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Everyday environments and activities of children and teachers in Swedish preschools

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ABSTRACT
How preschool teachers and children spend their time in preschool sets the stage for child engagement and learning. To describe characteristics of environments and activities and to compare child engagement in indoor and outdoor free play, systematic observations of children and teachers were performed in 78 Swedish preschool units. Results showed that indoor and outdoor free play were the main activity settings. Children interacted as much with other children as with teachers. The content focus was dominated by non-pretend play, construction, art and music, followed by pretend play and academic contents. Child engagement was significantly higher in free play indoors compared to outdoors. Teachers engaged in varied tasks, but their central task was managing. Teachers were typically in proximity to small groups of children, or by themselves, and mostly talked to or listened to a single child. Findings are discussed in relation to the preschool curriculum and future research needs.

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Preschool; activity; free play; engagement; observation; environment

Introduction

Early Childhood Education and Care (ECEC) is high on the policy agenda internationally as it has proven a wide range of long-term benefits for children, parents and society at large (OECD, 2017). Although international and European organizations like the OECD (2019), and the European Commission (2019) identify key factors for high-quality ECEC, awareness of the political agenda in different countries is needed (Moss et al., 2016). ECEC may differ widely concerning goals, target population, age structure, time-frames, etc. For instance, in the U.S., ECEC mainly target children age 3 or 4 years disadvantaged because of poverty, and the main goal for many ECEC settings is to improve children’s school readiness skills, such as early literacy, math, and cognitive self-regulation skills (Melhuish et al., 2015). In Sweden, almost 85 percent of children between 1–5 years, and about 95 percent of children 4–5 years attend ECEC, generally labelled preschool (Swedish National Agency for Education, 2019a). The Swedish national curriculum stresses that nurturing, socialization and learning should form a coherent whole, integrating play, care and education (Swedish National Agency for Education, 2019b). Such political differences likely relate to how children spend their time in ECEC in terms of environments and activities.

From a bioecological perspective, child development and learning emerge from multiply determined factors related to the child, interactions and characteristics of the settings where the child
is a participating member. Interactions in activities involving the child, adults, peers, and material, set the stage for child development and learning processes (Bronfenbrenner & Evans, 2000). Children’s observed engagement with teachers, peers, and objects can be seen as an indicator of proximal processes that are the primary driver of children’s development and learning. Engagement is a ‘relatively proximal indicator of whether instructional efforts are succeeding’ (Ponitz, Rimm-Kaufman, Grimm, & Curby, 2009, p. 117). Knowledge about how children and teachers spend their time in the ECEC environment, and their engagement in the activities is essential in understanding developmental and learning processes.

Previous studies in the U.S. have described how children spend their time in ECEC in terms of activity settings, defined as ‘the basic way that teachers organize class time in terms of both group size and activity’ (Vitiello, Booren, Downer, & Williford, 2012, p. 210). The studies showed a balanced use of free play, teacher-directed activities, and meals/routines (Early et al., 2010), or equal amounts of free play and whole group (Chien et al., 2010). Lately, a dominance of teacher-led whole groups where noted in some U.S. as well as some Portuguese ECEC settings (Coelho et al., 2019).

In Sweden, a sociocultural approach (Pramling Samuelsson & Pramling, 2013; Sheridan & Williams, 2018), focusing on learning, didactics, teacher – and child-perspectives, interaction and language, has to a large degree contributed to the development of preschool research. In addition, research on quality based on environmental rating scales, such as ECERS, have been implemented in Sweden (Garvis, Sheridan, Williams, & Mellgren, 2018), and standardized observations of quality using the Classroom Assessment Scoring System (CLASS; Castro, Granlund, & Almqvist, 2017). Few Swedish studies have observed how children and teachers actually spend their time across the day in preschool on a large scale. An early study describing everyday life for 5–6 year olds in Swedish preschools was conducted by Kärrby (1986), and revealed that children were in contact with adults for about 40 percent of the day, and that most activities took place in small groups, independent of whether the activity was child – or staff-initiated. Today preschool serves all children age 1–5 years regulated by a national preschool curriculum integrating care, development and learning. This suggests the need for a more updated picture of preschool everyday activities and environments, which is the first aim of this study.

A recent international ECEC study (Coelho et al., 2019), based partially on the same data collection as the present study, described a selection of preschool practices in Swedish, Portuguese, and U.S. preschool settings. The study showed that Swedish preschools were characterized by free play activity settings, defined as group conditions of high child choice of activities and locations. Less frequent teacher instructioning was also observed, defined broadly as teachers interacting with a child or children on a learning topic. The study provided a start in describing how children and teachers spend their time in Swedish preschool, but many questions remain unanswered. For example, what other types of teacher tasks are evident? How much do children communicate with teachers and children, respectively? And what is the content focus of children’s activities? Swedish preschools also have several smaller rooms, instead of a single large room, and children spend a lot of time outdoors (Garvis et al., 2018). But, how much free play occurs outdoors? And how are inside rooms utilized? Answers to such questions provide knowledge about environmental and activity characteristics for children and teachers in contemporary Swedish preschools.

Child engagement, learning, and development

To understand child development and learning, additional knowledge on how children engage with the preschool environment is necessary. When children are engaged in appropriate activities, they practice their competences and learn new skills (de Kruijff & McWilliam, 1999; McWilliam & Bailey, 1992). Engagement has been widely defined and assessed in the literature (Fredricks, Blumenfeld, & Paris, 2004). Research on participation has suggested that involvement is the experience of participation while attending an activity, and that the construct of engagement can be considered a
subtheme of involvement, including definitions such as intensity of involvement (Imms et al., 2016). Common operationalizations of engagement include ratings of level of engagement in specific activities or environments through surveys (e.g. Khetani, Graham, Davies, Law, & Simeonsson, 2015) or observations (e.g. Farran & Anthony, 2014; Kishida, Kemp, & Carter, 2008; McWilliam & deKruif, 1998). Studies have found that children’s behavioural engagement is a mediator between children’s social skills and language and literacy outcomes (Vitiello & Williford, 2016), and between global classroom quality and reading achievement (Ponitz et al., 2009).

Child engagement varies across a preschool day, and the variation can largely be explained by the type of activity setting attended (Powell, Burchinal, File, & Kontos, 2008; Vitiello et al., 2012). Free play settings have been related to higher levels of positive engagement for children (DiCarlo, Baumgartner, Ota, & Geary, 2016; Vitiello et al., 2012). However, in the international study (Coelho et al., 2019), Swedish preschools did not evidence the highest child engagement levels in free play. One potential reason could be the decision to combine indoor and outdoor free play observations in the analysis. Indoor and outdoor environments might provide different experiences for children and the combination might have concealed engagement differences according to location. A previous study in the U.S., comparing engagement in indoor and outdoor environments revealed few differences (Kroeker, 2017). This study will, as a secondary aim, compare observed child level of engagement in indoor and outdoor free play. Before approaching the aims of the current study, a deeper understanding of the Swedish ECEC framework is needed.

The current Swedish preschool framework

Swedish preschool has its roots in the Swedish welfare system and integrates education and care for all children between 1–5 years. The preschool is inclusive, and every child has a legal entitlement to preschool and should get their needs met. Municipalities provide preschool to all children free of charge from the autumn term when the child reaches the age of 3, and to all children in need of special support. The provision for younger children is publicly subsidized. The average group size for children between 4–5 years is 16.1, and for children 1–3 years is 12.6. Staff – child ratio is generally 1:5. Forty percent of preschool staff have an academic preschool teacher education (Swedish National Agency for Education, 2019a). A preschool usually has more than one unit. Each unit is typically staffed by a team of 3–4, with at least one staff member being a preschool teacher. Team configurations vary between and within preschool units. Traditionally, team members have had shared roles, but the role distinctions between preschool teachers and other staff, i.e. child-minders without a preschool teacher education, is more emphasised with recent revisions of the preschool curriculum.

The Swedish National Curriculum for preschool (Swedish National Agency for Education, 2019b) serves all preschools. It was instituted in 1998 and revised in 2010 and 2018. It states that preschool should be an enjoyable, safe, and rich learning environment, and that preschool teachers should apply a holistic approach to children’s development. The activities should focus on children’s play and exploration, giving children agency while still oriented towards the curriculum goals. The goals for the children are numerous and related to three overarching themes; (1) norms and values (2) care, development and learning, and (3) participation and influence of the child. The goals are formulated in general terms and it is the responsibility of the preschool teacher to organize the activities to approach those goals (Karlsson Lohmander & Pramling Samuelsson, 2015; Pramling Samuelsson & Sheridan, 2016). Each revision of the curriculum has placed greater responsibility on teachers to engage in pre-academic learning, while retaining the prominent role of social learning and play.

The current study

The current study will use systematic observations of individual children and preschool teachers performed across a day in 78 Swedish preschool units with the aim to describe characteristics of
preschool environments and activities for children (operationalized as type of schedule/activity setting, proximity to whom, talking/listening to whom, interaction state, type of task, material, content focus, and location) and of teachers (operationalized as proximity to whom, talking/listening to whom, material, content focus, and teacher task). Notably, we use ‘teachers’ to refer to all staff working with the children (i.e. including child-minders). A second aim is to investigate child engagement differences in indoor and outdoor free play.

The research questions are:

(1) What are the characteristics of children’s preschool environment and activities?
(2) Is there a significant difference in child level of engagement in indoor and outdoor free play?
(3) What are the characteristics of teachers’ preschool environment and activities?

Materials and method

Ethical considerations

Data from two larger projects were used; Early Detection-Early Intervention (TUTI) 2014–2015, and Participation and Engagement in Preschool International (PEPI) 2015–2016. The two projects were approved by the Regional Ethical Review Board in Linkoping, Reference No 2012/199-31, and 2014/479-31, respectively. In the TUTI project, observational data from all children in the preschool unit was collected, with the rationale that children without informed consent were unidentifiable once data collection was completed. In the PEPI project, only observational data from children with informed consent were collected. All children, teachers and adults working in the preschool were informed about the aim and procedure of data collection and could withdraw from participation. No observations were performed during diaper change/toileting. In both projects the units were provided verbal and written feedback.

Participants

Seventy-eight preschool units participated in the study. All units were inclusive in line with Swedish preschool norms. Most units reported no specific pedagogical profile (n = 48). The specific pedagogical profiles included Montessori, Reggio Emilia, and a focus on Christian values. Most units reported the target age as 3–5 years (n = 55), followed by 1–3 years (n = 9), age homogenous for 3, 4, 5 years, respectively (n = 6), and age heterogenous for 1–5 years (n = 4). The average number of registered children across the units was 20.70 (SD = 6.59), and the teacher–child ratio was 1:5. The average number of children eligible for bilingual support and special support across the units was 3.56 (SD = 5.59), and 0.64 (SD = 1.16), respectively. For eight units, background information was partly missing.

Across the units, the average percentage of children observed was 82% (SD = 22). The total number of observed children was 925, and observed teachers was 302. The average age of observed children was 51 months (SD = 9.23), with 53 percent boys, and 47 percent girls. No background data on teachers, or on the socioeconomical status of the families of participating children was collected. As Swedish preschools are universal by nature, socioeconomical diversity among children was expected.

Measures

The Child Observation in Preschool (COP; Farran & Anthony, 2014) and the Teacher Observation in Preschool (TOP; Bilbrey, Vorhaus, & Farran, 2014) are systematic observational instruments developed in the U.S. that focus on individual children (typically between 3–5 years) and their teachers/staff. The COP and TOP give detailed pictures of how each child/teacher spend their time in preschool, mainly from a broad academic learning perspective. If most children/teachers in the unit are observed,
individual observations can also be summarized at the unit level. The measures are primarily based on behaviour count categories, where the observer determine the type of behaviour or activity occurring, based on manual definitions. The codings can be used to create frequency counts of specified behaviours or activity characteristics. A few variables are based on ratings. The COP and TOP has previously evidenced high inter-rater reliability (Lutropp & Granlund, 2010; Coelho et al., 2019; Fuhs, Farran, & Nesbitt, 2013).

The COP and TOP are performed simultaneously by the same observer, and with the same procedure, using a tablet with FileMaker Pro software. Each teacher/child is located with the help of descriptions (e.g. hair colour, clothes) noted at the start of the observational day (and continuously as targeted children/teachers enter preschool). The child/teacher is observed for 3 s directly followed by coding of several categories; nine aspects of the child’s activity (eight behaviour count categories, and one category based on rating), and eight aspects of the teacher’s activity (seven behaviour count categories and two rating categories). Original COP and TOP categories are presented in Table 1. In this study, all categories except the TOP rating scale categories were used, as these are fully presented elsewhere (Coelho et al., 2019). Each category has several coding alternatives, but codes are mutually exclusive. Shortened definitions for coding alternatives used are found in the Appendix.

The observer then search for the next child/teacher on the list, observes for 3 s, and then perform the coding. The observer first codes the behaviours of each teacher one at at time with TOP, followed by observing each child one at a time with COP. When the entire group has been observed and coded once, which usually takes about 15 min, the observer starts again with the first teacher. The goal is to get close to 20 snapshot observations of each child/teacher across a preschool day. Teachers and children are continuously observed in the same order in each observational round.

Unit background information included pedagogical profile, target age, total number of children, teachers, and children eligible for special support and for bilingual support.

**Procedure**

**Recruitment and sampling**

Preschool units in the TUTI project (n = 39) were selected through stratified convenience sampling based on municipality size and population density. Only public preschools were approached, and no limitations of unit target age was made. Preschool units in the PEPI project (n = 39) were selected by a combination of purposive and convenience sampling. Units where the majority of children were three years or older were approached. Public preschool units in a region of Sweden where children with disabilities currently were enrolled were initially approached, in line with the overall project aim.

| Table 1. COP and TOP original categories. |
|------------------------------------------|
| **Category** | **Definition** |
| Schedule | How the child group, ≥75% of children, is organized |
| Proximity | Who is within one metre of the child/teacher |
| Verbal | If the child/teacher is talking, listening, (or fussing/crying COP) |
| To whom | To whom they are speaking or listening |
| Interaction state | Complexity of the interaction |
| Type task | Complexity of the activity |
| Material | The type of material the child/teacher uses |
| Focus | The content of the activity |
| Engagement | 5-point scale; Low = 1, High = 5 |
| Teacher taskb | The task/activity with which the teacher/child minder is engaged. E.g. instructing, monitoring |
| Level of instruction | 5-point scale; None = 0, to High inferential = 4 |
| Emotional tone | 5-point scale; Extremely negative = 1, to Vibrant = 5 |

aOnly for COP.  
bOnly for TOP.  
cTOP categories not used in the current study.
Then, independent (non-profit) preschool units in a smaller region of Sweden was approached, without further criteria.

In total, the seventy-eight units were nested in 48 preschools in twelve municipalities located in the south-east and central-east region. Based on municipality groupings (Swedish National Agency for Education, 2018), most units (n = 53) were located in or close to mid-size cities, followed by units in smaller cities or rural municipalities (n = 23), and two units in or close to large cities (>200,000 inhabitants). About a fourth (24%) of the units belonged to independent preschools similar to current national data (28%; Swedish National Agency for Education, 2019a). A previous report found no systematic quality differences according to public/independent preschools, geographical region, or municipality socioeconomic level (Swedish Schools Inspectorate, 2018).

**Data collection**
All preschool observations were performed by three trained observers, all with university degrees, during the fall seasons of 2014 (TUTI) and 2015 (PEPI), from September to December. Snapshots of children and teachers were performed continuously for a full day (8 am to 3.30 pm), except for a 30-minute break at lunch time, and when most children were sleeping (i.e. in groups with the youngest children). Therefore, the results do not provide a perfect reflection of time but are best interpreted as proportions of the observational day minus nap, lunch times, and toileting. Mean number of individual snapshot observations was 16.5 (SD: 6.7) for children and 13.5 (SD: 6.1) for teachers.

**Training and adaptations to COP and TOP for Swedish preschool context**
The observers underwent initial training on COP and TOP with material available from the original instrument developer in the U.S. Two observers received individual field training guided by the U.S. instrument team. Pilot observations in Swedish preschool contexts were conducted, and most COP and TOP categories and codes were deemed applicable. Yet, some adaptations were necessary, largely because Swedish preschools serve children between 1–5 years, and the outdoor environment is seen as a pedagogical environment (Swedish National Agency for Education, 2019b). Adaptations are presented in Table 2.

**Inter-rater reliability**
To provide inter-rater reliability agreements and estimates for COP and TOP, observers performed double coding of two preschool units (external to the study sample) during the data collection time period. All three observers performed reliability observations, with two observers in each unit. Observers counted and observed the exact same 3-second period. The total number of

| Table 2. Adaptations to COP and TOP for Swedish preschool context. |
|--------------------------------------|-----------------|-----------------|
| **Category**                         | Original content | Adaptation |
| -------------------------------------| -----------------|-------------|
| Proximity                             | 1 metre          | 3 meters for outdoors |
|                                      | NA               | Examples for outdoors: |
|                                      |                  | *Gross Motor* ‘Bicycles, climbing walls, swings or teeter’. |
| Material                              | NA               | New codes: |
|                                      |                  | *Fine motor* (e.g. beading pearls on a string or pegboard), |
|                                      |                  | *Gross motor* (e.g. climbing, running) |
| Focus                                 | Other            | |
|                                      |                  | Example for outdoors: |
|                                      |                  | *Drama/pretend play: ‘two or more children are pretending to be a family in a wooden house in the playground’ |
| Focus                                 | NA               | Examples for toddlers: |
|                                      |                  | *Medium high* ‘more intensive exploring of objects through turning, throwing, shaking, and without noticing others passing’, |
|                                      |                  | *Medium low* ‘distracted exploration of material’ |
| Engagement                            | NA               | |
|                                      |                  | |
| Engagement and Social interaction     | Engagement automatically ‘low’. | Enabling the child’s engagement to be coded higher than ‘low’ when interaction state is coded as social. |
| Location                              | NA               | New category. Child’s physical whereabouts. |

Note: NA = not applicable.
double-coded observations for COP was 217, and for TOP 62. Agreements were computed using both exact percentage agreement and Cohen’s kappa (k) (McHugh, 2012). For the engagement variable, one way-random effects Intraclass Correlation Coefficient (ICCs; Koo & Li, 2016) was also computed.

For COP behavioural count variables, the average agreement was 84.0%, with values ranging from 74.7% (for focus) to 94.5% (for location). The average Cohen’s kappa for the behavioural count measures was .76, with values ranging between .61 (for focus) and .92 (for location). For COP engagement (rating scale variable), the 5-level scale was collapsed to a 3-level scale to increase the reliability (1 = Low/Medium Low, 2 = Medium, 3 = Medium High/High). The exact agreement of the 3-level engagement scale was 72.7%, Cohen's kappa was .53, and the ICC was .84.

For TOP variables, the average agreement was 85.7%, with values ranging from 72.6% (for teacher task) and 93.5% (for schedule). The average Cohen’s kappa for TOP was .75, with values ranging between .50 (for focus) and .92 (for schedule).

**Analytic approach**

The study had a combined descriptive and comparative design. The analytic variables representing children’s preschool environmental and activity characteristics were the following: Schedule, proximity to whom, talking/listening to whom, interaction state, type task, material, content focus, and location. One variable was based on ratings and used for comparison: Engagement. The analytic variables representing teachers’ preschool environmental and activity characteristics were the following: Proximity to whom, talking/listening to whom, material, content focus, and teacher task.

To adjust the data in line with the COP and TOP manuals, a series of recode commands were performed. Specifically, when the COP category interaction state was coded as a routine-based activity, type task was recoded into other, and material and focus were recoded into none. Material and focus were conceived to be related to learning opportunities in the original development and we kept that same construction. Similarly, when TOP teacher task category was coded something other than instruction or assessment, material and focus was recoded into none.

For the descriptive analyses, all variables were first computed as the sum of individual scores (child/teacher) across the observations, and then aggregated by sum to the preschool unit level for child and teacher level data, respectively. Aggregation to preschool unit level was undertaken to display potential variability on unit level. Because of large unit differences in the total amount of observational snapshots (due to varying number of children/teachers present and observed) which would have complicated comparisons, variables were further computed as proportions of snapshots in which the target behaviour occurred, out of the total number of snapshots observed for each unit. In total, 15279 child snapshots (M = 195.88, SD = 48.37), and 4090 teacher snapshots (M = 52.44, SD: 17.97) were used in the analyses.

For some descriptive variables, frequency counts of combinations of categories were performed. For indoor and outdoor free play, the added category ‘location’ was used to identify when free play occurred indoors versus outdoors to provide frequency counts for both ‘indoor free play’ and ‘outdoor free play’. Frequency counts were computed for the following combinations (1) schedule = free play and location = outdoors, and (2) schedule = free play and location ≠ outdoors. Counting combinations of categories was also performed in a follow-up analysis, to contrast child unoccupied behaviours in indoor and outdoor free play, where each coding frequency was conditioned on whether it had occurred in indoor or outdoor free play. Finally, composite variables were created to better contrast to whom children and the teachers were talking or listening to. Specifically, the verbal codes ‘talking’ and ‘listening’ were combined with each of the following to whom categories: ‘a single child’, ‘a teacher’, or ‘a group’ (independent of group size).

For the comparative analysis of engagement, the structure of the COP data implied initial frequency calculations rather than an average overall rating. Frequencies of each combination (e.g. low engagement in indoor free play; medium engagement in outdoor free play) were first summarized at an individual level, then at the preschool unit level, and finally multiplied by its respective
engagement value (i.e., low = 1, medium = 2, and high = 3) to provide scores. These scores divided by
the total number of snapshots in indoor and outdoor free play, respectively, resulted in average levels
of engagement in indoor and outdoor free play. Difference in average level of engagement in indoor
and outdoor free play was analysed using a paired sample t-test ($p = .05$).

**Results**

**Characteristics of children’s preschool environment and activities**

To describe characteristics of children’s preschool environment and activities, frequencies of chil-
dren’s schedules, proximity to whom, talking/listening behaviours, interaction states, type of tasks,
materials, content focus, and locations were summarized for each preschool unit, and average pro-
portions were calculated.

The results (summarized in Table 3) indicate that free play indoors and outdoors were the two
most common schedules, while whole group and small group activities were relatively rare. The

| Schedule               | $M$ (SD) | Materials                  | $M$ (SD) |
|------------------------|---------|----------------------------|---------|
| Indoor free play       | .36 (.15)| None$^a$                   | .45 (.09)|
| Outdoor free play      | .21 (.11)| Toys/games                 | .23 (.10)|
| Transition             | .13 (.06)| Music movement/Gross mot. | .08 (.05)|
| Mealtime               | .13 (.04)| Drama/pretend play        | .07 (.06)|
| Whole group            | .08 (.06)| Literacy                  | .06 (.03)|
| Small group            | .04 (.06)| Art                       | .06 (.04)|
| Small group/s & free play | .04 (.06)| Science                  | .02 (.02)|
| Other                  | .01 (.02)| Math                      | .01 (.01)|
| **Proximity to whom**  |         |                           |         |
| Small group teacher    | .33 (.11)| Social studies            | .01 (.01)|
| Small group            | .22 (.08)| Content focus             |         |
| Self                   | .16 (.08)| Routines/social/none      | .45 (.09)|
| Child                  | .13 (.04)| Other                     | .17 (.07)|
| Whole group teacher    | .12 (.08)| Drama/pretend play        | .12 (.07)|
| Teacher                | .03 (.03)| Gross motor               | .07 (.05)|
| **Talking/listening to whom** |         |                           |         |
| Not talking/listening  | .52 (.10)| Fine motor                | .05 (.04)|
| Child                  | .18 (.06)| Reading                   | .04 (.03)|
| Teacher                | .16 (.06)| Math                      | .03 (.03)|
| Self                   | .08 (.03)| Literacy                  | .02 (.02)|
| Group                  | .05 (.05)| Science                   | .02 (.02)|
| **Interaction state**  |         |                           |         |
| Routine-based activity | .31 (.08)| Language arts             | .01 (.01)|
| Parallel               | .25 (.06)| Location                  |         |
| Associative            | .19 (.11)| Group room                | .43 (.18)|
| Alone                  | .09 (.06)| Outdoors                  | .24 (.12)|
| Unoccupied             | .09 (.06)| Play hall                 | .14 (.17)|
| Social                 | .03 (.02)| Dining room               | .14 (.06)|
| Cooperative            | .03 (.03)| Hallway                   | .05 (.04)|
| Onlooker               | .01 (.02)|                         |         |
| **Type task**          |         |                           |         |
| Non-sequential         | .34 (.10)|                         |         |
| Other                  | .32 (.08)|                         |         |
| Sequential             | .11 (.06)|                         |         |
| None                   | .09 (.07)|                         |         |
| Passive instruction    | .08 (.05)|                         |         |
| Social                 | .03 (.02)|                         |         |
| Disruptive             | .01 (.01)|                         |         |
| Fantasy Drama          | .01 (.02)|                         |         |

Note. n = 78.

$^a$Automatically coded when interaction state is coded ‘Routine-based activity’, ‘Social’, ‘Unoccupied’, or ‘Time out’.
locations of children’s activities were often group rooms suited for a smaller group of children, followed by outdoors. Children spent a third of the observational day in routine-based activities, such as, dressing, eating without interaction, forced waiting time. The most frequent type of interaction was parallel play, i.e. children playing with similar materials or engaging in a similar learning activity without interacting. In ten percent of the observations, children were noted as unoccupied, i.e. not attending to any learning-related activity despite opportunity.

Across the observational day, children talked to or listened to a single child as often as a teacher. In almost half of the observations, the focus of the activities were not classified as learning. Non-learning focus can refer to routine-based activities (routines without any identified learning content as defined in COP and TOP), being unoccupied, engaging in strictly social interactions, or being an onlooker. When a learning focus was observed, it was mainly non-specified (other), including non-pretend play, construction, art and music, followed by almost equal occurrences of pretend play and academic contents (summarizing reading, math, literacy, science, social studies, and language arts).

**Engagement in indoor and outdoor free play**

To compare child level of engagement in indoor and outdoor free play, individual child engagement was rated in indoor and outdoor free play, summarized and averaged for each preschool unit. The paired sample t-test showed that the difference in average unit engagement between indoor free play ($M = 2.04, SD = .29$) and outdoor free play ($M = 1.94, SD = .28$) was significant, $t(76) = 2.62, p = .011, 95\% \text{CIs: } [.02 \text{– } .14]$, with a higher level of engagement in indoor free-play. Follow-up descriptive analysis showed that child unoccupied behaviours occurred somewhat more frequently in outdoor free play ($M = .14, SD = .09$), compared to indoor free play ($M = .10, SD = .09$).

**Characteristics of teacher’s preschool environment and activities**

To describe characteristics of teacher’s preschool environment and activities, frequencies of teachers’ proximity to whom, talking/listening behaviours, teacher tasks, instructional materials, and content focus of instruction were summarized for each preschool unit, and average proportions were calculated.

The results (summarized in Table 4) revealed that the teachers were frequently in proximity to a small group of children, but also quite often by themselves. Across the observational day, when teachers talked to or listened to someone, it was often directed to a single child. The observed teacher tasks varied, but the central task was managing the child group. More behaviour approving than disapproving was observed, and relatively little personal care (likely related to the lack of observations during diaper change/toileting and an over-representation of units targeting older children). Assessment tasks were non-existent. When teachers engaged in instruction, the focus was mostly non-specified (other), including non-pretend play, building with blocks, art and music.

**Discussion**

The current study examined what Swedish preschool environments and activities look like for children and teachers, and shows the ongoing everyday activities and interactions that children and teachers are exposed to and participate in, i.e. characteristics that set the stage for proximal processes that enhance engagement and learning (Bronfenbrenner & Evans, 2000). The results revealed that free play indoors and outdoors are the two dominating activity settings, peer verbal interactions are as common as child–teacher verbal interactions, and engagement varies between indoor and outdoor free play.

When applying the bioecological model of child development and learning (Bronfenbrenner & Evans, 2000), the results observed on the preschool micro-level seem to reflect structures at the macro-level, such as Swedish policy and welfare system including the preschool curriculum goals.
Overall, the occurrences of indoor and outdoor free play indicates a relatively high level of child choice of activities, in line with the Swedish preschool curriculum (Swedish National Agency for Education, 2019b), and with recent European Union council recommendations for high quality ECEC (European Commission, 2019), where child-centeredness, play, and contact with nature are emphasized. A high extent of play in preschool has shown a strong relation to engagement and well-being in a Norwegian preschool setting (Storli & Hansen Sandseter, 2019). The relatively high level of child choice of activities might, in turn, help to explain some of the other characteristics found in the current study, although this remains to be confirmed.

Concerning whom children were talking or listening to, the relatively high extent of free play might explain why children almost to the same degree were engaged in interactions with other children as with teachers. It supports the preschool curriculum statement that ‘the group of children and the interaction between children are an important and active part of children’s development and learning in the preschool.’ (Swedish National Agency for Education, 2019b, p. 11). A recent Swedish study showed a strong relation between teacher-rated positive child group interactions and child level of engagement, despite child hyperactivity (Sjöman, Granlund, & Almqvist, 2016). An increased focus on peer-interaction in preschool and its relation to engagement and learning is therefore needed.

The relatively large amount of free play, in combination with the dominant use of smaller group rooms, might also explain why teachers often were in proximity to a small group of children, and that they mostly interacted with a single child. The result indicates that it is important to study how the environment is related to the actions of the teachers. However, why teachers were in non-proximity to children nearly 25 percent of the day is more unclear. It may indicate teachers merely standing back from the activities, or that teachers are engaged in reflective monitoring, used for the continued planning of activities. However, based on the non-existent amount of assessment tasks (including note-taking during monitoring), the non-proximity does not seem to indicate systematic forms of monitoring. Future studies should explore the relation between the teachers’ non-proximity and child engagement in Swedish preschool settings.

### Table 4. Characteristics of teachers’ preschool environment and activities (rank-ordered proportions).

| Proximity to whom | M (SD) | Materials | M (SD) |
|-------------------|--------|-----------|--------|
| Small group       | .32 (.11) | None* | .84 (.09) |
| Self              | .24 (.11) | Literacy | .04 (.03) |
| Small group teacher | .14 (.09) | Music movem./Gross mot. | .03 (.04) |
| Child             | .14 (.08) | Toys/games | .03 (.03) |
| Whole group teacher | .09 (.07) | Art | .02 (.03) |
| Teacher           | .07 (.05) | Science | .01 (.02) |
| Whole group       | .02 (.03) | Drama/prettend play | .01 (.02) |
| Talking/listening to whom | .40 (.11) | Content focus | .83 (.09) |
| Not talking/listening | .32 (.09) | Not instructing | .01 (.02) |
| Child             | .14 (.08) | Other | .06 (.05) |
| Group             | .13 (.07) | Reading | .03 (.03) |
| Teacher           | .02 (.02) | Math | .02 (.02) |
| Parent            | .09 (.07) | Social studies | .01 (.02) |
| Teacher task      | .09 (.07) | Literacy | .02 (.03) |
| Managing          | .33 (.12) | Science | .01 (.02) |
| Instructing       | .17 (.09) | Social studies | .01 (.02) |
| Monitoring        | .10 (.07) | Drama/prettend play | .01 (.02) |
| Socializing       | .09 (.05) | Gross motor | .01 (.02) |
| None              | .09 (.07) | Fine motor | .01 (.01) |
| Administrating    | .08 (.07) | | |
| Behaviour approving | .06 (.07) | | |
| Personal care     | .05 (.06) | | |
| Behaviour disapproving | .04 (.04) | | |

Note: n = 78.

*Teacher task is not coded ‘Instructing’.
The relatively high occurrence of indoor and outdoor free play may explain the central teacher task of managing (being active in organizing children’s activities and material) and not instructing, which appears more common in preschool settings with less free play and more teacher-led whole group activity settings (Coelho et al., 2019). However, as the most recent revision of the curriculum (Swedish National Agency for Education, 2019b) emphasizes instruction, in terms of ‘stimulating and challenging the children, taking the goals of the curriculum as a starting point and direction … based on content that is planned or appears spontaneously’ (p. 7), it might be a challenge for the teachers to focus more on instruction and form a coherent whole of care, socialization and learning. A previous study stressed that free play involves less guidance on when and how to create goal-directed learning opportunities, in comparison to teacher-led settings (Goble & Pianta, 2017). There is also an ongoing debate among preschool researchers and teachers in Sweden on what teaching means in a preschool setting (e.g. Sheridan & Williams, 2018). Cautionary remarks state that play should not be considered as a means for academic learning as it might overshadow other types of learning that occurs in play (Nilsson, Ferholt, & Lecusay, 2018).

Interestingly, the current study displayed a small but significantly higher level of child engagement in indoor compared to outdoor free play. The finding differs from a previous study showing few differences in indoor and outdoor engagement (Kroeker, 2017), and extends research showing that both indoor and outdoor free play are related to higher engagement (Vitiello et al., 2012). In an attempt to explain the engagement difference, a descriptive follow-up analysis was performed, contrasting the amount of child unoccupied behaviours in indoor and outdoor free play. Unoccupied behaviours were targeted as they automatically lead to low engagement codings (according to the COP manual). The analysis showed that unoccupied behaviours occurred somewhat more frequently in outdoor than indoor free play, which could partly explain the difference in child engagement found in this study. A recent Norwegian study (Storli & Hansen Sandseter, 2019) showed that different types of play take place in inside and outside free play, with more symbolic and constructive play occurring in inside free play, and more functional play in outside free play. Such activity differences could be one reason for the engagement difference found in the current study. Further investigations of the characteristics of indoor and outdoor free play and their relation to engagement are needed.

Future studies should also examine whether the relatively high frequency of unoccupied behaviours found in the current study are spread evenly across children, or whether children with certain characteristics, e.g. having special support needs, and/or being a second language learner, are more unoccupied than their peers, especially in free play. The latter situation would indicate a need for a different approach to engage these children in a majority of the activities in Swedish preschools.

Finally, it is important to note that the discussion is based on the unit averages. Most environmental and activity characteristics revealed moderate variability across preschool units and might be expected based on the open Swedish curriculum, placing much freedom to teachers to organize the educational activities (e.g. Pramling Samuelsson & Sheridan, 2016).

Limitations

This study has some limitations to consider. First, the findings are based on a convenience sample of preschool units which strongly limits the generalization that can be made to Swedish preschools in general. The participating preschool units may represent more advantaged rather than disadvantaged settings, although no such analysis was performed. This risk is somewhat countered by the relatively large number of preschool units and municipalities represented, and the universal nature of Swedish preschools. A related limitation is that not all children in the unit (present at the day of the observation) were observed, which is advised when performing aggregation of COP data to unit level. This was due to lack of informed consents for some children. Still, the average proportion of children observed was high, indicating a fair representation of the preschool unit. Additionally, no data was collected on the educational level of the observed preschool staff, and it is unclear how representative the sample is of Swedish preschools in terms of the number of educated preschool teachers.
Second, lower inter-rater agreement and estimates were observed for the engagement rating scale. Exploration of reliability data revealed that disagreements on engagement mainly occurred between medium and medium high engagement levels and reinforce the difficulties in distinguishing several engagement levels in children of various ages and in different settings. Lastly, the high occurrence of focus ‘other’ (non-specified) for children and teachers indicates that the measure might need additional adaptations/separations of the focus category to distinguish separate extents of e.g. non-pretend play, construction, art, and music.

Conclusion

This study provides a current, comprehensive and unique picture of the characteristics of preschool environments and activities for children and teachers in Swedish preschool settings. The findings indicate that children have a relatively high level of agency and choice of activities. Yet, child level of engagement seems to differ depending on the indoor or outdoor location of free play, and further examinations are needed to understand this difference. Across a day, children seem to interact verbally as much with other children as with teachers, stressing the need to focus on peer-interaction and its relation to engagement and learning. The results also indicate that teachers have many different tasks, where managing appears central. It motivates studies examining how teachers best promote child engagement and learning in free play settings, both in the physical conditions with many indoor group rooms, and outdoors in the playground. Overall, the results suggest that the type of activity setting should be considered when studying proximal interactions in preschool. Finally, the results point at dilemmas and possibilities with a curriculum where both child agency, play and teacher-led instruction are emphasized. Future studies should focus attention on how teachers can use the affordances of free play and interaction between children to further develop a coherent whole of play and learning in preschool.

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Data availability statement

The results of the current study is based on the data-set by Åström & Sjöman (2020). The data are openly available upon request in Swedish National Data Service at https://snd.gu.se/en. doi:10.5878/8rsx-5w70. Reference number 2019-219.

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**Appendix**

**Definitions of COP and TOP coding alternatives used in the study**

Coding alternatives for joint COP and TOP categories are presented in Table A1. Coding alternatives for sole COP or TOP categories are found in Table A2.

**Table A1.** Coding alternatives for shared COP and TOP categories.

| Category       | Codes                                      | Definition                                                                 |
|----------------|--------------------------------------------|---------------------------------------------------------------------------|
| Proximity      | Small group with teacher                   | Child/teacher is near at least one child and a teacher                     |
|                | Small group                                | Child/teacher is near at least two children and no teacher                 |
|                | Self                                       | Child/teacher is alone or set apart from others                           |
|                | Child                                      | Child/teacher is near a single child                                      |
|                | Whole group teacher                        | Child/teacher is near the whole group and (other) teacher is present.     |
|                | Teacher                                    | Child/teacher is near (another) teacher, but not other children.          |
|                | Whole group                                | Child/teacher is near whole group (≥75%), without (other) teacher         |
| Verbal         | No                                         | Child/teacher is neither talking nor listening                            |
|                | Yes                                        | Child/teacher is talking (understandable words or other sounds)           |
|                | Listening                                  | Child/teacher is listening to person (not tape recorder, TV, or video)    |
|                | Fussing/crying (COP)                       | Child is fussing, whining, crying, arguing, or yelling                    |
| To whom        | Not talking/listening                      | Not talking or listening to anyone                                        |
|                | Teacher                                    | A single teacher                                                         |
|                | Child                                      | A single child                                                           |
|                | Small group                                | At least two children, and no teacher                                     |
|                | Small group teacher (COP)                  | At least one child and a teacher                                          |
|                | Whole group                                | Most of the group (≥75%), and no teacher                                  |
|                | Whole group teacher (COP)                  | Most of the group (≥75%) and teacher                                     |
|                | Self                                       | Child/teacher is talking to self (understandable words or noises)         |
|                | Parent (TOP)                               | Parent or external adult                                                  |
| Materials      | Noneb                                      | No activity with learning-related materials                               |
|                | Toys/games                                 | Manufactured toys or materials related to play or fine motor activities   |
|                | Music movement/Gross mot.                  | E.g. musical instruments, singing, dancing, balance board                |
|                | Drama                                      | Related to pretend play. E.g. clothes, pretend stoves                    |
|                | Literacy                                   | Related to reading/writing print, vocabulary and comprehension            |
|                | Art                                        | Related to the arts. E.g. crayons, play doh, scissors                     |
|                | Science                                    | Related to physical science. E.g. pouring cup, magnifying glass           |
|                | Math                                       | Designed for math. Incl., numbers, measurement, puzzles, shapes           |
|                | Computer/tablet                            | Incl., computer, iPad, SMART board                                       |
|                | Social studies                             | Related to understanding people, emotions. E.g. globes, maps              |
|                | TV/Video                                   | Incl. any mechanical source of sound                                     |
|                | Worksheet                                  | Any prepared piece of paper. Usually including instructions              |
| Focus          | Noneb                                      | No learning-related (non-academic) content                               |
|                | Other                                      | Else. E.g. non-pretend with toys, building with blocks, art/music        |
|                | Drama                                      | Pretend play. E.g. roles are enacted, play resolves around a theme        |
|                | Gross motor                                | Large muscle movement. E.g. climbing, running, bicycling                 |
|                | Fine motor                                 | Fine motor activities. E.g. beadling pearls on a string or pegboard      |
|                | Reading                                    | Connected text with meaning                                              |
|                | Math                                       | Related to numbers, shapes, measurement, patterning, classification      |

(Continued)
Table A1. Continued.

| Category       | Codes                      | Definition                                                                 |
|----------------|----------------------------|---------------------------------------------------------------------------|
| Literacy       | Language arts + reading. E.g. name writing/recognizing                |
| Science        | Physical science and nature. E.g. colour mixing, exploring senses    |
| Social studies | Related to understanding people, history, behaviour, emotions         |
| Language arts  | Letter sounds/names. E.g. writing single letters, alphabet puzzles    |

*aAutomatically coded when interaction state is coded ‘Routine-based activity’, ‘Social’, ‘Unoccupied’, or ‘Time Out’.

Table A2. Coding alternatives for single COP or TOP categories.

| Category (COP)          | Codes                      | Definition                                                                 |
|-------------------------|----------------------------|---------------------------------------------------------------------------|
| Schedule (COP)          | Free play inside           | Relatively large freedom what to do and where. Location ≠ Outdoors        |
|                         | Free play outside          | Relatively large freedom what to do and where. Location = Outdoors        |
|                         | Transition                 | Child group is transitioning, e.g. lining up, washing hands, waiting     |
|                         | Mealt ime                  | Child group can start to eat or pass the food/snack.                     |
|                         | Whole group                | Child group is meeting together, and content is being discussed          |
|                         | Small groups              | All children are in small groups, each led by teacher. Non-optional      |
|                         | Small group & free play    | Some children are in small group/s and some in free play.                |
| Interaction state (COP) | Routine-based activity     | Non-academic. E.g. dressing, eating without interaction                   |
|                         | Parallel                  | Learning activity without interaction but similar materials as others     |
|                         | Associative               | Interaction without fixed rules. E.g. tower-building, sharing book        |
|                         | Alone                     | Child is involved in a unique activity and not interacting               |
|                         | Unoccupied                | Not involved in learning activity. Demands 2×3 s observation             |
|                         | Social                    | Informal interaction. E.g. talking about a television show, hugging      |
|                         | Cooperative               | Interaction with fixed rules. E.g. formal games, restaurant scenario with role speech |
|                         | Onlooker                  | Child is observing a learning activity but does not participate          |
|                         | Time out                  | The child is isolated from the group. E.g. out of the room, corner       |
| Type task (COP)         | Non-sequential            | No obvious sequence. E.g. doodling on a paper, pushing toy trucks         |
|                         | Other                     | Other expected tasks. E.g. washing hands, lining up, setting the table    |
|                         | Sequential                | Sequence of steps. E.g. working a puzzle, recognizable drawing           |
|                         | None                      | Not involved in learning or social talk                                   |
|                         | Passive instruction       | Child is recipient of instruction rather than active participant          |
|                         | Social                    | The child is interacting but not on a learning topic.                    |
|                         | Time Out                  | The child is isolated from the group. E.g. out of the room, corner       |
|                         | Disruptive                | Any behaviour that draws others off-task                                  |
|                         | Fantasy Drama             | Sequenced, predictable pretend play enacting familiar stories together    |
|                         | Wrongly accused            | Wrongly accused as disruptive                                             |
| Engagement (COP)        | Low to Medium Low         | Child is not attending at all, clearly not interested, to looking inconsistently at teacher/materials, flat affect, looking bored |
|                         | Low                      | Child pays attention to the activity. May look up but returns immediately. Seems interested in the activity but could give it up |
|                         | Medium                   | Child shows eager expression, positive affect, to intensely focused on the activity, displays genuine engagement, oblivious to noise |
|                         | Medium High to High       | Child shows eager expression, positive affect, to intensely focused on the activity, displays genuine engagement, oblivious to noise |
| Location (COP)          | Group room                | Room suited for a smaller group of children                               |
|                         | Outdoors                  | The preschool playground, or playground/woods outside preschool           |
|                         | Play hall                 | Room used for activities where most children are present                  |
|                         | Dining room               | Room used for mealtime                                                    |
|                         | Hallway                   | Hallway, incl. bathroom area                                             |
| Teacher task (TOP)      | Managing                  | Activity that is required to run a classroom. E.g. teacher is active in organizing children, providing materials |
|                         | Instructing               | Teacher is interacting with child/children on a learning topic            |
|                         | Monitoring                | Passively observing children                                             |
|                         | Social                    | Personal/informal conversation. E.g. talking about home life             |
|                         | None                      | No task (or unrelated to the class).                                     |
|                         | Administrating            | E.g. paperwork, talking on the phone (work-related)                      |
|                         | Behaviour approving       | Approving verbal comments, facial expressions, physical contact          |
|                         | Personal care             | E.g. tying shoes, fixing clothes, help blowing nose                      |
|                         | Behaviour disapproving    | Disapproving facial expressions, verbal comments, physical contact       |

*aAutomatically coded when interaction state is coded ‘Routine-based activity’, ‘Unoccupied’, or ‘Time Out’.