own observations. In Tanthof and Morgenstond children mainly played on the sidewalk around single-family homes and front gardens from which parents can easily keep an eye on their offspring.

**Gender Differences**

We saw a difference between boys and girls when it comes to playing outside. In general fewer girls play outside than boys (41% girls vs. 59% boys), but this differed per age group. Above nine years old, the difference between girls and boys increases (29% vs. 71%), while they were quite evenly distributed among 5-8 years old children. This is consistent with previous observational studies in the Netherlands (Helleman, 2021; Vermeulen, 2017) and Belgium (Meire, 2020). In addition, our research shows that girls are more often accompanied by an adult. Several reasons may play a role here. Over the years, there is a rising concern among parents about the safety of their children. Due to various incidents and media attention, concern

among parents about children's vulnerability to harassment, (sexual) assault, abduction and murder in public space increased (Valentine, 1996), although a research in five different European countries (Greece, Portugal, Estonia, Croatia and Norway) shows that this varies by country (Sandseter et al., 2020). The public space increasingly became a place against which children must be warned and protected (De Visscher, 2008). Besides these so-called 'stranger dangers' parents became also increasingly concerned that their children would come into contact with a rough and aggressively street culture that in some places was accompanied with underage drinking, drugs, vandalism and (petty) crime. In addition, due to the volume and speed of cars, there was already a fear of traffic accidents (Valentine, 1996). A review of several studies shows that those concerns are even more pronounced for girls than for boys (Boxberger & Reimers, 2019). Two studies in the United Kingdom showed however that the parents - with eight to eleven year old children - perceived sons and daughters to be equally vulnerable in public space (Brown et al., 2008; Valentine, 1996). Girls and younger children however report more fears for their personal safety in public space than boys and older children concerning 'stranger danger' or 'fear of traffic' (Matthews, 2003; Valentine, 1996). In addition, girls also indicate in various studies that they are also left out because of rejection, bullying, and competitive behavior (De Visscher, 2008; Karsten, 2003; Lloyd et al., 2008). The barrier to play outside is increased even further when boys are taunting and shaming the girls.

There also appear to be some differences in the type of outdoor play behavior between girls and boys. Girls make less use of sports fields, and are more often swinging, hobbling, climbing and hanging than boys. Other research also shows that boys are more likely to engage in sports and active games, while girls are more likely to play with, at, or inside playground equipment (Karsten, 2003; Reimers et al., 2018). So the question is whether the girls' wishes and preferences match with the formal play spaces in residential areas. Especially for older children, often skate parks and public sports fields are constructed. Research in England and Australia found that skateparks were almost used entirely by males (Walker & Clark, 2020). And the paved areas are generally more suitable for and used by boys whose behavior is more wide-ranging and who tend to engage more in sport-based physical activities (Dyment & O'Connell, 2013; Snow et al., 2019). This is also apparent from this study: three-quarters of the children on the public sports fields are boys. Different studies also show that girls are more likely to be sedentary (Hyndman & Chancellor, 2015; Reimers et al., 2018). This is not the case in this study: boys and girls were 'relaxing' just as often (22% vs. 20%).

**District Differences**

Looking at where children play, all three districts show an even distribution between formal (range of 56%-58%) and informal (42%-44%) play spaces. However, there are differences in the supply and meaning of informal areas between the three districts. This is caused by variations in lay-out and density of the built environment. In Tanthof we expected - because of the green layout - more children playing in and around the shrubs and bushes. This was not the case (only 4%). On the other hand, we did see an influence of the traffic infrastructure - with a lot of local traffic, dead-end streets, speed bumps and living streets – on children's play behavior, as we saw more children playing on the street (9%) in comparison with the other two districts.

Informal play spaces nearby single-family homes and apartment blocks are of importance in each district. But not all informal public areas are equally meaningful as informal play area. This depends for example on accessibility, safeness and attractiveness. For example, in Morgenstond, there are more long, wide through roads for motorized traffic. These kinds of traffic structures hinder the range of action of children, because generally children are not allowed to cross wide and busier roads alone (Skår & Krogh, 2009). Here too, we saw that especially the car-free streets, closed courtyards (with some play elements here and there), and wide sidewalks attract more children. In the more dense district of Kolenkitbuurt/Overtoomse Veld children also played on sidewalks around the apartment blocks, in the semi-public courtyards and on newly designed car-free streets. In this way, urban design has an influence on playing behavior. That is also the case for formal play spaces: supply creates demand. As noted before, we mainly saw children playing in places that have been designed for them: schoolyards, playgrounds and

public sport fields. The route from school to home was often an important indicator of where we found children. That also has to do with the relatively high building density in the three districts and the Dutch culture where a lot of primary school children walk or cycle to school because most of the routes are safe and schools are nearby.

Finally, it is good to mention that the demand and use of informal and formal play spaces are not only influenced by density, road structures and other physical environmental aspects, but also by the social environment. For example the occupancy rate of the homes, demographics, the upbringing of parents and the social class of households (Karsten & Felder, 2016; Korpela et al., 2002; Parent et al., 2021; Sandseter et al., 2020). We will focus more on these factors in our follow-up research when we talk to children and parents.

## Strengths and Limitations

This study has some strengths and limitations. We used the GPS app 'ArcGIS Survey123' to investigate some fundamental questions of outdoor play. With the app we were able to register who was playing, with whom they were playing, what they were doing in what type of play space and link that information to the exact geo-location. Another strength of our study was that we observed children's play behavior in an entire district (a child-led study), rather than focusing on a limited number of specific play spaces (location-led).

This study also has some limitations that should be taken into account when interpreting the results. First of all, because of the target group, observations were conducted after school. It is possible that the age group 0-4 years is underrepresented because they have already played outside before that time. Likewise, older children may be more likely to play outdoors after dinner. Secondly, we only observed in good weather conditions. In general, children play outside more and longer in good weather than in bad weather. This can give a skewed picture, because children may play in other places and engage in other play activities in good than in bad weather conditions. Thirdly, to demarcate the research area, the administrative boundaries of the three districts were used. These administrative boundaries may not be relevant to children's play behavior. Fourth, when observing, no contact was made with the children due to the possible influence on play behavior (the observer effect). Therefore, the observers had to make an estimate of gender and age. Fifth, the observations took place at an appropriate distance, so that the conversations between children could by no means always be heard, while they can provide information about whether the kids are just talking or role-playing. And lastly, since we wanted to document the playing behavior in an entire district, the observations were based on a few minutes. A child sitting quietly on the sidewalk will be registered as such. However, a few minutes later, the child may be doing something else (chalking, running, etc.). So, the snapshot we made, might not always do justice to the diversity of play through time.

## Implications

The results of this study show that we need to pay more attention to a number of aspects in outdoor play both in research and in policy.

For example, personal factors, such as age and gender need to be taken into account when planning, (re)designing and maintaining outdoor play spaces. At a young age, we see many parents accompanying their children. Sufficient benches for the parents with a view of the children playing are therefore important. Fortunately, with regard to gender, there is an increasing awareness that planning and public space are mostly dominated by men and boys and often built for the 'default male' citizen (Walker & Clark, 2020). The answer to this problem is not to create separate places for boys and girls (*divide*). The philosophy of 'gender mainstreaming' is based on the idea that we should design inclusive public spaces that meet everyone's needs and where everybody is feeling welcome (*mix-up*). For example, by making play spaces big enough to facilitate different kinds of play (Miedema, 2020). Play spaces in which the terrain with play attributes (swings, slides, climbing objects) should be as large as the area for ball games (Karsten, 2003). It

also helps to think less in large, mono-functional play areas. Smaller places at one play space prevent girls from becoming marginalized as happens in big open spaces. So, we recommend differentiating and creating more defined places in a play space with different play types and play activities for all generations and for people with different skills.

Furthermore, a dichotomy between boys and girls is somewhat precarious (Helleman, 2022). Due to differences in for example age, competence, culture, education, personality, and position in the family there can be great differences between girls (and between boys). In follow-up research, it would therefore be interesting to look more at differences between characters and personality traits than just gender and to investigate to what extent the wishes and needs of children with different character and personality traits are met in public space.

In addition, more attention should be paid to the child-friendliness of the built environment since it plays an important role in the (im)possibilities to play outside (Hart, 1979; Kyttä, 2002; Helleman & De Visscher, 2022; Ward, 1978;). The way municipalities design, arrange and manage our cities has an important influence on whether there are enough public spaces and play areas for children. The focus is often on the formal play spaces. Our research showed that children not only play in these places that are specially designed for them. A car-free street, a wide sidewalk or a bush with shrubs is also important for children to play outdoors. In addition, the design of formal play spaces is often aimed at active play. Our research shows that chilling, sitting and talking to other children are equally important. Therefore, in research, a broader definition of play should be taken into account and in policy and practice more attention should be paid to places and attributes where children can sit together face to face, hang out, socialize and chat. At the same time, municipalities should pay more attention to the accessibility of play spaces (Helleman, 2018). One can design a wonderful play space, but when it is hard or unsafe to reach nobody will use it. In other words: to realize a play-friendly environment, the focus must be shifted from the formal play spaces to pluriform play spaces that can easily be reached by children of different ages and capacities.

## Declarations

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