# Honoring Children's Agency:
## A Systematic Review of Research *With* and *By* Children in Environmental Contexts

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**ABSTRACT**

In the context of the climate crisis, children are often framed as vulnerable, yet they also possess the agency to act as change-makers. This systematic literature review examines research conducted with young children in environmental contexts, emphasizing strategies that affirm children's agency as active participants rather than passive subjects. Findings suggest that true participatory research with and by children is not defined by a specific theoretical framework or methodological approach, but by the extent of children's involvement: before and beyond the data collection phase. For this to occur, researchers must practice reflexivity, release control over the research process, and foster collaboration with teachers and families to create a culture of co-research. This review contributes to the broader discourse on participatory action research in early childhood education, providing guidance for researchers and educators seeking to engage children as co-creators of knowledge and change.

***Keywords*:** early childhood, environmental education, education for sustainability, participatory research, child-led research

In the context of the climate crisis, young children are often conceptualized as vulnerable. There is no doubt that children are uniquely impacted by climate change: they are more heat sensitive than adults (Sheffield et al., 2017), at greater risk for dehydration (Kousky 2016), and are more likely to experience injuries in extreme weather (Biswas et al., 2010). Though these physical impacts are undeniable, and need to be addressed, we must not presume vulnerability as the defining characteristic of children in a changing climate. As Oswell (2013) argues "children are not simply beings, they are significant doings. They are actors, authors, authorities and agents. They make a difference to the world we live in" (p. 3 cited in Wyness, 2015). Children are not only shaped by their world, they shape it.

The Early Childhood Education for Sustainability (ECEfS) literature positions children as *current* agents of change "possessing the ability to make their own choices and affect change" (Dean & Elliot, 2022, p. 63), rather than *future* environmental stewards. This reframe is essential, as much of the Environmental Education literature has focused on nurturing children's connection with the environment to inspire their future environmental action (Chawla, 2020). This systematic literature review simultaneously acknowledges the impacts of the climate crisis on children while affirming their right to speak and act for themselves, in society, and in research.

Conducting research *with* and *by*, rather than on, children has been proposed as a promising paradigm in Environmental Education (EE) research by Barratt Hacking et al. (2013) in their seminal chapter *Children as Active Researchers* and documented as an emerging trend in EE by Green (2015). Green (2015) argues that "the way in which EE researchers approach research with young children is key... in promoting children's active participation as agents of change" (Green, 2015, p. 208). Therefore, I assert that as a field, there ought to be a direct connection between our affirmation of children's agency and engaging children in the research and knowledge co-creation processes.

This systematic literature review examines the theoretical and methodological approaches used in research *with* and *by* young children in environmental contexts, focusing on the roles of both children and researchers. By affirming children's agency and positioning them as active change-makers, this review aims to inform research practice and strengthen participatory action research in early childhood education. It contributes to a broader conversation on equipping researchers and educators with the tools to meaningfully engage young children in the research process. Therefore, the research questions guiding this literature review are as follows:

1. What theoretical and methodological approaches are being used in environmental contexts to conduct research *with* and *by*, rather than *on*, young children?
     a. What role(s) do the children and researchers play in the research process?
2. What challenges have been identified by researchers working in environmental contexts to conducting research *with* and *by* young children?

## Method

This systematic literature review was guided by the Galvan and Galvan (2017) method for conducting literature reviews. Consisting of an 8-year period, from 2015-2023, this review builds on the work of Green (2015) that explored literature from the United Nations Decade of Education for Sustainable Development (2004-2014). Inclusion was limited to empirical articles that had undergone double-blind peer review to ensure the articles met professional and ethical standards. Further, research conducted with young children aged birth to ten was included to focus on early childhood. Finally, the EE field is broad and evolving; therefore, research from EE, ECEfS, and other research conducted in environmental contexts concerning climate change impacts or involving nature-based learning were included. These inclusion criteria are expressed in the form of questions in Table 1.

**Table 1**
*Inclusion Criteria Identification Questions*

| Inclusion Criteria Questions: |
| --- |
| Was this study published between 2015 – 2023? |
| Did this study undergo a double-blind peer review? |
| Is the content or context of this study relevant to EE, ECEfS, climate change education, or nature-based learning? |
| Does the study involve children in the research process? That is, is this research conducted *by* or *with* children (as opposed to *on* children)? |
| Are the children involved in the study ages birth to 10 years old? |

### Data Collection

Literature searches were conducted using Education Research Complete, which was chosen as it is an educational database focusing on a range of ages and educational topics, in the hopes of generating the broadest range of possible results to apply the inclusion criteria. The following keywords were used to address the topic of the review: "participatory action research or community-based participatory research," "young children or early childhood or preschool or kindergarten or early years," "environment or sustainability or climate change or natural resources or environmental protection," "children as researchers," "children as active researchers," "child-led research," "environmental education or outdoor education or conservation education." Additionally, filters limited the search to include only peer-reviewed articles published between 2015 and 2023. These searches resulted in 121 articles, of which nine met the inclusion criteria. Additionally, I conducted a backward citation search (Briscoe et al., 2020), examining the reference lists of the nine articles to identify other relevant articles for inclusion. This search resulted in an additional two sources for inclusion, for a total of eleven articles included in this review.

### Data Analysis

I created a data extraction matrix consisting of categories that correspond to the research questions, as recommended by Galvan and Galvan (2017). A summary of the data extraction matrix can be found in Appendix A. The relevance of these categories to the inclusion criteria and research questions is outlined in Table 2.

**Table 2**
*Matrix Category Relevance to Inclusion Criteria and Research Questions*

| Category | Inclusion Criteria Relevance | Relevance to RQ |
|---|---|---|
| Field | Environmental contexts including EE, ECEfS, climate change, and nature-based learning. | |
| Age of children | Ages birth to 10 years old. | |
| Theoretical Foundation | Participatory research with or by children | R1 |
| Methodology | Participatory research with or by children | R1 |
| Data Collection & Analysis | Participatory research with or by children | R1 |
| Ethical & Other Considerations Working with Children | Participatory research with or by children | R1a / R2 |
| Role of Child | Participatory research with or by children | R1a |
| Role of Researcher | Participatory research with or by children | R1a |
| Challenges | Participatory research with or by children | R2 |
| Recommendations | Participatory research with or by children | R2 |

After confirming articles met the inclusion criteria, each article was reviewed in its entirety and data related to the categories (see Table 2) was extracted. A comparative approach was used to analyze the data across each category of the extraction matrix (Galvan and Galvan, 2017). After populating the data extraction matrix, I reviewed the data set by category and grouped related approaches. For example, in respect to methodology, I extracted the methodologies utilized, the sources cited to support those methodologies, and a brief description and justification for the use of that methodology. Once this analysis was complete for all categories, I conducted a thematic analysis (Braun and Clarke, 2012) to identify key themes, similarities, and differences across the included articles and across categories. The themes I synthesized were then organized into findings that answer the research questions addressing: theoretical foundations, methodological approaches, role of the child, role of the researcher, and challenges. Considering these findings, recommendations are made in the hopes of furthering effective and impactful participatory action research with and by young children.

**Findings**

Eleven articles were included in the final analysis. Articles were equally split between publication in journals specific to EE (such as the *International Journal of Early Childhood Environmental Education*, *Environmental Education Research*, and the *Australian Journal of Environmental Education*) and publications specific to early childhood (such as the *International Journal of Early Childhood*, *Early Child Development and Care*, and the *Journal of Early Childhood Literacy*). One outlier (Nah & Lee, 2016) was published in *Action Research*. The articles included here represent six countries: Australia, Canada, South Korea, Sweden, the United Kingdom, and the United States (see Figure 1).

**Figure 1**
*Articles by Location, per Country*
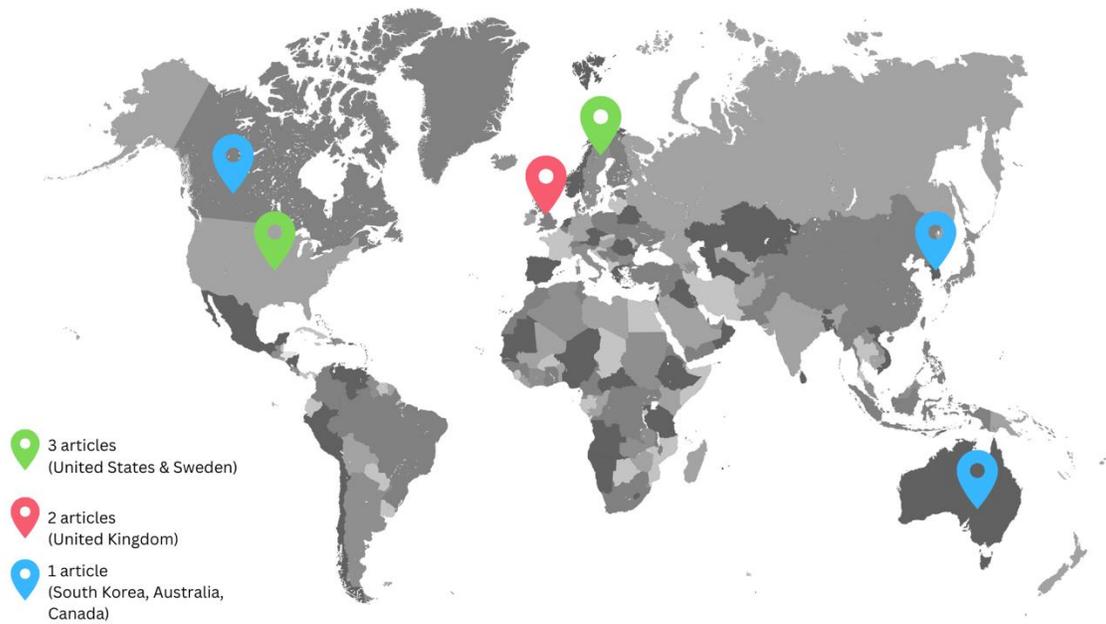


Building upon the work of Green's (2015) systematic review, I utilized Barratt Hacking et al.'s (2012) continuum of methodological approaches regarding research with children. In their typology, research *on* children, refers to children as subjects to be researched. Research *with* children, refers to studies that invite children to play a more active, collaborative role in the research process. Research *by* children, refers to studies that are initiated and conducted by children, even without adult intervention. I have mapped the studies included in this review onto Barratt Hacking et al.'s continuum (see Table 3).

It is notable that none of the included articles meet the definition of Barratt Hacking et al.'s (2012) conceptualization of research authentically conducted by children wherein children "are the researchers independent of adult intervention…children are responsible for all stages of the research from planning, through data gathering, analysis and dissemination," (p. 439). This may be because of the age of children included, with all but two studies including children younger than six. However, this is not to suggest very young children are not capable of conducting their own research, merely that, as of this review, that work has not been reported.

**Theoretical Foundations**

A wide range of theoretical foundations underpinned the included articles. They have been grouped into categories (see Table 4). Articles that engaged children in the research project were grounded in theoretical foundations that take seriously the role of children as active agents and warn against the potential of tokenization of children's involvement in the research process. Three articles were strongly grounded in a theoretical paradigm (such as post-humanism), and seven utilized childhood theories to describe and position children as competent social actors (such as the New Sociology of Childhood). Four articles referenced the UN Convention on the Rights of the Child (1989, 2005), which asserts children's rights to participation in decisions that affect their lives. Finally, five articles cited learning theories such as experiential learning (Kolb, 1985) and place-based education (Sobel, 2020) to frame how children learn and engage with their world.

Notably, the majority of studies foreground the agency of children through the use of childhood theories. In doing so, the authors clearly established respect for the child as an active agent not only in the context of the research study but in society. Appropriately, the theoretical foundation often informed the role of the child in the research project. For example, Postila (2022) used Stengers' 'slow science' to position children as "the connoisseurs, the

producers of local knowledge in their expertise of their preschools and their surroundings" (p. 279). Even articles that did not cite one of the childhood theories included in Table 4 (Harwood & Collier, 2017; Postila, 2019, 2022) explicitly named the participatory aims of the research study. However, these aims were not always fully actualized.

**Table 3**
*Included Articles Along the Continuum of Barratt Hacking et al.'s Childhood Research Approaches (Adapted from Barratt Hacking et al., 2012 and Green, 2015)*

| Research on Children* | | Research with Children | | Research By Children | |
|---|---|---|---|---|---|
| participant that is observed or measured. Adult researchers interpret data. | listened to; however, adult researchers ultimately interpret the data. | primarily led and interpreted by adults. Methods are designed to understand children's perspectives. | participatory and collaborative and includes children's perspectives. Children participate in the data collection but are not involved in other phases of the research project. | engaged as co-researchers, throughout the project (i.e. beyond data collection). Methods and project design honors children's agency and active participation. | conduct and lead all stages of the research process. |
| | | Williams et al. (2017) Haywood-Bird (2017) Williams & McEwen (2021) | Harwood & Collier (2017) Nordén & Avery (2020) Moore et al. (2021) | Nah & Lee (2016) Green (2016) Green (2017) Postila (2019) Postila (2022) | |

* Articles aligned with this category were intentionally not included in this review as they did not meet the inclusion criteria. However, the category is included here for clarity.

**Table 4**
*Theoretical Foundations of Included Articles*

| Theory | Key Authors | Article |
|---|---|---|
| **Theoretical Paradigms** | | |
| Post Humanist | Stengers (2010;) Tsing (2015) Taylor (2013) | Postila (2022) Harwood & Collier (2017) |
| New Materialist | Haraway (2016) Taguchi (2014) | Postila (2022) Harwood & Collier (2017) |
| Situated Knowledge | Haraway (1988) | Postila (2022) Postila (2019) |

| Common Worlds | Taylor (2013); Haraway (2004); Haraway (2008); Taylor & Giugni (2012); Pacini-Ketchabaw & Taylor (2016) | Harwood & Collier (2017) |
|---|---|---|
| Slow Science | Stengers (2018) | Postila (2022) |
| Relational Ontology | Stengers (2015); Stengers (2018) | Postila (2022) Postila (2019) |
| Post-Marxist Critical Theory | None cited. | Haywood-Bird (2017) |
| **Childhood Theories** | | |
| Huizinga's theory of play and place | Huizinga (1949) | Moore et al. (2021) |
| Children's Social Capital | Wong (2017); Wood et al. (2013) | Williams & McEwen (2021) |
| New Sociology of Childhood | James, (2009); James & Prout, (1990) | Green (2017); Green (2016) |
| | James & Prout (1997) | Nordén & Avery (2020); Nah & Lee (2016) |
| | James, Jenks, & Prout (1997) | Moore et al. (2021) |
| | Barratt Hacking et al. (2012); Green (2015) | Williams et al. (2017); Green (2016) |
| | Holloway & Valentine (2000) | Nah & Lee (2016) |
| **Policy** | | |
| UN Convention on the Rights of the Child | United Nations (2005); United Nations (1989) | Moore et al. (2021); Green (2017); Green (2016); Nah & Lee (2016) |
| **Learning Theories** | | |
| Constructivist | None cited. | Haywood-Bird (2017) |
| Social constructivist | Rogoff (2003) | Nah & Lee (2016) |
| Experiential Learning | Kolb (2014); Kolb (1985) | Williams et al. (2017) |
| Active Learning Theory | Hart (2013) | Williams et al. (2017) |
| Transformative Learning Theory | Mezirow (1997) | Williams et al. (2017) |
| Social Cognitive Theory | Bandura (1986), Paton (2003) | Williams et al. (2017) |
| Place-Based Education | Smith (2002); Sobel (2020); Woodhouse & Knapp (2000) | Nordén & Avery (2020) |

| Framework for Significant Learning | Fink (2013) | Williams et al. (2017) |
|---|---|---|
| Explorative Pedagogy | Vecchi (2010) | Postila (2022) |

**Methodological Approach**

The included articles employed a range of methodological approaches, though all utilized qualitative data. Moore et al. (2021) used a comparative case study to understand children's varied perspectives on their outdoor play spaces at two childcare centers. Haywood-Bird (2017) used a critical approach to ethnography in her study of children's enaction and understanding of power in their outdoor play. Haywood and Collier (2017) reported on an ethnographic study exploring children's relationship with humans and nonhumans. Green (2016, 2017) used a phenomenological approach to understand children's experiences of their environment as a means of evaluating child-friendly data collection methods. Participatory action research was utilized in Williams et al. (2017), and Williams and McEwen's (2021) work to engage elementary school students in flood prevention education. Both Nordén and Avery (2021) and Nah and Lee (2016) utilized action research approaches to redesign outdoor play areas in their respective settings (a childcare center in Sweden and a childcare center in South Korea). Postila (2019, 2022) used a multidisciplinary approach and pedagogical working methods that were familiar to the children to explore water and water-related environmental issues. Additionally, Haywood and Collier (2017) and Moore et al. (2021) utilized the Clark and Moss (2021) mosaic approach, which identifies participatory tools to elicit children's perspectives.

*Methods*

A variety of child-friendly data collection methods were used to engage children in the research process. Three categories of data collection were identified: documentation, interviews, and observation. Documentation methods included those that involved the children documenting their own experiences and perspectives through the use of: GoPro Cameras (Green, 2016, 2017; Harwood & Collier, 2017); photography (Nah & Lee, 2016; Nordén & Avery, 2020; Postila, 2019); personal diaries or informal writing (Harwood & Collier, 2017; Nah & Lee, 2016; Postila, 2022), drawing, making models or making art (Green 2017; Moore et al., 2021; Postila, 2019, 2022), role play (Green, 2017), map making (Moore et al, 2021), site tours (Moore et al., 2021), sensory tours (Green, 2016, 2017) and field trips (Nah & Lee, 2016).

Interviews were another common method employed, though in a variety of ways with varying degrees of structure including informal conversations with children (Harwood & Collier, 2017; Nordén & Avery, 2020;) child-led interviews (Nah & Lee, 2016); researcher-led interviews (Williams et al., 2017); group discussions (Nah & Lee, 2016; Williams et al., 2017; Nordén & Avery, 2020; Williams & McEwen, 2021); video-stimulated recall discussions (Green, 2016, 2017), storytelling (Postila, 2022), interviews with teachers (Nah & Lee, 2016; Nordén & Avery, 2020); and interviews with families (Haywood-Bird, 2017; Williams et al., 2017).

Finally, Nordén and Avery (2020) and Haywood-Bird (2017) used participant observation. Notably, all articles used multiple methods to both authentically engage children and draw on several data sources to support triangulation and verification. While the studies included utilized a range of approaches and often cited the participatory nature of these approaches, it appears that it is not the specific methodological approach or method used that indicates "research by" children, but the child's active involvement in the project before and beyond the data collection phase.

**Role of the Child**

Researchers utilized a range of strategies to engage children authentically in the research process (see Table 5). At a minimum, all studies sought children's assent to participation and utilized child-friendly data collection methods. This should be considered a baseline when the aim is research conducted *by* children. The studies included here provide promising examples of children's authentic involvement in the research process including selecting the issue of investigation, choosing data collection methods, directing the researcher's documentation (what they could or could not document), participating in data analysis, and sharing findings.

**Table 5**
*Children's Involvement in the Research Process*

| Activity | Description | Article |
|---|---|---|
| Assent to participation | Children were given opportunities to opt out of activities. | All |
| Participation in child-friendly data collection methods | Children participated in data collection methods. | All |
| Issue Selection | Children decided what issue or topic to focus on. | Green (2017) |
| Method Selection | Children chose which data collection methods to use for the study (from a set of methods presented by the researcher). | Nah & Lee (2016); Green (2017) |
| Direct the researcher in documentation | Children decided what not to include in (or delete from) documentation for analysis and/or direct the researcher's documentation. | Harwood & Collier (2017); Postila (2019); Postila (2022). |
| Interpret the data | Researchers brought back data to children (sometimes in the form of video or photos) and had a discussion with the children to understand their perspectives on the experience. | Nah & Lee (2016); Green (2016); Green (2017) |
| Share Findings | Children presented findings to families at the end of the project. | Green, (2017) |

To ensure children's authentic and active participation, the researcher often had to release some amount of control over the research project. Doing so created meaningful opportunities for not only the children's involvement in, but also influence on, the research process.

**Role of Researcher**

Most articles also explicitly detailed the role of the researcher in the study. This act of reflexivity appears to have been essential to successfully engage children in the research process as researchers had reflected on their positional power in the project as adults, and often as outsiders. Green (2017) aptly notes, "the way research is guided and facilitated by adults will greatly influence what children share or don't share in the process" (p. 7). Many of the other studies also reflected on this reality. Beyond mere acknowledgment, researchers intentionally crafted a role for themselves in the research project that made space for the children's enacted agency.

As these conceptualizations of the role of the researcher were analyzed, I identified three categories, participant observer, facilitator, and co-researcher, which I then mapped onto Barratt Hacking et al.'s (2013) childhood research approaches (see Table 6).

Several researchers acted as participant observers and did not involve children in the research process beyond data collection. They utilized primarily observation methods, though some included children's documentation (Harwood & Collier, 2017; Moore et al., 2021), and one included interviews with families (Haywood-Bird, 2017). In this role, methods were designed to elicit and understand children's perspectives, but the research process was primarily led and interpreted by adults.

Some researchers acted as facilitators and actively involved children in the data collection, often facilitating group conversations and processes with the children. In their work on flood prevention, Williams and McEwen (2021) and Williams et al. (2017) facilitated a flood education intervention and conducted researcher-led interviews with

children as well as interviews with families. In these studies, children participated in the data collection, but again, the research process was primarily led and interpreted by adults.

**Table 6**
*Continuum of the Role of the Researcher mapped onto Barratt Hacking et al.'s childhood research approaches (Barratt Hacking et al., 2012)*

| *Methodological Approach* | Research with Children | | Research by Children |
|---|---|---|---|
| | | | |
| *Role of Researcher* | **Participant Observer** | **Facilitator** | **Co-Researcher** |
| | Harwood & Collier (2017) | Williams et al. (2017) | Nah & Lee (2016) |
| | Haywood-Bird (2017) | Nordén & Avery (2020) | Green (2016) |
| | Moore et al. (2021) | Williams & McEwen (2021) | Green (2017) Postila (2019) Postila (2022) |

Finally, some researchers acted as co-researchers with the children. In this approach, researchers made space for children's active involvement in the research process beyond data collection. Nah and Lee (2016) provide a robust description of their role as researchers that is particularly notable:

> We not only observed but also participated in the activities involved in the development of the outdoor play area; accordingly, child participation was actualized. Specifically, we participated in the project by helping and offering assistance with the activities…We encouraged the parties involved in the project by providing ideas, searching for relevant resources when they approached us with problems, and cooperating in efforts to maintain a fundamentally democratic relationship, *in which all parties could exercise power and share control of the decision-making process* [emphasis added] (p. 340).

In this approach, the researchers constructed their role as specifically ensuring the children's active participation in not only data collection but the research process more broadly. Green (2017) similarly noted her role as making space for the children's discussion, input, and decision-making. Finally, Postila (2022) described her role as one of eliciting questions, creating the conditions for children's stories to emerge and be seen as valuable, and synthesizing the stories shared by the children while acknowledging who and how they were created (i.e., with the children). In this role, researchers intentionally engaged children throughout the research process by making space for their active participation. In addition to participating in the data collection, children also contributed to issue selection, data analysis, and dissemination.

**Challenges**

Challenges to conducting research with and by children, included following the children's lead, social influence of the researcher, adult receptivity and buy-in, and coordination time and investment, each of which is described in detail below.

***Following the Children's Lead***

Though the theoretical foundations provided a strong grounding for the methodological choices regarding the role of the child as well as the role of the researcher, the reality of enacting those roles proved challenging. Postila (2019,

2022) found that staying with the children, their interests, and concerns was not always easy but was worthwhile. She reflects, "as a researcher, at times I had to let go and lose control both of the research process as well as the data production" (2019, p. 224). This entailed allowing the children to continue their play or experimentation at times when the questions or inquiries framed by the researcher were not taken up by the children, rather than forcing their engagement.

Further, engaging seriously with children in the research process, particularly around environmental issues, sometimes surfaced challenging ethical issues or questions. Postila (2022) notes this in her work exploring water with preschool children. The children posed challenging questions about who has access to clean water and the impacts when dirty water is ingested. As adults, it is important to recognize our own discomfort or limiting beliefs around children's capabilities to deal with difficult topics and instead follow their lead, supporting their inquiry in developmentally appropriate ways. As Williams and McEwen (2021) note, a lack of engagement with children around potentially challenging or emotional topics can, in fact, "convey hopelessness and instability to children who are searching for guidance and answers" (p. 1643). Following the children's lead requires taking seriously their questions and concerns and finding developmentally appropriate ways to engage with them in those concerns.

Following the children's lead required flexibility. Green (2017) found that using an assigned schedule and grouping for the children to rotate through methodological activity centers "did not necessarily support children's autonomy in the project." (p. 10) This led her to allow the children to engage with the data collection stations however they liked, which posed challenges of its own: overcrowding and completing work in the time allotted. However, it did allow for the children's freedom of choice and movement. Ultimately, Green (2017) recommends that "when opportunities arise, researchers should embrace children's innovations - doing so provides deeper insight into the life world of a child and honors children's agency in the process" (p. 18). While certainly more time-consuming, and requiring a great deal of reflexivity, this flexible approach appears very important in supporting children's agency in the research process.

### Social Influence of the Researcher

Many researchers reflected on the influence of their presence in the research project, given the unequal power dynamic between adult and child which may result in children responding to researchers in the way they believe is socially desirable or required. While in some ways unavoidable, it appears very important that researchers both acknowledge and do their best to ward against traditional power dynamics. Researchers utilized several strategies to do so, including ongoing assent throughout the research project, reading children's body language to gauge assent in addition to verbal assent processes (Haywood-Bird, 2017), giving children agency over what is documented and how, and utilizing multiple methods to document a variety of perspectives and experiences (Green, 2017). Ultimately, Haywood-Bird (2017) noted that despite these efforts "not all dynamics of power and privilege between me and the children could be erased" (p. 1018), making researcher practices of reflexivity, particularly regarding their power and role in the research process, even more essential.

### Adult Receptivity and Buy-In

Notably, every article included in this review was conducted in the context of a school or early childhood care center. As such, all studies included, to some degree, teachers and families. While adult participation is not necessarily an inherent challenge, if all adults involved are not brought into the theoretical framing, particularly regarding children's agency and active role in the research process, it appears challenging to fully actualize the aims of the research project to be collaboratively conducted with or by children.

This can be due to a variety of factors. Nordén and Avery (2020) suggested that preschool teacher's lack of prior experience in EE led to an inability to engage with children's questions and interests. This posed challenges to the research process and revealed a tension between the children's curiosities and desire to enact their agency in the context of the project and the teacher's expectations for the children's participation. Further, they observed the adults involved with the project's "limited interest and curiosity to listen to what the children might be thinking during the activities" (Nordén & Avery, 2020. p. 328). This posed significant challenges and ultimately led to missed opportunities to involve the children and authentically understand their perspectives.

Nah and Lee (2016) recognized the larger cultural context also greatly influences how adults interact with the research process with young children: "it is difficult to implement child participation initiatives in an authoritarian culture, where the notion of childhood as subordinate to adulthood has prevailed" (p. 348). Green (2017) also notes adults' and educators' misplaced instincts toward maternalism, thereby viewing children as vulnerable, innocent, and in need of protection. Challenges to adult buy-in include both individual and cultural factors that researchers should consider and address when aiming to implement research with and by children.

### Coordination and Time Investment

Further, this approach that foregrounds children's agency takes time. Nordén and Avery (2020) found that educators' aim "was getting the work done quickly, rather than adding extra time and space for communication and engagement with the children" (p. 328). It seems evident that this work cannot be rushed, particularly if the aim is to authentically follow the interests and curiosities of the children. Nordén and Avery (2020) also recognized the need for significant coordination and planning time, which proved difficult to build into teacher schedules. Nah and Lee (2016) similarly noted that the process of engaging adult participants takes time and investment beyond any one research project. This finding is also supported by Barratt Hacking et al.'s (2013) assertion that time is needed to support the success of the research project to foster trust and relationships between children and adults in the research process.

## Discussion

The purpose of this systematic literature review was to explore the theoretical and methodological approaches utilized in research conducted with and by young children in environmental contexts in the hopes of informing ongoing professional research practices that affirm children's agency and position children as agents of change. While the studies included utilized a range of theoretical and methodological approaches, it appears that it is not the specific approach used that indicates research with or by children, but the child's active involvement in the project before and beyond the data collection phase, which requires active reflexivity on behalf of the researcher to create space within the research process for the children's active involvement.

It is notable that none of the studies included in this review met Barratt Hacking et al.'s (2012) criteria for research conducted by children; primarily that it is conducted "independent of adult intervention" (p. 439). This is not necessarily problematic; particularly when children's agency is understood from a relational perspective (Wyness, 2015): adult engagement is not necessarily interference or infringement on children's agency. By understanding agency as a collective, rather than individual, competency, we can work together, adults alongside children, to address the challenges we face.

As researchers, we must cultivate nurturing and supportive environments that empower children to exercise their agency. This can be achieved through relational approaches that actively engage and respect children's perspectives, choices, and contributions, including:
- Involving children in all research phases: topic selection, method selection, data collection, analysis, and dissemination.
- Explicitly stating the researcher's role to surface power dynamics and foster collaboration.
- Practicing reflexivity and flexibility to prioritize children's interests and agency in the research process.
- Facilitating dialogue between children and adults about their respective roles in the research (Barratt Hacking et al., 2013)
- Using child-friendly methods for assent, such as post-it notes (Nah & Lee, 2016) or visual symbols (Moore et al., 2021).
- Addressing cultural norms that may hinder children's agency (Nah & Lee, 2016).
- Fostering an inclusive, participatory environment where all participants (teachers, families, etc.) support children's engagement in research.

As children experience the impacts of climate change, conducting research with and by children could be a way to foster their sense of agency. As Wiliams and McEwen (2021) suggest "the research design itself could serve to create

social capital between the children" (p. 1644). Researchers have also found that talking with children about potentially distressing topics, such as natural disasters, did not cause the children to be more fearful, it in fact did the opposite, with many children reporting they felt less worried (Ronan et al, 2015, cited in Williams and McEwen, 2021). Although in the context of engaging older children (age 10-13), Trott (2019) found that utilizing participatory methodologies and action-oriented projects can expand children's agency.

Sanson et al. (2022) argue that "it is important not to underestimate very young children's knowledge, curiosity, and competencies about environmental issues" (section 5.2.1, para 2). By embracing a relational understanding of agency (Wyness, 2015), we can honor those competencies and support children's inquiry with the world around them.  When we understand agency as collective, rather than individual, and when we take seriously the rights and capabilities of children, it becomes clear that one way forward in navigating our changing climate is through shared engagement: with children and adults.

## Conclusion

Eight years after Green's (2015) review, examples of research *by* children are few. While some promising examples exist (Nah & Lee, 2016; Green, 2017), the field of EE has not realized the potential identified by Barratt Hacking et al. (2013) for engaging children as active researchers. If we take children's agency and internationally affirmed rights seriously, we must move beyond research *on* children to authentic research with and by children that prioritizes children's participation and perspectives in every phase of the research process. Merely naming children's right to participation is not enough. Theoretical presuppositions must be embodied throughout the entirety of the research process for children's perspectives to come forward and their capabilities as co-researchers and change agents realized and respected.

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*Denotes articles included within the literature review.

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**Appendix A: Summary of Data Extraction Matrix**

| Authors & Year | Age Group | Country | Theoretical Foundation | Methodological Approach | Method | Role of Child | Role of Researcher |
|---|---|---|---|---|---|---|---|
| Postila, (2022) | 3-5 | Sweden | Post Humanist New Materialist Situated Knowledges Slow Science Relational Ontology Explorative Pedagogy | Multidisciplinary | Storytelling Children's Diaries Photography | Participated in issue selection and documentation. | Creating the conditions for children's active participation. Posing questions, documentation, synthesizing learning. |
| Williams & McEwen, (2021) | 7-9 | United Kingdom | Children's Social Capital | Participatory Child Led Approach. Guided by Greig et al. (2012) and Davis (2015) | Group Discussion | Participated in the child-led, researcher facilitated discussions | Building rapport with the children, facilitating discussions. Project design, data collection & analysis. |
| Nordén & Avery (2020) | 3-5 | Sweden | New Sociology of Childhood | Participatory Action Research (Kemmis 2009; Kemmis et al. 2014).) | Photography Informal Conversations with children Group Discussions Interviews with Teachers Participant Observation | Participation in children's council (group discussions) and project implementations. | Navigated tension between positioning as expert, facilitator, and equal participant in the project. |
| Moore et al. (2019) | 4-5 | Australia | Huizinga theory of play and place New Sociology of Childhood UN Convention on the Rights of the Child | Comparative Case Study Mosaic Approach | Conversational Storytelling Drawing Site Tours Photography Artefact collection Map Making | Participate in the data collection | Led project design and analysis. |

| | | | | | Wishing Stones | | |
|---|---|---|---|---|---|---|---|
| Postila (2019) | 3-5 | Sweden | Relational Ontology Situated Knowledge | "Pedagogical Working Methods" | Photography Drawing Field Notes | Participate in data collection, make decisions regarding what data sources to delete or save and which data to include in dissemination. | Decide with children what data sources to save or delete. Facilitate research process, make space to follow children's interests and inquiries. Led analysis. |
| Green (2017) | 3-6 | United States | New Sociology of Childhood UN Convention on the Rights of the Child | Participatory Phenomenology | GoPro Cameras Creating Art Role Play Making Models Sensory Tours | Selected topic for investigation, selected data collection methods, participated in data collection, participated in data analysis through group discussion, shared findings with family members | Supported research process that made space for children's active engagement, prepared relevant materials given the children's decisions. |
| Harwood & Collier (2017) | Preschool | Canada | New Materialist Post Humanist Common Worlds | Mosaic approach (Clark & Moss, 2011) | Go Pro Cameras Photos Educator Journals Researcher notes Surveys Conversational Interviews | Documented their experiences with Go Pros and iPad. Directed researchers in what they could or could not document. | Led research design and implementation. |
| Haywood-Bird (2017) | 2.5-5 | United States | Post Marxist Critical Theory Constructivist | Ethnography with a critical lens | Participant Observation Field Notes Interviews with Families | Directed researcher away from their play when they did not want to engage. | Utilized noninvasive fieldwork to respect children's agency. Led |

| | | | | | | | research design and implementation. |
|---|---|---|---|---|---|---|---|
| Williams et al. (2019) | 7-9 | United Kingdom | New Sociology of Childhood Experiential Learning Active Learning Theory Transformative Learning Theory Social Cognitive Theory Framework for Significant Learning | Participatory Methodological Approach using Shier's (2001) 5 Stage Method | Intervention activity (making a flood box), interviews with children, interviews with families. | Participated in intervention and interview | Designed and led research project. |
| Green (2016) | 3-6 | United States | UN Convention on the Rights of the Child New Sociology of Childhood | Phenomenology | GoPro Camera, Sensory Tours, Video-stimulated recall discussions | Decide if, how, and when to participate in data collection. Interpreted their experiences through group discussions. | Identified felt were relevant video clips to bring to the children for discussion. Facilitated discussion amongst the children. |
| Nah & Lee (2016) | 5-6 | South Korea | New Sociology of Childhood Social constructivist | Action Research with flexible, open-ended design | Photography, Field Trips, Drawing, Informal Writing, Child-led interviews, Educator-led interviews, Circle Time Discussions. | Children involved in issue selection (outdoor play space) and project management; children led theme development, investigation, and application phases of project | Committed facilitator and co-participant. Secured resources, supported children's agency and ensured a democratic process. |