Connecting Early Childhood Development to Climate Change

Insights for Communicators

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I. Introduction

Climate change is a present reality,[1] and children are among those most at risk of long-lasting harm to their health as a result.[2] Burning oil, coal, and gas releases harmful pollutants, as well as excess carbon dioxide, which leads to the warming of the Earth. This increase in temperature drives worsening disasters like wildfires, heat waves, and floods. In the United States, the devastation caused by the Los Angeles wildfires in January 2025 was a chilling reminder that climate change is impacting us now and will continue to in the future. The particular impact of such climate-related events on child development is a hugely pressing yet often overlooked area.

Scientific research tells us that young children's brains and biological systems—including their immune, metabolic, and cardiovascular systems—develop in an interconnected manner and are shaped by their environments. These environments provide both enriching experiences and opportunities that support healthy development, as well as adverse exposures that can hinder it. Certain periods, including the prenatal stage and early childhood, are especially critical, as developing biological systems are highly sensitive to environmental influences. The conditions in which children grow up play a key role in shaping their physical and mental health, learning abilities, and social-emotional wellbeing, both in childhood and later in life. Climate change is changing the environments young children grow up in, and this has, and will continue to have, an impact on them into the future.[3]

Despite the risk of negative consequences of climate change for children's health and development, this is not an issue that the public is widely aware of, nor is it the focus of media coverage on climate change. In an analysis of all online news articles mentioning climate change from October 2023 to October 2024 (over 2 million) and all tweets over the same year (over 4 million), only 4 percent included any mention of children. Less than 2 percent mentioned children's health and development. Leaving children out of the conversation ignores the outsized harm they will face if we don't act now to mitigate and adapt to the changing climate. It also allows the issues of climate change and early childhood development to remain unconnected in people's thinking.

This brief presents the cultural mindsets that people in the United States use when thinking about the impacts of climate change on early childhood development. Cultural mindsets are deep, assumed patterns of thinking that shape how we understand the world. They are broadly available to people who share a culture and may be cued to help people understand an issue or make decisions. Frames that cue mindsets that align with our communications goals, and do not cue mindsets that counter our goals, are productive. This brief includes the most common mindsets, as well as less common, but still available mindsets that show promise for productively reframing the issue. Examining the available cultural mindsets about this topic gives us important insights into the challenges and opportunities communicators face. Our existing cultural mindsets can alternately enable or stand in the way of the transformations needed to help children thrive in a changing climate.

Any form of communication can activate cultural mindsets, so in this research we examined two major sources of communications that the public may be exposed to about the effects of climate change on early childhood development: the media and the advocacy field. The media play an important role in activating or downplaying different cultural mindsets. News media can interact with other forms of media, like social media, to shape public thinking. As the media play a role in spreading and cuing mindsets, it is important to gain some understanding of how the media present the issue of how climate change impacts children's early development. Advocacy organizations also play a role in communicating about the issue through their publicly accessible materials. Examining how the media and advocates are communicating about the issue can give us an idea of the messages that the public may encounter on the connection between climate change and child development. This brief includes a media content analysis and a field frame analysis that present more detail on what the current communications terrain looks like.

Our analysis reveals that there are limited available mindsets that accurately reflect the impacts that climate change is having and will continue to have on young children. The media also largely are not writing about children in the context of climate change, and even less on the developmental impacts. The *lack* of established thinking and discourse presents an exciting opportunity. It means that this is a moment when advocates can more firmly enter the discourse with well-framed materials, shape media coverage, and ultimately make this issue something that the public both understands and cares about.

In our research to understand cultural mindsets, we found the following:

1. People tend to think of immediate or short-term effects of the impacts of climate change on children but not the long-term developmental impacts.

2. When thinking about the indirect effects of climate change on children, people focus on how fetuses are impacted during pregnancy and the role of parents in protecting kids from harm—rather than wider impacts to caregiving.

3. Mindsets about who will be most affected by the changing climate tend to focus on communities marginalized by class but downplay the effects of racism.

4. Responsibility for protecting children from the effects of climate change is placed on parents first, the government second.

5. The government's role as a protector of children from the impacts of climate change is thought to be compromised by corruption.

6. Solutions for helping children thrive in the face of climate change are not top of mind, and people tend to default to technological fixes.

This report is organized into five main sections:

- **What are we trying to communicate?** We begin with a description of the content on climate change and early childhood development that needs to be conveyed, based on interviews with scientists, academics, doctors, and advocates who are researching and communicating on this issue.

- **How does the American public think about climate change and early childhood development?** This section outlines the cultural mindsets—the implicit assumptions and taken-for-granted ways of thinking—that people use to think about climate change and early childhood development. We highlight the mindsets that make it difficult to communicate the core ideas, as well as the mindsets that could facilitate communication about our core ideas.

- **How is the field communicating now?** In this section, we present frames and narratives emerging from an analysis of public-facing communication materials produced by the field of advocates working at the intersection of climate change and child development.

- **What is the media discourse on climate change and children?** We share headline findings emerging from an analysis of media and social media coverage on this issue over the past few years.

- **Emerging recommendations for communicators.** We conclude with a summary of what this research means for advocates and others who are communicating about climate change and early childhood.

This research is the first part of a larger project to develop a communications strategy to communicate effectively about the impact of climate change on children. This strategy would help advocates advance a new narrative with greater speed and power and create public will for prioritizing child development and wellbeing. Further research will be needed to build on the insights offered in this brief to identify the most effective ways of framing this issue. Those frames could then be used by a wide variety of organizations, sectors, and disciplines to align on a shared narrative that accurately reflects the broad story to the public about the impacts of climate change on early childhood development. This shared narrative has the potential to shift the larger cultural narrative about climate change so that children are appropriately included and prioritized in talks about the impacts, and the public is aware of the outsized harm they face.

II. What are cultural mindsets and why do they matter?

Cultural mindsets (or mindsets, for short) are deep, assumed patterns of thinking that shape how we understand the world and how we make decisions. In shaping how we think, mindsets structure and produce our beliefs and attitudes.

The mindsets that we hold can normalize or problematize aspects of the existing social order. For example, a mindset rooted in individualism makes public policies that support the community good seem off base, unnecessary, and misguided. Individualism focuses our attention on measures that help individual people make better decisions (e.g., health education) and takes our attention off the ways that broader structures and systems affect our lives (e.g., the ways that housing affordability, toxins in our water, or access to quality food affect our health).

We all have multiple, sometimes contradictory mindsets that we can use to think about a given issue. For example, while Americans often think individualistically, we also have access to more ecological and systemic mindsets. When these mindsets are active, they bring into view social systems and the ways that environments shape outcomes alongside individual choices. They also lead us to recognize the need for changes to systems, including via policy change.

Cultural mindsets are highly durable. They emerge from and are tied to cultural and social practices and institutions with deep historical roots. In our research, we focus on cultural mindsets that emerge from common, national social practices and institutions—mindsets that are shared across our national culture. It is important to recognize, however, that different people and groups will engage with these common mindsets in different ways. For example, a mindset can be more salient—more frequently drawn upon and more consistently used in thinking—for one group than for another. In addition, cultural subgroups within society also have access to distinctive mindsets that emerge from institutions and practices specific to these groups.

How Does Cultural Mindsets Research Differ from Public Opinion Research?

Public opinion research examines the explicit attitudes and preferences that people hold about specific issues. Cultural mindsets research explores the deeper, underlying ways of thinking that shape and explain these patterns in public opinion. Where public opinion research examines *what* people think, cultural mindsets research examines *how* people think. For example, public opinion research might demonstrate that people support health education programs more than they support policies that support access to healthy housing. Cultural mindsets research explains why this is, revealing the role that the mindset of health individualism plays in driving these opinions and preferences.

III. Methods

Below, we describe the methods we used to create this phase of our research. For further information on our methods, refer to the Appendix:

1. Expert Interviews

A total of 16 one-on-one interviews were conducted over Zoom with experts in the fields of climate change, early childhood development, and the intersection of those fields. These interviews were conducted from February to April in 2024. This group includes pediatricians, educators, policy advocates, and academics.

2. Literature Review

We conducted a review of academic and gray literature (reports published outside of academic journals) to support our understanding of the problem, as well as to understand more about climate communications. The expert interviews were combined with findings from the literature reviews to produce the core ideas—that is, what people working on the issue want the public to understand about climate change and early childhood development in the United States.

3. Advisory Board Feedback Sessions

We assembled an Advisory Board of professionals in the fields of climate change, early childhood development, and the intersection of these issues. The Board includes pediatricians, policy analysts, and representatives of nonprofits working on early childhood education and parents' concerns in the face of climate change.

4. In-Depth Cultural Mindsets Interviews

We conducted 20 interviews with a diverse sample of members of the public in August 2024. We analyzed these interviews to identify the cultural mindsets that people use to think about climate change and early childhood development. We selected participants to resemble a cross-section of the general public, with particular attention to achieving representative quotas of parental status, political views, location, age, and race. We screened people out if they were actively involved in advocating for this issue.

5. Field Frame Analysis

We did an analysis of public-facing communications materials from 16 organizations focused on the intersection of climate change and early childhood development.

6. Media Content Analysis

To understand how media frame early childhood development and climate change in the United States, FrameWorks conducted a quantitative analysis of the general prevalence of the topic in the news, as well as two separate qualitative content analyses of online news articles and posts on X. In the quantitative analysis, we aimed to understand how often articles and posts about climate change mention children, child development, and children's health and wellbeing. The qualitative analyses delved deeper into the specific ways that news articles and users on X communicate about climate change and young children. Through the first qualitative analysis, we aimed to understand how the news media portrayed climate change's impact on children's health and development in 2024. The second analysis looked specifically at how extreme heat (e.g., heat waves and heat domes) has been framed in news articles and X posts over the course of six summers (2019–2024). We chose to investigate media discourse on extreme heat because it constitutes an observable and close-to-home climate event that has significantly impacted the lives of people in the United States. For more information about the methods, see the Appendix.

Taken together, these methods reveal a picture of the communications landscape for the issue of how climate change affects early childhood development. The expert interviews, literature review, and Advisory Board guide what should be communicated; cultural mindsets show how the public thinks about the issue; and the media content analysis and field frame analysis provide a broader context of the messages that are currently being suggested to the public.

IV. What are we trying to communicate?

To develop an effective strategy for communicating about climate change and early childhood development in the United States, it is necessary to first identify a set of core ideas to get across. To do this, FrameWorks' researchers conducted a series of 16 interviews and a review of selected literature. We then held a feedback session with our Advisory Board. Below, we summarize the core ideas that emerged from this process, which represent the content that needs to be effectively communicated and the solutions that the field wants to build support for through strategic communications:

1. **Climate change poses serious risks to children's health and development.**
   Climate change is already affecting the social, built, and natural spaces where children live, grow, play, and learn. Rising temperatures, air pollution, and food and water system disruptions are directly impacting children's health, leading to an increase in asthma, learning difficulties, and mental health challenges. Extreme weather events, such as wildfires, worsen air quality and can expose children to harmful pollutants, while contaminated water and food insecurity pose additional risks. These interconnected causes are accelerating, fundamentally altering childhood and increasing long-term health vulnerabilities.

2. **Climate change impacts children differently than adults, so their specific needs must be considered in mitigation and adaptation efforts.**
   Children are particularly sensitive to environmental changes due to their developing physiology, brain architecture, and limited autonomy. Extreme heat puts them at a higher risk of dehydration and cognitive impairments, while exposure to air pollution and wildfires disproportionately affects their developing lungs. Young children are also uniquely at risk during climate-related disasters, as they have less ability to navigate emergencies and are more prone to experiencing long-term emotional distress. Additionally, climate change impacts begin before birth, with prenatal exposure to air pollution and extreme heat linked to the risk of preterm birth and low birth weight, which can affect a child's health over their lifetime. Effective climate policies must account for these specific sensitivities in children.

3. Climate change impacts the care that children receive, which impacts early childhood development.

Children's wellbeing is deeply connected to the health and stability of their caregivers, including parents, educators, and health care providers. Climate change threatens caregivers' physical health, economic security, and mental wellbeing, making it harder for them to provide stable, responsive care. Additionally, climate change puts strain on caregiving systems—schools, child care centers, and health care facilities—which are often under-resourced and struggling. Extreme weather can damage infrastructure, disrupt services, and exacerbate workforce shortages, making it harder for children to access education and medical care. Without intervention, these disruptions increase the risks for negative developmental outcomes.

4. Structural inequities in early childhood are exacerbated by climate change.

Children in marginalized communities—especially those in poverty and Black, Indigenous, and other communities of color—often experience the harshest effects of climate change. Marginalized children are already more likely to live in areas with high pollution, inadequate infrastructure, and limited health care access, making them more susceptible to climate-related health risks. Additionally, marginalized communities often have fewer resources to recover from climate disasters, leading to greater displacement, educational disruption, and economic instability. Systemic racism and policy failures have historically placed these communities at higher risk, and climate change will likely only widen existing disparities unless targeted action is taken.

5. Pursuing mitigation, adaptation, and resilience is important in responding to climate change now.

Urgent action is required to reduce carbon emissions (mitigation), adjust to climate challenges (adaptation), and strengthen social support systems (resilience). Ending fossil fuel dependence is critical to protecting children's health, and early childhood advocates can play a role in promoting sustainable solutions. Adaptation strategies, such as heat-resilient schools, green play spaces, and improved health care access, will help safeguard children's wellbeing. Strengthening early childhood systems—by investing in child care, health care, and education—is essential for building resilience and ensuring that children, especially those in marginalized communities, are supported through climate-related disruptions.

For an illustration of how climate change can impact children differently from adults, consider the 2025 Los Angeles (L.A.) fires.[4] Extreme heat during the summer of 2024 created an exceptionally dry atmosphere and dried out the vegetation in the L.A. area, making it easier for wildfires to catch and spread. Children were, and will continue to be, uniquely impacted by the fires compared to the adults in their lives. First, there are some direct effects on children's health and development. For example, children breathe more and closer to the ground than adults,[5] so they will inhale more of the ash left behind by the burned buildings. Some of the chemicals in this toxic ash have been linked to heart disease and lung issues in the long term.[6] Several schools in L.A. also burned to the ground,

leaving children to enroll in new schools away from friends and community or to miss school for weeks to months altogether.[7] This could impact mental health, learning, and social-emotional development. There are also indirect effects on children when adults who interact with children are affected. Parents, educators, and child care workers were also all impacted by the fires and likely experienced elevated stress as they managed the disruptions to their lives. This could also negatively impact the caregiving they provide to children. For example, thousands of workers in low-income jobs lost their jobs as a result of the fires.[8] Their children's lives will be impacted by this loss of income, and in a city famously expensive to live in, this could lead to displacement or, at minimum, increased financial stress. Children from other marginalized and racialized communities are also disproportionately affected. In the historically Black community of Altadena in L.A., a town formed as a result of redlining, residents' houses were devastated as resources were less quickly distributed there than in the wealthier community of the Pacific Palisades.[9] This resulted in the displacement of several families who had lived in Altadena for generations, disrupting the community.

The L.A. fires are just one example, but climate change will continue to have negative consequences for the United States by exacerbating extreme weather events, threatening our food supplies, making clean drinking water more scarce, and simply making our everyday lives hotter.

V. How does the American public think about climate change and early childhood development?

To explore public thinking about the impact of climate change on early childhood development in the United States, researchers at FrameWorks conducted 20 one-on-one, two-hour-long cognitive interviews with members of the US public. The interview participants represented a diversity of viewpoints: liberal and conservative; urban, suburban, and rural; and parents and people without children. In addition, the sample was diverse across race, income, gender, and geographic location. For a full description of the sample, see the Appendix. These interviews were analyzed to identify the deep, implicit ways of thinking that people use to think about climate change, early childhood development, and the impact climate change has on development. Three overarching findings emerged across the cultural mindsets research:

1. **There is a lack of mindsets directly connecting climate change and early childhood development.**

   When asked, participants tended to say they had never thought about these two topics together. However, over the course of the interviews, people drew on several mindsets to make sense of how climate change could affect children. This suggests there is an opportunity for the field to create frames and narratives that fill this gap.

2. **There is a lack of a developmental perspective when it comes to understanding the impacts of climate change on children.**

   Although people reason that children are impacted by the environment around them, there is a lack of cohesive mindsets about the long-term impacts of events that happen during early development. Children are understood to be more sensitive than adults but also to be able to recover quickly from harms encountered in childhood. Those mindsets that emerged connecting climate change and its impacts on child development tended to be about the immediate and direct effects, for instance, of air pollution or heat on children's bodies. More indirect effects were mostly understood through the parent-child relationship, neglecting the influence of other adults in a child's life. In neither case were people thinking about impacts in terms of long-term health and development.

3. **People do not tend to think of solutions to climate change that are geared to protecting children. Even when asked directly about children, people resort to technological and individualistic solutions.**

The causes of climate change are not generally well understood, and people cannot easily articulate solutions that are proportionate to the scale of the problem, even if they think it's a big problem. In addition, because climate change is not connected to children in people's minds, people don't tend to offer specific solutions that can help kids thrive in the face of climate change, beyond offering children more information about climate change. Rather, people default to technological solutions or individual actions such as recycling.

CLIMATE SKEPTICISM: HOW MIGHT IT SHOW UP, AND WHAT CAN WE DO ABOUT IT?

In our broadly cross-sectional sample of the public, climate skepticism was low. Our participants mostly thought that climate change exists and is caused by human activity. Skepticism, when it arose, came up in connection with the mindset that *Change Is Natural* and that the Earth will correct itself over a long period of time, and the mindset that *Climate Change Is Propaganda* spread by the wealthy and powerful to control us and turn a profit. However, even when people did express skepticism about climate change, they were willing to reflect on how environmental events and particular climatic changes (like extreme heat) could affect children. While further research is needed to test framing strategies, this suggests that such environmental impacts may be a helpful entry point to talking about climate change, particularly amongst the more skeptical. Additionally, it was common for people to express that they themselves had experienced observable changes to the weather, compared to when they were younger. This again suggests that focusing on observable events could be a helpful way to push back against skepticism. Further research is needed to determine how best to combat skeptical mindsets when communicating about climate change, but these initial results suggest there may be some hopeful avenues to explore when talking about climate change and its impacts on children.

Overall, children are not top of mind when people think about climate change. However, by examining the mindsets that people use when asked about the intersection of these issues, we can start to see opportunities for building on some productive mindsets. The findings below group the cultural mindsets into several key insights on public thinking. It is important to note that these cultural mindsets reflect how people in the United States currently *think* about this issue, rather than serving as recommendations for how we should *talk* about the issue. We do, however, reflect on what the mindsets might mean for communicators, outlining the kinds of opportunities and challenges they present.

Summary of Insights and Related Cultural Mindsets

Below, we provide a summary of the overarching insights from our public mindsets research and some of the key mindsets available to people. These insights are detailed in the pages that follow.

Insight	Related Cultural Mindsets	Main Assumption (what the public thinks)
People tend to think of immediate or short-term effects of the impacts of climate change on children but not the long-term developmental impacts.	*Vulnerable Children*	*Young children are especially susceptible to the immediate harms of climate change because of their physical fragility, dependence, and lack of knowledge.*
	Kids Are Resilient	*Children naturally adapt to and recover quickly from environmental harms.*
	Only in the Future	*Climate change won't seriously impact children until they are adults, so they are not affected now but will be in the future.*
When thinking about the indirect effects of climate change on children, people focus on how fetuses are impacted during pregnancy and the role of parents in protecting kids from harm—rather than wider impacts to caregiving.	*Maternal Mediated Transmission*	*Environmental harms affecting the parent during pregnancy impact the fetus because it is in the parent's body, although it is not entirely clear how this transmission happens.*
	Family Bubble	*Children's wellbeing and outcomes in life are determined mostly by their parents and home environment.*
	Parenting Is Physical	*A parent's physical health determines how well they can care for their children, and climate change will affect a parent's physical health.*
	Protector Parents	*It is primarily a parent's job to protect children from environmental threats.*

Mindsets about who will be most affected by the changing climate tend to focus on communities marginalized by class but downplay the effects of racism.	*Opportunity Structures*	*Marginalized communities have less access to resources, so the impacts of climate change will likely be exacerbated.*
	Class Not Race	*Socioeconomic status, not systemic racism, determines how severely people will be impacted by climate change.*
	Climate Change Doesn't Discriminate	*Climate change affects everyone equally, regardless of race, class, or background, ignoring structural disparities.*
Responsibility for protecting children from the effects of climate change is placed on parents first, the government second.	*Government as a Safety Net*	*Government intervention should be minimal, but if parents fail to protect their children, the government has a duty to step in.*
	Government as Protector	*Government has a duty to protect its constituents from environmental harms.*
The government's role as a protector of children from the impacts of climate change is thought to be compromised by corruption.	*Profit over People*	*Corporations prioritize profit over human and environmental health.*
	Government Is Corrupt	*Government officials are influenced by corporate interests, compromising their duty to protect the public from the harms of climate change.*
Solutions for helping children thrive in the face of climate change are not top of mind, and people tend to default to individualistic and technological fixes.	*Children as Sponges*	*Children absorb everything from their surroundings and early experiences, so early exposures deeply shape their future. This underpins a dominant assumption that educating children about climate change is a key solution to the problem.*
	Individualism	*Individual choices and personal responsibility, rather than systemic forces, determine life outcomes.*
	Consumerism	*Making more environmentally friendly consumer choices is a key way to mitigate against climate change.*
	Linear Progress	*Society naturally advances and improves over time. This connects to an assumption that technological advancements will be able to fix the climate problem.*

Detailed Cultural Mindsets Findings

FINDING #1

People tend to think of immediate or short-term effects of the impacts of climate change on children but not the long-term developmental impacts.

While people don't initially make an association between children and climate change, they can reason about how climate change might impact kids. However, these impacts are usually assumed to be acute and short term rather than developmental and long term. In some responses, people reason that effects may stick around for longer periods of time, but explanations of how exactly these effects last long term are vague. The following three mindsets reflect people's thinking about the short-term effects.

The *Vulnerable Children* Cultural Mindset

When thinking with the *Vulnerable Children* mindset, people assume that young children will be disproportionately impacted by climate change, compared to adults. Children are assumed to be more vulnerable than adults for a few reasons. First, because their bodies are more fragile. Second, because they lack the knowledge to make informed decisions about potential threats to their safety, especially during extreme weather events. And, third, because they are dependent on others for resources and have limited agency of their own. When thinking with this mindset, people mostly think about vulnerability in the short term, and long-term effects aren't often mentioned, except when discussing the effects of air pollution specifically. Sometimes children are grouped alongside other people considered vulnerable to climate change, like older persons, which suggests that people aren't thinking about the unique aspects of child development that might contribute to vulnerability.

> *You know, you kind of always hear about [how] homeless or unhoused people, younger people, and elderly people basically are more susceptible to certain things, again whether asthmatic or a vulnerable situation, or something like that. ... I think it affects [them] more, but ... [to a] lesser sense it does affect all of us.*
> **Female, white, 41 years old**

People can access multiple and, sometimes, conflicting mindsets. So although the *Vulnerable Children* mindset paints children as particularly susceptible to danger, another mindset, *Kids Are Resilient*, assumes that children have the ability to easily recover from harm.

The *Kids Are Resilient* Cultural Mindset

When drawing on the *Kids Are Resilient* mindset, people also express that there will be some impacts on children as the environment changes but instead talk about the ability of children to bounce back. Although the emphasis is on resilience rather than vulnerability, this mindset is similarly dismissive of the developmental impacts, focusing on in-the-moment responses and effects of acute situations.

Using the *Kids Are Resilient* mindset, people assume that part of being a child is learning to adapt to difficult situations. People characterized children as *resilient* and *good at going with the flow*. In the context of pollution, one participant said explicitly that they thought children could "morph with it," as illustrated below:

> *You know, that's a good question. Because I don't really know [if children are impacted differently than adults]. I want to say that it does because they're so little and vulnerable. And at the same time, because they're still developing, they can either—it depends on what the pollution is. They can get rid of it or grow themselves out of it, or kind of morph with it.*
> **Female, Hispanic, 48 years old**

The *Only in the Future* Cultural Mindset

When thinking with both the *Vulnerable Children* and *Kids Are Resilient* mindsets, people acknowledge that there will be some immediate impacts of climate change on children, but with the *Only in the Future* mindset, people assume that children will not be affected by climate change right now, but they will be when they are adults.

When people think using the *Only in the Future* mindset, they tend to assume that climate change is not having major effects now, but there will be more widespread disruption in the future. They also assume that in the present day, only adults are really affected by climate change because adults are responsible for making decisions. When using this mindset, people reason that children will be affected when they become adults because they will have to be responsible for addressing the effects of climate change when they are older, and climate change will have noticeable effects on our environments by the time they are adults.

> *I won't say [children are impacted] so much right now, but maybe later on in the future, like food scarcity, pollutants in the water could be another one, as well. Not drinking safe water to drink. Or maybe eating animals or fish that are contaminated with different things.*
> **Male, white, 27 years old**

What does this mean for communicators?

The mindsets that arise when participants are asked if climate change will affect children position these effects as short lived in the case of *Vulnerable Children* and *Kids Are Resilient* and delayed until adulthood in the case of *Only in the Future*. The first two mindsets leave space for communicators to build on the existing understanding that climate change will hurt children. However, communicators must find ways to explain the long-term impacts of environmental influences on development. Assuming that children will be able to adapt to our changing environment without consequence might undermine the understanding of the long-term impacts that early pollution exposures can have on children. *Only in the Future* thinking productively assumes that climate change will result in a different world than the one we recognize today, but communicators must push back on the idea that children are too young to understand or feel the impacts of climate change now and into the future.

HOW THE *VULNERABLE CHILDREN* MINDSET UNDERPINS THE WAY PEOPLE THINK ABOUT THE IMPACTS OF SPECIFIC ENVIRONMENTAL CHANGES ON CHILDREN'S DEVELOPMENT

There were no major mindsets that people used to consistently connect climate change broadly with impacts on children's development. However, when asked about specific climate change–related impacts, there were a few ways that people used logic from the *Vulnerable Children* mindset to describe how these events could impact children, and sometimes they would assume that there will be some undefined long-term impacts on children's bodies or mental health. The assumption that early childhood is a particularly sensitive time for development is sometimes present in this logic, but these patterns emerged only in relation to questions about specific types of climate change–related events.

For example, participants assumed that air pollution has long-term effects on children's developing lungs and that climate-related disasters can have long-term impacts on their mental health. However, when asked broadly about the impacts that climate change might have on children, people tended to default to short-term thinking, such as *Kids Are Resilient* or *Vulnerable Children*. We observed the following patterns in how people spoke about such impacts:

1. **Climate-related pollution harms (developing) children.**
   People assume that children are smaller, weaker, more vulnerable, and still developing. Because of this, the increasing amounts of harmful pollutants in the environment—including in our soil, water, and air—are putting children at risk and disrupting development.

   Researcher: *What, if any, do you think the impacts of climate change might be?*
   Participant: *Living nearby, I'm sure, by coal mines, or anything, there's factories, industrial areas. I'm sure that's not good for the development of young children's lungs. They're breathing in toxic chemicals on a daily basis at a young age when that is supposed to be the time that your lungs are developing, your body is developing. You're feeding it all these bad chemicals that can't be good, and it's gonna affect you throughout your life.*
   Male, Hispanic, 57 years old

2. **Climate events can traumatize kids.**
   When asked about how they thought extreme weather events could affect children, participants talked about how extreme weather events could cause displacement because of the destruction of houses. This displacement, they reasoned, would lead to trauma for children in the immediate aftermath. For example, one respondent noted:

   I could see it, then possibly getting some form of PTSD out of the whole thing, especially if it's like they watch one of their family members pass away during one of those storms, or they're standing right there by their house and see the whole thing just collapse during a storm. Something like that could really damage them mentally, and I'm sure something like that would stick with them for the rest of their lives.
   Male, white, 27 years old

3. Extreme heat leads to disruption and physical discomfort.
People also sometimes think of extreme heat in the context of climate change's impact on children. They connect extreme heat to effects on children's bodies (such as overheating and heatstroke) and to disrupted routines—for instance, if it's too hot to play outside. Unlike other extreme weather events like floods, people don't tend to connect heat waves to mental health impacts.

Outside of what we've already talked about, just if—if say they're used to being able to go outside for recess or something. And if we are having a heat wave, that's ill advised. So then again, kind of having that routine disrupted and, again, they don't necessarily know the danger or kind of why it's happening; they're just kind of being told.
Female, white, 41 years old

What does this mean for communicators?

There is some awareness of how physical development may be impacted by the environment, particularly when it comes to the example of asthma and air pollution. In addition, people bring up how exposure to extreme weather events might impact mental health, because they are traumatic experiences. Both of these patterns are promising because they are available examples of how the environment can impact children's bodies and minds. However, these patterns indicate that long-term effects may be less understood beyond some specific examples. Perhaps these examples could be used as starting points to strengthen the logic that climate change–related events have impacts on development, and communicators could build on these examples by connecting them to the range of long-term outcomes they can affect in child development. For example, when children inhale air pollution, it can have long-term impacts on not just occurrence of asthma but also on their brain development. So, too, can overheating impact their physical health in the long term. Communicators could build on the gaps in these patterns to make the explanatory chain clearer: Climate change will lead to environmental changes, which will lead to effects on development, resulting in long-term effects on child health. Communicators also need to counter the doom of *Damage Done Is Damage Done* thinking by appropriately conveying the ongoing plasticity of children's developing systems and the potential for new experiences and environments to improve outcomes. This is a fine line to tread, because plasticity is both the cause for concern and the reason for hope—it is why the impacts of climate change can be so harmful to children—and why the right solutions can be so effective.

When thinking about the indirect effects of climate change on children, people focus on how fetuses are impacted during pregnancy and the role of parents in protecting kids from harm—rather than wider impacts to caregiving.

People tend to focus on the direct and immediate impacts of climate change to children's bodies, rather than indirect impacts that are mediated by parents, educators, and other caregivers. While these indirect impacts were not generally front of mind, people relied on four mindsets to make sense of how the impacts of climate change on adults will also impact children.

The *Maternal Mediated Transmission* Cultural Mindset

In this mindset, there is a clear link between the effects of climate change during pregnancy and how that will impact a fetus. This was the most frequently held mindset about how climate change will affect development indirectly. When thinking with the *Maternal Mediated Transmission* mindset, people assume that fetuses are physically affected by the pregnant parent's experiences, actions, and environments. They assume that the development of fetuses is indirectly affected by the world, mediated by the pregnant parent's body. For example, one respondent said:

> *There's articles about chemicals being in the water, lead, stuff like that, where you're drinking that water and that stuff is contaminated. And it gets into your body, and if you're a pregnant woman, and now you're feeding that to your baby. There's studies; some studies say that that results in early childbirth, preemie babies, child development, all sorts of stuff.*
> **Male, Hispanic, 57 years old**

This quote is representative of the way people use this mindset to describe the parent-to-fetus transmission of harmful substances. There is the idea that what the parent takes in will impact the fetus, including diet and psychoactive substances, in addition to pollution. Other mindsets that arose about indirect effects similarly focused on the link between parents and children.

The *Family Bubble* Cultural Mindset

As with much of our work focused on children, the *Family Bubble* mindset was prevalent across these interviews. When using the *Family Bubble* mindset, people assume that parents or other adult family members in the home are primarily responsible for providing children with access to the needs and experiences they require to be healthy, well, and properly socialized adults. What happens in the home is thought to matter much more than any other environmental impacts. This mindset also assumes that parents are a major influence on children during early development, because they are the main adults responsible for ensuring access to the things they need to thrive.

> Researcher: *Who is responsible for making sure that young children have what they need?*
> Participant: *Well, there's layers to that. At first, you would say parents, or their caregivers, so that's their basic needs. Food, shelter, water, place to sleep, comfort. Um, clothing. Um, make sure that they're alive, right? What it takes to keep them alive, keep them out of trouble. Keep them from, you know, knocking themselves upside the head.*
> **Female, Hispanic, 41 years old**

Importantly, the *Family Bubble* mindset downplays the role that other adults play in children's development by focusing on parents as the main adult influences in a child's life. Connected to the use of this mindset, the other mindsets that emerged about indirect effects were also about parents specifically, rather than any other adults who interact with children.

The *Parenting Is Physical* Cultural Mindset

When participants were asked specifically about the impacts of climate change on adults who interact with children, the *Parenting Is Physical* mindset emerged. This mindset builds on *Family Bubble*, because it includes the idea that caregivers in the home are primarily responsible for caring for children. However, people imagine this care as resulting from physical ability, for example, providing direct caregiving and getting them to school. People reason that parents will be negatively affected by climate change because it will affect their physical health or access to resources. This change in their physical ability is assumed to diminish the quality of parenting they can offer. For example, the quote below describes how poor air quality could affect the parent's physical health and, thus, their ability to take care of their child:

> *Well, I guess if the air quality isn't good and they were in bad health to begin with, ... and they're not as well equipped to be able to take care of the children ... if the parent is gasping for breath, if they have pollution, not enough oxygen, like running a short distance, then if they need to go help their child or their child runs away, stuff like that, they can't effectively do it. Or if the parent is too weak and is wheezing all the time, they're not able to take care of a child's basic needs, I guess. I assume so, anyway.*
> **Male, white, 20 years old**

The *Protector Parents* Cultural Mindset

The *Protector Parents* mindset is often paired with the *Vulnerable Children* mindset explored above. When thinking with the *Protector Parents/Vulnerable Children* mindsets, people assume that children are inherently vulnerable and parents are primarily responsible for children's safety. This mindset assumes that children need to rely on their parents in climate events, as the following quote illustrates:

> *Heat waves, kids don't really understand like, "Oh I'm getting too hot to be out here running around. I should probably go inside and drink some water." I know with my son, I have to remind him to drink water all the time because he gets too wrapped up into playing at the playground or something and forgets to drink some water.*
> **Male, white, 27 years old**

Inherent in this mindset is the idea that parents are directly responsible for taking care of their children in the face of climate change. Using this way of thinking, respondents also talked about how parents may feel the stress of not being able to properly take care of their children:

> *I would say a child might have a certain benefit over an adult, which is a child depends on someone and if they do have that person, or people, or network that supports them, they don't feel this responsibility to take care of themselves because they're taken care of versus an adult who might feel—you know, as a child feeling powerless is okay because you don't have to have the power. As an adult, feeling powerless to help yourself or to help your family, which is even worse. Like if you can't take care of your children in this kind of situation, if you can't protect them, I think it's devastating. So, this feeling of responsibility for adults might be overwhelming compared to being a child who doesn't necessarily understand what's going on. They feel it very much, but they don't understand.*
> **Male, white, 31 years old**

However, people were generally not talking about how that parental stress might also impact caregiving; for example, there was no mention of how a parent's stress may impact their ability to engage with and be emotionally responsive to their children. As above, there was also no mention of other adults who might protect children in the face of climate change.

What does this mean for communicators?

In some ways, the *Protector Parents, Parenting Is Physical*, and *Maternal Mediated Transmission* mindsets are somewhat productive in that they start to hint at the ways children and fetuses can be indirectly impacted by climate change through adults. However, they are narrow in scope. *Protector Parents* neglects the importance of other adults and the government in protecting children from the impacts of climate change. *Parenting Is Physical* is promising because it is the only mindset that connects the impacts of climate change on parents to the possible impacts on children rather than fetuses. However, it is limited in scope in that it focuses on the effects of climate change on a parent's physical wellbeing and how that will affect their ability to provide direct caregiving. This is a limited view of the way adults can influence development, as it ignores the social and emotional influences of parents and other connected adults. *Maternal Mediated Transmission* is limited in its focus on the parent as a vessel for fetal development, rather than a person in their own right. The impacts on the parent are not mentioned as affecting them but rather only the fetus' health and development. *Family Bubble* is largely limiting in that it places full responsibility for children on their caregivers in the home. This could be a barrier to people thinking about the wide scope of indirect effects on children, as climate change affects all the adults in their lives. Across

these mindsets, there is also the assumption that children need to be protected from negative environmental influences, but there is not similar attention paid to how to expose children to positive environmental influences that could help them thrive.

Communicators could build on some of the more productive mindsets to expand the understanding that children will be indirectly affected by climate change's effects on a range of adults they interact with. For example, early childhood educators will have to adjust to rising heat that might change how much children can go outside. Communicators could also work on building a clearer explanation of how climate change–related events can have physical, social, and emotional effects on adults and how that could indirectly affect children. Communicators could also present more examples of positive impacts of environments on development. This could spur more thinking about what solutions would be needed for children to thrive, rather than only what children need to be protected from. The mindsets discussed above largely suggest that the role of adults in children's development is about making sure they avoid being harmed, rather than proactively encouraging positive development.

FINDING #3

Mindsets about who will be most affected by the changing climate tend to focus on communities marginalized by class but downplay the effects of racism.

The mindsets that arose in this work suggest that people generally reason that climate change affects everyone in relatively similar ways. When people do talk about some groups being more impacted by negative effects than others, they often use mindsets that acknowledge that lower-income families will be more affected but downplay the disproportionate negative environmental effects in non-white communities. There was one mindset that people drew upon to reason about how marginalized people might be disproportionately impacted: the *Opportunity Structures* mindset. However, two other mindsets were more prevalent—the *Class Not Race* and the *Climate Change Doesn't Discriminate* mindsets—and both serve to actively downplay how systemic racism will exacerbate the effects of climate change.

The *Opportunity Structures* Cultural Mindset
When thinking with the *Opportunity Structures* mindset, people assume that the impacts of climate change are exacerbated by existing inequalities that constrain marginalized communities' access to life-saving resources. Participants asserted that marginalized people will be more impacted, given that their access to resources is already constrained:

> *I think at the basic level, it's always going to be more marginalized communities [who] are impacted more by climate change. I think about massive storms in the Gulf of the United States. They've really, really disproportionately impacted people who were already really kind of on the fringes of society and did not have a lot of resources to begin with. I think that small island nations, nobody's advocating for them. It's the same as—say you're working at a nuclear power plant and an intern realizes there's going to be an explosion. Who's going to listen to that intern? Who's—nobody. They don't have a voice and so I think that, you know, anyone who does not really have a voice or is on the fringes of the market power gets impacted more.*
> **Female, Asian, 47 years old**

Interestingly, this mindset does not take into account the disproportionate exposure of different groups to the effects of climate change, but it mostly considers just how they can recover after an event or adapt to the changes in general.

The *Class Not Race* Cultural Mindset

There is an understanding that class will affect how people are impacted by climate change, but sometimes this is weighed competitively against race, with people making the case that climate impacts are *more* connected to class than they are to race. We call this mindset *Class Not Race*, and it can serve as a form of racism denial. When thinking with the *Class Not Race* mindset, people directly express that race is likely not a factor that will influence how children are impacted by climate change. It is a very binary way of thinking that could be driven by a number of factors—perhaps the idea that racism is no longer an important force shaping society, discomfort about talking about race, or a lack of understanding of how class and race are intertwined in our society. For example, one respondent said:

> Researcher: *How about on the basis of "age, or class, or race, or ethnicity"? Do you think any of those things affect [someone's experience of the effects of climate change] or not really?*
> Participant: *Not really. I think it all comes down to if it does, if anything does affect it, it would probably be depending on how well off you are economically. I mean, if you're rich, you can kind of do and move where you please. If you aren't, you really don't have a choice. You kind of live where you live.* [chuckle]
> **Male, white, 32 years old**

The *Climate Change Doesn't Discriminate* Cultural Mindset

Another mindset that arose was the *Climate Change Doesn't Discriminate* mindset. When thinking with this mindset, people assume that the effects of climate change will be common and uniform, and no groups will be more impacted by climate change than any other groups. This mindset is even more limiting than *Class Not Race*, in that it assumes that there will be no differences in how climate change will affect children. For example, one participant said:

I feel like it's probably—I'm probably the stray one in this opinion here, but I feel like it would hurt everyone equally. It's—I don't feel like it picks and chooses who it's gonna hurt. The smoke's not gonna only come after me because I'm white or because I'm a male. It's gonna go after the same person that's standing next to me. I feel like pre-existing health conditions could definitely affect it, but, race or gender, I don't really feel like would do a lot.
Male, white, 27 years old

What does this mean for communicators?

Opportunity Structures is a promising mindset because it includes a recognition that there are current structural disparities that will be exacerbated, although these disparities are usually thought of in terms of access to resources rather than also considering the disproportionate exposure that marginalized groups will have to climate change–related events. The other mindsets arising about differences in impact suggest that communicators will be challenged to find ways to connect racism and climate change. Relying on the *Class Not Race* and *Climate Change Doesn't Discriminate* mindsets can lead to active denial of the role of racism in climate impacts. Leaning into the strengths of the *Opportunity Structure*s mindset could provide some base understanding of how structural oppression limits resources and, consequently, will increase the impacts of climate change on some communities. However, communicators will have to find ways to frame issues of structural racism specifically, as they are notably missing from the mindsets uncovered, despite research showing that communities of color are and will continue to be disproportionately impacted by pollution and other climate impacts.

FINDING #4

Responsibility for protecting children from the effects of climate change is placed on parents first, the government second.

As discussed above, the *Family Bubble* and *Protector Parent* mindsets position parents as the primary people responsible for protecting their children from the effects of climate change. However, there are other mindsets that open up the idea that government is somewhat responsible for protecting children.

The *Government as a Safety Net* Cultural Mindset

When thinking with the *Government as a Safety Net* mindset, people assume that the government's role comes secondary to parents as protectors of children. Government should care for children by providing basic needs if parents are unable to, and should play a role in ensuring that parents are treating children well. A few participants even said that government intervention with children should be limited, but it has a responsibility to protect children from harmful parents and if parents cannot protect the children themselves:

> Participant: *Um, well, like … uh, let's say we're speaking government. Um, it's a touchy and crazy, uh … I feel like there is a certain responsibility, as far as government to oversee possibly, to make sure there's no neglect or harm, but at the same time … uh, their reach should be limited. Um, their power should be limited. Um, but yeah, the best way how to do it, I think, is the parent's responsibility, or whoever is raising the child.*
> Researcher: *Why do you think their power should be limited?*
> Participant: *Well, uh … there's a … certain level for involvement, I think they shouldn't be involved in … other than making sure that the child is healthy and safe, um, they're not harmed. Uh, I'm not sure how much more they should be involved.*
> **Female, Black, 52 years old**

The *Government as Protector* Cultural Mindset

When thinking with the *Government as Protector* mindset, people assume that one role of the government is to protect its citizens from harms. In the context of climate change, this means people use the mindset to reason that the government should protect people from the impacts of climate change. For example, this participant stated that protecting the "air and water" is part of protecting people from harm:

> *That's part of the government's job is to have an army and a police force, either local or national, and uh, that protecting the air and the water is part of that keep-me-safe kind of thing. Um, so … the government can do it. It's always about lobbyists coming in and padding their books to not do it. I mean, that's really where it's at. There's, there's an entire street in Washington, DC, that is nothing but lobbyists. And they spend all day, all year long spending money to get, uh, their Congress people to vote for what they want, rather than what you and I send them there for.*
> **Male, white, 62 years old**

However, as also reflected in the quote above, other mindsets arose that questioned how well the government is doing as a protector of children. This idea is further explored in the next finding.

What does this mean for communicators?

The ideas of the *Government as a Safety Net* and *Government as Protector* mindsets could be leveraged to push for legislation that addresses climate change because doing so would protect children. This could be a helpful entry point for people who are skeptical about government involvement usually but are open to government intervention when it is for the sake of children.

FINDING #5

The government's role as a protector of children from the impacts of climate change is thought to be compromised by corruption.

Although people think to some extent the government is responsible for protecting children, there are mindsets that question whether the government can effectively fulfill this role when it comes to climate change. Specifically, mindsets arose that link government corruption to corporate greed and negative effects on children.

The *Profit over People* Cultural Mindset

When thinking with this mindset, people believe that greed (particularly corporate greed) drives climate change, as corporations prioritize money over the wellbeing of the planet and its inhabitants generally, and over children's wellbeing specifically:

> *I think people [cause climate change] but definitely the market systems that we live within. So, if a culture or a government allows people to look at the planet as something they have a right to take from as much as they want in order to make money with no thought as to what happens to children or the next generation, then that is what damages the planet and causes climate change.*
>
> **Female, Asian, 47 years old**

In another representative quote, a participant connects corporate greed to pollution and the use of toxic substances, both of which could affect children's wellbeing:

> Researcher: *Are corporations responsible for addressing the impacts of climate change?*
> Participant: *Oh, I think so. I think some of them do a lot, especially when the government tells them they have to. But some of them—some of them are just smaller companies, I think, even smaller corporations that are run by somebody, by people that are responsible, try to do the best they can. But again, it goes back to greed and such. And their responsibility is to their stockholders or their other four or five partners to make more. And sometimes that money and greed to get to that next level is too much. And it affects their product and it affects— which makes effects on the kids because it pollutes the air; it pollutes the water. It may contain something, somebody that produces a toy may contain something in that plastic or that paint, or something on there that gets, that the kid can ingest or has a little bit of radiation in it that they didn't know was affected because plastic has radiation in it, some of it. Or the paints, or whatever, that over time will affect the kids.*
>
> **Male, white, 69 years old**

In other mindsets, the government is also implicated in allowing corporate greed to go unchecked.

The *Government Is Corrupt* Cultural Mindset

When thinking with this mindset, people draw on *Government as Protector* to reason that the government *should* protect its citizens from pollution, but government corruption prevents effective environmental protection. People using this mindset also assume that lobbyists pay politicians to weaken enforcement of environmental protections. For example, when asked what they think might be causing climate change, one participant said:

Greed. Because a lot of companies have money to do things to dispose of their waste improperly and get away with it, basically. And if they get caught, they get a little fine. And sometimes they do get caught, and they don't get fined because they pay somebody off or they know somebody, and they're like, "Hey, it was a mistake; it won't happen again; let me slide this one." Or "I didn't know it was going on." I think that's a bunch of BS, you know? So, I think it boils down to greed and money. If we didn't have all this, I don't think it would be as bad because people are doing things that they know are wrong and getting away with it.

Male, Hispanic, 57 years old

What does this mean for communicators?

There is promise in people understanding that corporate greed drives carbon emissions, as fossil fuel–using industries are the largest contributors to climate change. The *Profit over People* mindset could be a starting point for communicators to explain that letting corporations continue to emit carbon has real impacts on people's health and on children specifically. The *Government Is Corrupt* mindset could be demoralizing if people believe there is nothing that can be done to change things. Communicators could lean into the strengths of these mindsets— they are explanations of structural problems that need to be changed for our society to mitigate the effects of climate change. However, communicators could also look for ways to frame how people could take collective action to demand more from the government, on the basis that the government should be protecting children from harm. Communicators could aim to pair responsibility for climate change with specific solutions that are both ambitious and feasible, which could overcome fatalism by pointing people in the direction of specific action.

FINDING #6

Solutions for helping children thrive in the face of climate change are not top of mind, and people tend to default to individualistic and technological fixes.

Participants were asked how our society could help children thrive in the face of climate change. Responses fell into three categories: (1) teaching children about climate change, (2) individual behavior change, and (3) technological solutions to climate change. Teaching children about climate change was the only solution focused specifically on children, while the other two solution types were geared toward fixing the problem of climate change for everyone. This may be because of the lack of availability of mindsets about exactly how climate change will impact children. Also notable is that most of the solutions focused on mitigation, but the solution specific to children was about adapting to climate change.

Solution 1: Teaching Children about Climate Change

Interview participants proposed only one solution that specifically focused on helping children thrive in the face of climate change. That was to educate children more about climate change. For example, one participant said:

> *What do I think? Man, oh gosh. I think to thrive, you need more information [on] how to deal with it, you know, useful information. How to maneuver through climate change. What are your options? Being more educated on it.*
> **Male, Hispanic, 65 years old**

There are a few assumptions in this line of thinking: first, that providing children with information will affect what they do now and in the future, as in the *Children as Sponges* mindset. This solution also draws from the *Individualism* mindset, as it suggests that the solution to a systemic problem is empowering individuals to make better choices.

The *Children as Sponges* Cultural Mindset

When thinking with this mindset, people reason that childhood is a period of time when children internalize all interactions and aspects of their surroundings in ways that can affect them long term. When talking about development broadly, people reasoned that what children are exposed to early matters for their long-term wellbeing. One participant stated:

> Researcher: *What shapes children as they grow?*
> Participant: *Their family, of course. Other—if they're around other children. Then what they see, TV, music, media, things like that. All those things can affect children and how they grow.*
> Researcher: *When you mentioned "media," how does that shape children as they grow?*
> Participant: *Well, it depends on what they're exposed to. If there are things that are not considered—that I would not consider age appropriate for certain children. So, you've got positive and negative. You've got YouTube videos and things where they can teach them their ABCs and functioning and things like that. There's also things that are not meant for children that if they're exposed to early could really, really damage their development, and it's just a negative effect on them.*
> **Female, Black, 41 years old**

The *Individualism* Cultural Mindset

When thinking with the *Individualism* mindset, people assume that life outcomes are a result of individual choices, rather than anything systemic. In addition, people assume that individuals make choices that they believe are best for them. For example, one participant stated that children can be protected from at least some impacts of climate change if they are informed and make choices based on that information:

> Researcher: *What do you think, if anything, should be done to lessen or prevent the impact of climate change on young children?*
>
> Participant: *I mean, to lessen the impact, I mean, I guess teach them about things. I mean, inform them about "Hey, you know, when there's a tornado this is what you need to do; this is what we need to prepare for. You go in the basement. That's what all that food's down there for. Don't touch it; we save that for a tornado, for emergencies." So, I mean, I guess you can somewhat lessen the blow on it. You know, teach them how to survive. ... So, I guess you can prepare them to lessen the trauma that they might suffer.*
>
> **Male, Hispanic, 57 years old**

Combining the logic of the *Children as Sponges* and *Individualism* mindsets, people may think of education as a solution to help children thrive because early exposure to information would presumably have positive effects on children's choices as they grow. However, this solution is limited to adapting to some elements of the environmental changes that will occur, while not advocating for larger-scale changes that could help mitigate the effects of climate change.

Solution 2: Thoughtful Individual Actions

Other individualistic solutions were proposed as ways adults can combat climate change. Participants mentioned that we need to be more thoughtful with our actions, including thinking about our personal energy use and making more responsible purchases. For example, this participant mentioned carbon footprints, recycling, and reducing their energy use:

> *Well, the biggest is to reduce carbon footprints. Um, be, be more, uh, respectful of, of nature. So, you reduce the carbon footprints, which means that you're not burning off as much smog; you're not using the fireplaces when it's bad weather days for air pollution. You're, uh, using less packaging and, and just being responsible. Being cognizant of what needs to be done. So, recycle, reuse, and, uh, ride your bike.*
>
> **Male, Black, 48 years old**

This solution relies on the *Individualism* mindset to some extent, as it assumes that individual choices can ultimately make a difference in the larger problem of climate change. It focuses exclusively on mitigation but not on adaptation or resilience to climate change. This solution also relies on the *Consumerism* cultural mindset.

The *Consumerism* Cultural Mindset

When thinking with the *Consumerism* mindset, people reason that their individual purchasing choices are meaningful and can have impacts on larger social problems like climate change. An example of this mindset is illustrated in this quote:

> *What, if anything, should be done about climate change? I think that we all need to try to do better [at not] polluting our planet. In terms of, if we all did our part to lessen pollution, whether it's with the food we eat, whether it's the products we use, and the cars that we drive in.*
>
> **Female, Asian, 44 years old**

Solution 3: Technological Fixes

Participants suggested different technologies as parts of the solution to climate change. For example, investments in alternative energy sources and electric vehicles were mentioned frequently, as in this quote:

> *Alternative energy sources. Also, efficiency in terms of power usage, insulation. I know that some places, you know, they'll incentivize people to install better insulation in their houses to save energy and money in the long run, and so, these kinds of moves that—I think energy is a big, a major component on all fronts, whether it's at the consumer level or at the producer level. Technologies for vehicles, you know, all kinds of vehicles to support the development—would be nice if there was a plane that didn't run on tons of fuel. And I know we're far away from that, but maybe if it was prioritized, maybe if they threw a bunch of money at it, [it would] have a positive effect at least in the long run.*
>
> **Male, white, 31 years old**

Participants also reasoned that because technology is a solution, scientists should be in charge of making the decisions about how we move forward on climate change as a society:

> *I feel like us as a species should do more to help prevent it. I don't really know if electric cars are the way to go just because I've seen some articles where it's saying the lithium mining is nearly as bad if not worse than the emissions from CO_2 from a gas-powered vehicle. I would hope that there's a scientist or activist group or something that comes up with a way that better helps offset the carbon emissions that we have and just helps find better ways to clean up the environment.*
>
> **Male, white, 62 years old**

The *Linear Progress* Cultural Mindset

These solutions could be connected to the *Linear Progress* cultural mindset. When thinking with this mindset, people think about progress as inevitable and acting linearly over time. Societies are believed to continually get better as they move into the future. In other FrameWorks projects, we have also found a mindset of *Technological Progress Is Inevitable*, where people assume technological advancements are inevitable. This is reflected in the first quote in this section, where the participant said, "I know we're far away from that," implying that we are on a path toward these changes, even if they are far away.

What does this mean for communicators?

Most solutions that participants suggested focused on addressing climate change broadly, rather than helping children thrive specifically. This may be due to the relative lack of shared mindsets about climate change's specific impacts on children. Communicators could work on ways to strengthen the understanding of the impacts of climate change on children, specifically on early childhood development. In addition, a relatively small number of solutions arose for a problem as complex as climate change. Communicators could examine how to share a range of specific mitigation and adaptation solutions that are needed, especially those changes that take a more systemic approach

to improving health care, energy systems, and urban planning. Climate change can also seem like a problem that is too big for individuals to help solve, so communicators should aim to propose ways that individuals can plug into action toward more systemic solutions. There is room for communicators to propose solutions focused on children to fill the gaps that currently exist in public thinking.

HOW DO THESE FINDINGS RELATE TO OTHER RESEARCH ABOUT CULTURAL MINDSETS ON EARLY CHILDHOOD?

FrameWorks has a long history of exploring cultural mindsets about early childhood development, but this is the first time we have researched public thinking about the intersection of early childhood and climate change. So, how does people's thinking about children differ when the context of climate change is introduced? At the outset of this project, we expected that conversations about climate change would broaden people's thinking about how children fare in our society, as well as the need to consider children in government policy on an issue that is not, on the face of it, a *children's issue*. We thought there might be some softening of the otherwise hard boundaries of the *Family Bubble* mindset, with people thinking thematically about the wider environmental context beyond the episodic close-up environment of the home. To some extent, this seems to be the case. For instance, people drew on the cultural mindset of the *Government as Protector* more than we have typically seen in other projects about early childhood.

However, to a large extent, the mindsets that people use to think about early childhood in general are the same mindsets that people use to think about early childhood in the context of climate change. For instance, people drew on several dominant and familiar ways of thinking, like the *Family Bubble* mindset, the idea that *Damage Done Is Damage Done*, and the idea that *Kids Are Resilient* and can bounce back from adversity. This isn't surprising, given that people generally aren't thinking about climate change and kids together in the first place. Because this intersection is often new to people, they rely on existing mindsets about children and, separately, climate change, to make sense of it.

With the right frames, however, this can change. Insights from other research give us hope that there is a ripe opening here to build productive connections. For example, in research conducted in partnership with Leading for Kids, examples of the government taking important steps to address children's wellbeing by providing clean air and water were by far the most effective—and easiest examples for people to latch on to—and took thinking away from the dominant *Family Bubble* mindset. Similarly, on our Place Matters project, we have found several powerful and effective framing strategies to help people productively connect the built and natural environment with structural racism and child development. In other words, we cannot assume that simply mentioning kids and climate change in the same breath will effectively shift thinking—but good frames certainly can.

VI. How is the field communicating now?

In light of the core ideas described above, we looked at how a range of organizations are actually communicating right now. As part of this research, we conducted a narrative scan and analysis of public-facing communications materials from 16 organizations working at the intersection of climate change and early childhood development (i.e., the "field"). These organizations include professional associations, nonprofit advocacy groups, cross-disciplinary coalitions, government agencies, and academic institutions. Our analysis revealed four trends in framing strategies across organizations' communications materials, which are described below.

1. Field communications emphasize children's unique vulnerability to climate change.

Advocates highlight children's unique biological and developmental vulnerabilities to climate change and emphasize that children's heightened exposure to environmental stressors and heavy reliance on adult caregivers put them at increased risk. Phrases like "first and worst" reinforce the idea that children suffer disproportionately from the effects of climate change. However, such phrases also neglect the importance of relationships and the interconnected nature of wellbeing by implying that impacts to adults are somehow separate from and unrelated to direct impacts to children.

Alongside *Vulnerability*, the values of *Protection* and *Safety* feature prominently, all of which adopt a defensive stance against looming threats, rather than offer an aspirational future vision. Mothers in particular are depicted as the primary protectors of their children and, to a lesser extent, of the planet, appealing to a kind of nostalgia for traditional gender roles. In these ways, field communications are likely to reinforce the *Vulnerable Children* and *Protector Parents* mindsets, which risk obscuring the many other actors involved in caring for children in a changing climate.

THE TROUBLE WITH VULNERABILITY FRAMING

Groups are sometimes framed as *vulnerable* when communicators want to elicit compassion. However, this framing can cue unhelpful mindsets that suggest these groups are weak or failing at something.[10] It can also be related to a mindset about children that assumes that once harm has been done, it cannot be reversed. This way of thinking can stand in the way of thinking about solutions, because people can assume that interventions after the harm won't matter if it occurs during early childhood.

When FrameWorks' researchers have tested vulnerability frames in the past, they have been ineffective at motivating people to think about systemic change or changes to policy. Instead, people can default to thinking that some groups are inevitably more vulnerable than others and that some people's lives are always going to be harder. Further research could help us find alternative ways to frame the impacts of climate change on young children that move away from vulnerability.

2. Structural inequity is named and blamed for creating additional layers of vulnerability.

Beyond using a unique vulnerability frame to talk about how all young children are impacted by climate change, field communications use this frame to reference the ways that low-income populations, Black, Indigenous, and other communities of color, and non-Western nations are impacted by climate change as well. Children from these groups are described as facing a "double threat" (or in some cases "triple threat") due to a combination of climate impacts and one or more systemic disadvantages. An innocence frame is similarly applied to both children and marginalized communities, emphasizing, for example, that the "least responsible are most affected." While such communications explicitly underscore the need for justice and accountability, they unhelpfully portray low-income and BIPOC groups as victims more so than participants or drivers of climate action.

The practices of invoking race without explaining structural racism, and of noting disparities without identifying the policies that have produced them, risks activating unhelpful patterns in thinking (such as *Class Not Race* and *Colorblind Racism*) that perpetuate the denial of systemic injustices and enable victim blaming. For example, references to "countries at high risk" and "places least equipped to tackle" climate change, as well as observations like the fact that "Black homes are less likely to have AC," may inadvertently suggest that certain regions or communities lack the ability or commitment to respond effectively, rather than highlight root causes of structural inequity.

3. Much attention is paid to the observable consequences of climate change, while very little is paid to underlying causes.

Communications around climate and children tend to focus heavily on the visible consequences of climate change, while offering little explanation of its underlying causes. There is often no clear mechanism identified to explain why climate change is happening, nor mention of fossil

fuels at all, and discussions of responsibility are vague or absent altogether. Statements like "climate change is taking the places we love" implicitly assign agency to climate change itself, potentially diverting focus away from human-driven causes and solutions. At times, climate change is also conflated with closely related but distinct concepts such as environmental degradation, energy use, extreme weather, or pollution. For example, phrases like *climate pollution* and frequent references to *ozone* are likely to create confusion and could potentially lead to misunderstanding about the driving forces behind climate change.

The consequences of climate change, which receive far more attention than causes, are typically framed in terms of individuals' own lived experiences rather than collective, systemic, or global challenges. Communications frequently emphasize how climate change will shape an individual child's life trajectory—particularly in terms of future health and financial prospects—rather than highlighting its broader social and community-level impacts. This individualized framing may impede public understanding of the nature and scale of the problem, while also making it harder to galvanize system-level responses and collective action.

4. The solutions offered are much smaller (in scope, size, and scale) than the problem.

Despite the large-scale nature of climate change, the solutions presented by many advocacy organizations are often small and individualized. Given that the public is generally not thinking about the wider systemic solutions that are needed, this framing practice represents a missed opportunity for advocates to inform and mobilize. Common recommendations offered by the field underscore the value of getting informed, talking to friends and neighbors, voting, and calling representatives. There is also a lot of emphasis on the importance of *going green*, which involves making responsible consumer choices and environmentally friendly decisions at the household level, such as purchasing electric vehicles, weatherizing homes, and increasing energy efficiency.

References to policy and systemic solutions are often general and vague, claiming, for example, that we need "better policies," "government action," and "to work together." When specific and concrete policy recommendations are offered, which is infrequent, they tend to be framed within the purview of certain mission-specific organizations rather than legitimate topics for public discourse and collective concern.

For instance, some advocacy organizations list the policies they are working to get passed on the "About Us" page of their websites or in their annual reports, where they account for their expenditures and staff time, instead of on the pages aimed at public audiences or in materials that invite public action. This framing positions policy advocacy as the responsibility of specialized entities rather than a common project that requires widespread civic engagement and grassroots political pressure. By not clearly articulating systemic solutions for broad public consumption, advocates may be missing key opportunities to mobilize political will and drive large-scale change.

VII. What is the media discourse on climate change and children?

To understand how media frame early childhood development and climate change in the United States, we conducted a media content analysis. The cultural mindsets interviews tell us how the public is thinking about the issue, and the field frame analysis tells us about how the field is communicating about the issue. The media content analysis adds more information about the messages in circulation that members of the public may be exposed to.

Researchers at FrameWorks first conducted a short, quantitative analysis to understand how often articles about climate change typically mention children and how often those articles are focused specifically on children's health and development. Researchers then conducted a qualitative analysis with two separate samples of news articles and tweets. One analysis included 50 news articles from 2024 about climate change's impact on early childhood development to understand the themes arising in articles that center on children in a discussion of climate change. The other included articles and tweets specifically about heat waves, including 50 news articles from 2024 and 250 tweets, up to 50 from each year from 2019 to 2024. We analyzed articles specifically about heat waves because heat was frequently mentioned in our mindsets interviews, and it seemed to be a climate impact that people more easily noticed in their everyday lives. This was in an attempt to see how children were positioned in media about specific climate events. The results below are a synthesis of all three of our analyses. For further information about the methods, see the Appendix.

FINDING #1

The effects of climate change on early childhood development are rarely discussed in the media.

A review of media coverage and social media discussions on climate change from October 2023 to October 2024 found that children are rarely mentioned in climate discourse. Only 4.16 percent of climate-related articles referenced children and an even smaller percentage (1.83 percent) addressed either children's health or development (see Figure 1 below).

Figure 1: The Volume of News Articles Mentioning Climate Change, or Climate Change and Children

■ Climate change ■ Climate change and children
■ Climate change and children and health or development
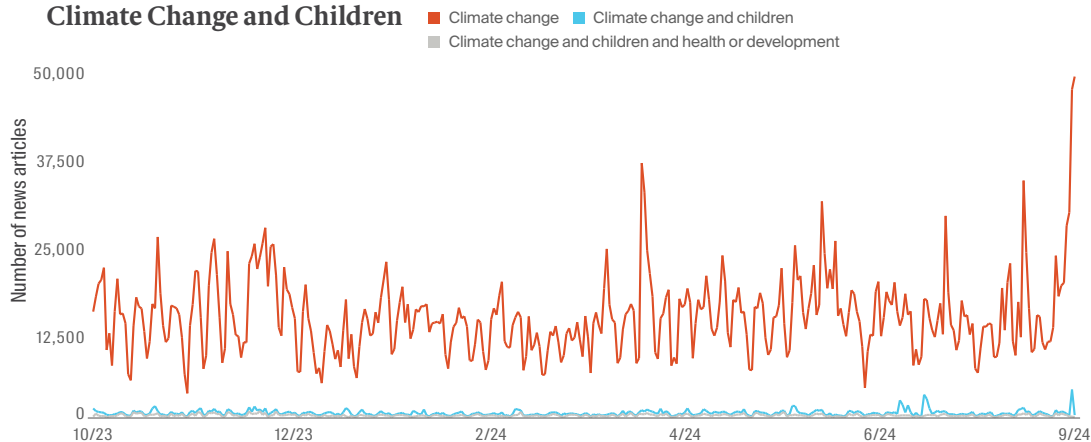
In an analysis of tweets about heat waves from 2019 to 2024, we saw a low overall volume of posts mentioning the impact of heat waves on children. However, we did see a rise in coverage over time. In summer of 2024, there were nearly seven times the number of tweets about this than there were five years ago, with the steepest rise happening between 2020 and 2022, after which volume remained relatively stable (see Figure 2). This increase over time, at least in connection with heat waves, could potentially be related to the steady rise of extreme weather events in the United States—and the rise of heat waves specifically.

Figure 2: X Posts about Heat Waves and Children and Health, Wellbeing, or Development
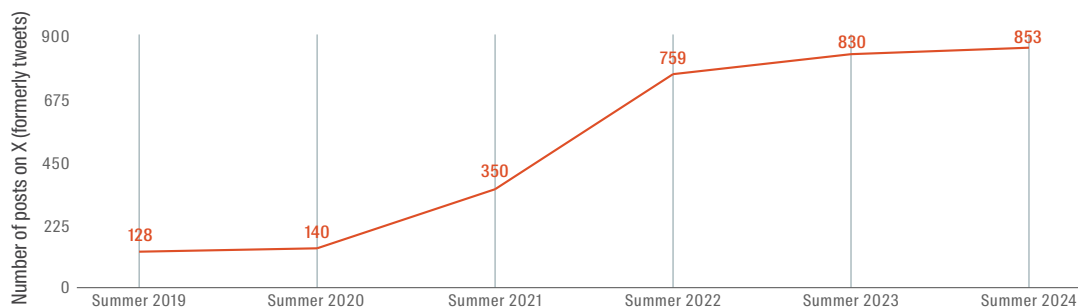
Overall, though, these findings highlight a significant gap in public discourse, where the unique dangers children encounter in the face of climate change are largely overlooked. The dearth of articles about climate change and kids in online news or social media is both an opportunity and a challenge. It's a challenge in that the public is not being widely informed of this issue through the media, but it's an opportunity in that there are not many competing frames about climate change and kids already in the media. Advocates could play a significant role in setting the agenda on how this topic is framed and discussed.

When articles and X posts talk about the effects of extreme heat and climate change on children, they note that children are developing and are more vulnerable—but they do not usually elaborate on what *developing* or *vulnerable* mean.

Media articles and X posts briefly highlight the fact that children experience the effects of climate change differently and that they are more susceptible than the average adult to climate change-related ills. Articles and posts in our sample state that children are vulnerable because they are developing. However, articles and posts neither elaborate on what it means to be developing nor do they effectively describe what children are vulnerable to. Where articles and posts do explain why children are uniquely vulnerable, they do so very narrowly, referring only to the immediate, short-term effects that children are susceptible to rather than the long-term effects that can befall children, like chronic illness or long-term displacement. The following quotes are from three separate sources:

> *Children are especially sensitive to changes in the climate because they spend more time outdoors and they are still developing. Reliant on adult caregivers, they also have less control over their surrounding environments and less understanding of health risks.*

> *Extreme heat is particularly dangerous to young children, older adults, and those with chronic medical conditions. I encourage all residents to take the necessary steps to protect themselves as well as their families, neighbors, pets.*

> *What are the dangers of extreme heat? Heat-related illness can be deadly if not recognized and treated early and often starts with muscle cramps or spasms, experts say. Heat exhaustion and heat stroke could follow. Young children and infants, pregnant women, the elderly, and people with chronic medical conditions are especially vulnerable, as are those who can't get around well or who live alone. Symptoms of heat exhaustion may include heavy sweating and fatigue; a weak pulse; skin that's cool, pale, or clammy; and headache, dizziness, nausea, and fainting.*

When the media provides such superficial explanations of ideas like vulnerability and children's development, it does not paint an accurate picture of the unique effects that climate change has on children. Readers of these articles and posts need to know that children are susceptible to both immediate and long-term physical and psychological consequences because their growing bodies and brains have different needs than adults. In addition, the reliance on vulnerability framing may cue unhelpful mindsets that detract from systemic thinking about how we can address the impacts of climate change collectively.[11]

Class disparities are often mentioned, but systemic causes are not discussed.

Articles and X posts often mention that people living in poverty are especially susceptible to the effects of climate change. Income is listed as one of many factors that exacerbate the effects of climate change. However, references to income very seldom go beyond this brief mention. This allows the reader to make their own interpretations of why children in poverty might disproportionately experience the harms that come with extreme heat. These quotes come from three separate sources:

> *In 2015, the Pope released a version of the Ten Commandments to help preserve the planet for future generations. 1) Recognize Earth is in peril and actively care for it, as God loves His creation. 2) Listen to people experiencing poverty, who disproportionately suffer from environmental crises, underscoring the moral urgency. 3) Adopt a new approach to economics and politics that prioritizes the common good and sustainable management of our shared home, Earth.*

> *Populations at highest risk typically include older persons, children and adolescents, persons with pre-existing health conditions, pregnant women, outdoor workers, persons with limited access to cooling resources, and persons living in low-income communities.*

> *"Air pollution impacts everyone, but certain groups are at a higher risk of health harms, including children, older adults, people experiencing poverty and living in underserved communities, individuals who are pregnant, and people with an underlying health condition like lung disease," said Harold Wimmer, president and CEO of the American Lung Association.*

This framing leaves out a lot of important context. Experts explain that low-income communities typically have less political influence, and therefore policymakers are less beholden to them and more likely to allow or engender harm. This means that low-income communities are more likely to be located in high-pollution areas. Climate disasters further this strain. This framing belies all of this context and invites the public to blame "culture" or "individual responsibility" for why low-income families suffer disproportionately from climate change. Communicators need to be attuned to this, especially in view of Finding #7, which shows that the media already places responsibility on individuals/parents for adaptation strategies.

Racial disparities are sometimes mentioned, but systemic causes are not discussed.

Across news articles and X posts, discussion of the fact that the effects of climate change disproportionately affect children from marginalized racial groups is scant. Most articles do not mention racial disparities at all. When they do, these articles fail to explain the role of systemic racism in causing these disparities, as shown below:

> *Regan also noted the disproportionate impact air pollution has on communities of color. African Americans contract respiratory illness, including asthma, lung disease and lung cancer, at a higher rate than their white counterparts, according to the National Library of Medicine. The likelihood of getting these diseases, and their severity, increases with exposure to air pollution.*

> *We know the burdens of this public health crisis do not fall evenly across the city. Black Americans are 40 percent more likely to live in extreme heat locations and are also more likely to live in places with the highest rates of childhood asthma.*

The above framing does not directly connect to policies. For example, racist policies and practices, such as segregation, redlining, and zoning communities of color as industrial sites, have caused Black Americans to be 75 percent more likely than white Americans to live near areas with high pollution like oil and gas facilities. This means that when temperatures rise due to climate change, children in communities of color are more likely to develop pollution-related illnesses like asthma and lung disease.

Occasionally, articles and X posts discuss race and class in the same breath, inadvertently implying that racial disparities could just be the result of income inequality:

> *School closures related to heat are becoming more frequent, according to a report by the Center for Climate Integrity and the firm Resilient Analytics. There is also accumulating data on temperature inequality and the effects of heat. Low-income neighborhoods and communities of color, which describes Aguilar's, can be as much as 7 degrees Fahrenheit (3.9 degrees Celsius) hotter than richer and whiter neighborhoods, leaving students and educators to swelter in a warming world.*

> *To ensure effective implementation, the EPA is partnering with other federal agencies through the Joint Office of Energy and Transportation to provide school districts with robust technical assistance. The selections announced today will provide funds to school districts in 47 states, Washington, DC, and several federally recognized Tribes and US territories. Prioritized school districts in low-income, rural, and Tribal communities comprise approximately 45 percent of the selected projects and will receive approximately 67 percent of the total funding. The program advances President Biden's Justice40 Initiative, which aims to deliver 40 percent of the overall benefits of certain federal investments to disadvantaged communities that are marginalized, underserved, and overburdened by pollution.*

Though racism is related to income inequality, this way of framing racial disparities as flowing solely from income inequality could cue a *Class Not Race* mindset, which we found in our cultural mindsets work. Messaging that evokes the *Class Not Race* mindset can also engender thinking that naturalizes income inequality. If racial disparities are framed as flowing only from class inequalities, it could further the underlying belief that class inequality, unlike racism, is a natural consequence of the free market rather than a structural failure. Communicators need more nuanced ways of talking about how racism is related to income inequality.

It is also not enough to simply state racial disparities exist. If the media are not explaining how it is that communities of color are disproportionately affected by climate change, then people are more likely to fall back on existing unproductive mindsets—like the *Class Not Race* mindset—even when messaging does not directly evoke these mindsets.

Articles about heat waves and children tend to frame climate change as having immediate effects on children. Articles about other aspects of climate change frame it as a threat to children's futures.

Among articles that connect extreme heat to children's health, the effects on children are usually framed as immediate or imminent. These articles focus on (1) the physiological effects of extreme heat on the bodies of children and fetuses or (2) the effects of extreme heat on children's ability to learn. Extreme heat is described as increasing the incidence of respiratory illness, damaging developing lungs, and causing heatstroke. Some describe adverse effects on fetuses, such as the risk of preterm birth, stillbirth, or low birth weight. Similarly, extreme heat is linked to lower test scores and reduced concentration. All of these are immediate effects that occur during a heat wave. Notably, longer-term effects of heat on children's development are not a part of this discourse:

> *Just recently, Phoenix hit its 100th straight day at or above 100 degrees Fahrenheit (37.8 degrees Celsius), shattering the record set in 1993. She remembers scary moments "seeing soccer kids and my own children pass out and faint from, you know, heat-related illnesses," she said. "It was seeing my sons dehydrated." Scores of US schoolyards like hers are carpeted in heat-absorbing asphalt, with no shade even for play areas. The buildings were often made with wall and roofing materials that radiate heat into indoor spaces. Kids are also more vulnerable to heat illness than adults. Their bodies have a harder time self-regulating in extreme heat, in part because they sweat less, so they can become dehydrated faster. Climate change is heightening the risks. School closures related to heat are becoming more frequent, according to a report by the Center for Climate Integrity and the firm Resilient Analytics.*

> *Heat waves and heat domes are particularly dangerous to kids with asthma, a new study finds. Daytime heat waves are associated with 19 percent increased odds that a child with asthma will wind up in the hospital, researchers discovered. What's more, heat waves that stretch for days double a kid's risk of being hospitalized due to asthma. "We found that both daily high heat events and extreme temperatures that lasted several days increased the risk of asthma hospital visits," said researcher Morgan Ye, a research data analyst with the University of California, San Francisco School of Medicine (UCSF). For the study, the team analyzed data from the UCSF Benioff Children's Hospital Oakland between 2017 and 2020, using climate data to determine the timing of heat waves for each zip code in the hospital's service area. "We continue to see global temperatures rise due to human-generated climate change, and we can expect a rise in health-related issues as we observe longer, more frequent, and severe heat waves," Ye said in a UCSF news release.*

This is in contrast to sampled articles that discuss aspects of climate change other than heat waves in relation to children's health. Among these articles, climate change's threats to children are framed as a future problem. The future threats are mentioned vaguely without detailed explanations:

> *"Transitioning away from dirty diesel and toward clean electric buses is a smart investment in our children's future," said Regional Administrator Lisa F. Garcia. Cleaner air and less pollution are a net positive for the community and, thanks to the Bipartisan Infrastructure Law, this is just the beginning. Beyond the community, the reduction in greenhouse gas emissions from these bus replacement projects will help to address the outsized role of the transportation sector on climate change.*

> *Children are known to be of greater risk for health complications from breathing fossil fuel emissions. They'll also be the ones saddled with future climate warming consequences.*

> *We need to ensure that the children born today have the chance to live a long and healthy life. We cannot stand by as the climate crisis continues to threaten lives, disrupt livelihoods, and destroy our only planet. It's time for action. It's time to adapt.*

Experts agree that if we do not act now, climate change will indeed have more devastating effects in the future. However, climate change is having life-threatening consequences even now. By framing climate change as a phenomenon that will impact children in the future, communicators may inadvertently reinforce the idea that we need not pursue policy changes now. It may be necessary for communicators to use framing that highlights the many real and present climate change phenomena besides heat. At the same time, communicators should not lose sight of the fact that long-term mitigation and adaptation strategies are also necessary.

FINDING #6

Articles discuss mitigation strategies that apply to everyone and are not child-centric.

Climate experts explain that young children are particularly sensitive to the environment because of their body physiology, developing brain architecture and biological systems, and limited autonomy. Consequently, they argue that child-centric policies must be included in climate change mitigation strategies. However, articles that detail the unique harms that climate change creates for young children do not usually discuss child-centric solutions. Instead, they discuss broader strategies that, while necessary, do not directly target the unique harms that befall children through climate change. Articles in our sample tended to emphasize emissions reduction policies, even after discussing harms specific to children:

> *But here's the thing: Climate solutions are health solutions. Limiting emissions from the Chevron refinery doesn't just lessen global warming; it also decreases the number of days my patients miss from school due to asthma flares and the amount of time their caregivers miss work.*

A new report suggests that switching to electric vehicles would prevent millions of asthma attacks in children and save the lives of hundreds of infants by 2050. The American Lung Association found that switching to zero-emission vehicles and electric grids would prevent 2.8 million asthma attacks, 2.7 million respiratory symptoms, 147,000 cases of acute bronchitis, and 508 infant deaths.

The new report says one solution to the growing health problems among young people is for all new car buyers to choose a zero-emission vehicle by 2035 and to purchase zero-emission heavy-duty vehicles, such as ambulances, trucks, and buses, by 2040.

It is undoubtedly important for readers and the public to know that emissions reduction policies are vital for everyone, including children. However, it is equally important for articles to discuss child-centric mitigation policies like greener, more sustainable parks/playgrounds and climate education in schools. Doing so further highlights the fact that children are uniquely affected by climate change and need supports tailored to their specific needs.

FINDING #7

Articles and X posts frame government as the party primarily responsible for mitigation strategies. Conversely, parents/caregivers are framed as the party responsible for adaptation strategies.

Articles and X posts in our sample overwhelmingly place responsibility for mitigating climate change (i.e., reducing carbon emissions) on the government. They focus on federal policy changes, calling for the government to adopt a particular mitigation strategy or to abandon a problematic practice. Some focus on reporting what the government has already done:

Much work remains to end intensive animal agriculture and make the world a safer place for humans and nonhuman animals. We must hold corporations and elected officials accountable for how their actions affect nonhuman animals' wellbeing and public health. Governments must stop subsidizing animal agriculture and instead support more sustainable farming practices.

The American Lung Association's Barrett said stronger federal policies are also needed to prompt a bigger change to cleaner energy. The Biden administration is expected to announce revamped tailpipe emissions standards for cars and trucks in March and regulations for power plant emissions in April.

Seasonal allergies have always been around, but because of climate change, we're seeing longer pollen seasons and more intense release of pollen that are increasing the number of cases and their severity. Recognizing the increasing effect on people, the EPA in February revised its clean air standard for particulate matter in the air that also can aggravate breathing. It was reduced from 12 micrograms per cubic meter to 9 micrograms per cubic meter, with the new level expected by the agency to prevent up to 4,500 premature deaths and 290,000 lost workdays by 2032. Patel would have liked to see a more stringent standard but said the decrease is a "big step forward."

Conversely, articles and X posts place the responsibility for *adaptation* strategies (action designed to adjust to existing impacts of climate change) on parents/caregivers. This is especially true when articles are focused on heat or air pollution. As shown below, parents are encouraged to ensure that their children are hydrated and have access to clean/cool air:

> *But now we have to think about helping [to] keep our kids safe from climate change. Clinton highlighted what parents can do about heat and air pollution. "Our kids don't have the same lung capacity that we do to help kind of take in air, clean air, and so they're really vulnerable to air pollution," Clinton said. "And so what are we doing to help clean the air with the ventilation in the space and places that we spend time—and what are we doing to help support, hopefully, there being less pollution in the air in the future?"*

> *Tracy Holloway, professor of energy analysis and policy at the University of Wisconsin–Madison and a member of the group Science Moms, pointed out mothers are often the decision-makers for their household purchases, so doing some research can make a difference. "Climate change is a real issue, and there are real solutions," Holloway pointed out. "When we're making big purchases, to be thinking about whether this is a purchase that's going to move things forward in the right way; whether it's an electric vehicle, rather than one that uses a lot of gasoline, or an energy-efficient dishwasher."*

> *Car safety is exceedingly important, especially with children, whose bodies can heat up three to five times faster than an adult, according to Dr. Vohra. "Never leave a child or pet in a hot car, even for only a few minutes."*

This is inconsistent with expert recommendations which advise that governments spearhead adaptation strategies like the rebuilding of playgrounds with materials that will not overheat, installing climate-friendly air-conditioning systems in schools, and returning land to Indigenous stewardship (which can then allow for regenerative and protective practices).

This is a curious dichotomy that communicators need to be attuned to. Future testing may be needed to ascertain whether the public is similarly dichotomizing climate strategy. Though parents and caregivers can alleviate some of the strain that climate disasters put on children, focusing on adaptation strategies that are solely the responsibility of parents and caregivers overlooks the need for broader systemic adaptation strategies that go beyond the capacity of individuals to provide.

FINDING #8

The impact of climate change on caregivers and parents, and consequential effects on children's development, is rarely discussed.

Climate advocates explain that climate disasters place a significant mental, emotional, and financial burden on the people who take care of children. These disasters cause harm that hampers caregivers' ability to care for the children who depend on them. This is one important way in which climate change indirectly affects children. However, discussion of both the impacts

of climate change on caregivers and the consequent effects on children's development when their caregivers suffer is markedly absent from news articles and X posts. Instead, as mentioned above, articles that do connect children and climate focus on pollution, extreme temperatures, and resulting school closures. This disregard for caregivers is especially evident in the way some news articles discuss pregnancy, for instance. During pregnancy, people are especially susceptible to the impacts of climate change–related pollution and heat. Despite this, some articles ignore this and imply that exposure to climate change during pregnancy is problematic only insofar as it affects fetal development. No explicit mention is made of the fact that the climate changed—induced pollution harms fetuses by first harming the pregnant person:

> *Pollution can harm a child's health even before birth. A pregnant person's exposure can cause a baby to be born early or with a low birth weight, studies show. Premature babies can have significant health problems at birth and throughout their lives.*

> *The long-term effects of air pollution from wildfire smoke or extreme heat can affect children under 18 by damaging their lung function, causing heat-related stress, and affecting fetal development. Even before a child is born, exposure to ozone and particles during pregnancy can lead to premature births, low birth weight, miscarriages, and stillbirths.*

Similarly, articles and X posts do not discuss caregivers and how climate change indirectly affects children by affecting their caregivers' wellbeing. Yet, climate experts advocate that this is one way that climate change affects children's health. They argue that adverse effects on caregivers—such as illness, stress, and displacement—have negative consequences for children. If a parent becomes sick or displaced after a climate disaster, for instance, it can affect their ability to take care of their children. Children could then face food insecurity, interruptions to school attendance, trauma, and many other undesirable consequences. By ignoring this connection between caregiver wellbeing and children's health, the media may perpetuate a narrow understanding of children's health that excludes the fact that climate disasters can impact it by impacting caregivers' wellbeing.

VIII. Emerging recommendations for communicators

All of these recommendations are in the service of helping communicators build awareness of how climate change impacts early childhood development and build support for solutions:

1. **Talk about the impacts of climate change on children, and on development, when you talk about climate change.**
   Children are largely missing from the conversation about climate change, despite facing significant risks to their current and long-term health. When writing about climate change, communicators should talk about children specifically.

2. **Highlight the present impact of climate change on children, not just the future impacts.**
   Mindsets such as *Only in the Future* and *Kids Are Resilient* can obscure the present impact of climate change on children by framing it as a future problem in one case and, in the second case, as a problem that can be easily overcome. Communicators should highlight the impacts on early childhood development that are happening and will continue to happen as a result of climate change. Be sure to talk about how climate change is happening now, and give examples of how it is currently affecting children.

3. **Talk about developmental impacts of climate change clearly, not just current health risks.**
   Our research suggests there are mindsets that connect environmental changes to long-term developmental impacts, such as *Maternal Mediated Transmission*. However, there are several other ways that the effects of climate change can influence long-term health outcomes for children. People understand that children are more susceptible to the effects of climate change, as shown in the mindset *Vulnerable Children*; however, they tend to think of these effects as immediate and short term.

4. **Connect climate change's impacts on adults to impacts on children's health and development.**
   Experts talk about the environment's indirect effects on early childhood development. These indirect effects include the ways that adults' interactions with children will change because of climate change. For example, if a parent's job is lost due to a climate emergency, which was the case for many in the January 2025 L.A. fires, it affects aspects of family stability, which

has impacts on child development. The impacts of climate change on adults and how they affect children are not well understood beyond the transfer of substances to a fetus during pregnancy. In addition, people tend to think of parents as the only influential adults in children's lives. However, we have to consider the impacts of climate change on all adults around young children, including pediatricians, educators, and parents.

5. **Be clear that marginalized groups will be disproportionately impacted by climate change, and explain why.**

   The *Opportunity Structures* mindset could serve as an entry point to understanding that marginalized groups already have strained access to resources. This could be expanded to talk about climate change explicitly. Elsewhere, we have found it effective to use explanatory chains to explain how policies from the past have caused current disparities, by explaining, for example, how a factory built near a community in the past has impacts on the children who live there now.[12] The public understands that low-income communities will be disproportionately impacted, based on mindsets like *Class Not Race*, so there may also be ways to connect that understanding to other structural inequities. Racism should be specifically mentioned as one of the factors that will lead to disproportionate impacts.

6. **Shift responsibility for protecting children from only parents to our governments and wider society.**

   The public tends to think about parents as the primary influence on children's development. In addition, they place responsibility for protecting children on parents first, as seen in the *Protector Parents* and *Vulnerable Children* mindsets. If parents are unable to protect their children, people use *Government as a Safety Net* to reason that the government is responsible for stepping in. This mindset could be leveraged to make the case that we need policy change on climate change for the sake of our children.

7. **Talk about collective solutions that address the root causes of climate change, such as changes that need to be made for the good of our children's health. Be sure to talk about how people can get involved in change.**

   Currently, the solutions that are top of mind for members of the public (and that are discussed in media and the field) are either individualistic or imagine technology as the solution to climate change. There is room for communicators to propose more collective solutions that get to the root of the problem. The *Profit over People* mindset shows that there is some recognition that corporations have a role in driving climate change and that this is connected to the drive for continual growth. However, this may also contribute to some fatalism on how to solve this issue, as the government is implicated in allowing corporations to exploit the environment. To combat fatalism, propose solutions that are more systemic but that individuals can get involved in. While more research is needed on the most effective framing strategies, this could mean more emphasis on civic action (e.g., joining a climate movement group, contacting representatives about climate policies) and less emphasis on individuals going green.

IX. Future directions for research and testing

This research leads us to a few potential directions for research and testing. Some of the questions we could explore in further phases of this research are as follows:

1. **Will a child health frame encourage people to see the government as more responsible for action on climate change?**
   Even participants who said they normally do not agree with government intervention were more open to government intervention when it came to protecting children. In addition, people recognize that the government could push for policies that restrain corporate emissions but currently chooses not to. The issue of climate change having long-term implications for children's health may then be an interesting way to frame the need for policy solutions. A message like, "to protect our children's health, we need to address climate change" could be tested for whether people are more concerned about the issue of climate change.

2. **How should we talk about how the impacts of structural racism will be exacerbated by climate change?**
   The understanding that racism will affect who is affected by climate change and the extent to which they are was notably missing from the conversation, both in the public and the media. We should test different ways of talking about race in this context.

3. **How should we talk about pollution?**
   Pollution and climate change are often conflated, which could be a barrier to a clear understanding of climate change. However, pollution seems to also be more easily understood as a factor leading to negative impacts on child health. In this way, pollution could be a helpful issue frame to talk about climate change. Issue frames use examples that are familiar to the reader to explain a larger problem. The familiarity with pollution as a climate change impact means it could be a promising issue frame. Future research could explore how to best communicate about pollution so that it is not understood as the same as climate change but as a marker and cause of climate change.

4. **How can we best frame the direct and indirect effects of climate change on children's development?**
   Currently, both the direct and indirect effects of climate change on children's development are not well understood. Perhaps an explanatory chain could be tested that includes the following steps: climate change causes environmental changes→ these environmental changes affect children and the adults they interact with→ children's development is affected by these impacts on themselves and the adults in their lives→ impacts on development can be long-lasting.

5. **How should we increase understanding of early childhood development as a particularly important time for long-term health?**
   People tend to think of the short-term impacts on child health when asked. However, the developmental impacts are important to understand. Exploring strategies for making the link between development and long-term health outcomes will be useful.

X. Conclusion

Climate change is already reshaping the world in ways that deeply affect early childhood development, yet public discourse, media coverage, and policy responses have not fully acknowledged the magnitude of this impact. Our research reveals critical gaps in public understanding, shaped by dominant cultural mindsets that limit how people think about climate change's effects on children and development. These mindsets—such as the tendency to see climate change as a future problem rather than an immediate crisis, or to place responsibility primarily on parents rather than systemic actors—pose significant barriers to effective communication and action.

However, with a better view of how people think about the issue, we can develop new communication strategies that expand the public's ability to recognize the long-term developmental consequences of climate change, the indirect effects on children through caregivers and communities, and the structural inequalities that will exacerbate the effects of climate change on some children more than others.

Further research could develop frames that can be used across the sector to better communicate the impacts of climate change on early childhood development. Mobilizing new frames will create public will for prioritizing child development and wellbeing and will help the many policymakers, advocates, and other changemakers who are working on climate solutions understand how these solutions shape children's development and lifelong health. By working together and speaking from the same playbook, we can advance a new narrative with greater speed and power. Ultimately, the outcome we seek is that US policymakers design and implement climate efforts that support healthy pregnancies and early childhood development for all children, particularly those from historically marginalized groups. As more people champion and take action to improve outcomes for children and our planet, developmental environments for children will be positively shaped, fostering lifelong health and thriving communities.

Appendix: Research methods and samples

Core Ideas of Climate Change and Early Childhood Development

The core ideas were garnered through expert interviews, a literature review, and consultation with our Advisory Board. We interviewed a total of 16 experts in the fields of climate change, early childhood development, and the intersection of those fields—including pediatricians, educators, policy advocates, and academics. Each interview lasted one hour, via Zoom. They were conducted between February and April 2024 and, with participants' permission, were recorded and transcribed for analysis.

Alongside the expert interviews, we conducted a review of academic and gray literature published by research and policy institutes to support our understanding of the problem, as well as to understand more about climate communications. The expert interviews were combined with findings from the literature review to produce the core ideas—that is, what people working on the issue want the public to understand about climate change and early childhood development in the United States.

To guide us throughout the project we assembled an Advisory Board of professionals in the fields of climate change, early childhood development, and the intersection of these issues. The Board includes pediatricians, policy analysts, and representatives of nonprofits working on early childhood education and parents' concerns in the face of climate change. All the members of the Advisory Board were included in our expert interviews. In addition, the Board gave feedback on the core ideas that guide the project.

Cultural Mindsets Interviews

We conducted 20 in-depth, one-on-one, two-hour semi-structured interviews with a diverse sample of members of the public during August 2024. These interviews took place over Zoom and were recorded with participants' written consent. We used a professional marketing firm to recruit participants who represented a cross-section of the general public. We prioritized achieving representative quotas on parental status, political views, location, age, and race. We also had quotas on age, marital status, and educational attainment. To avoid interviewing people with particular expertise in this issue, we screened people out if they were actively involved in working or volunteering with organizations in the fields of climate change or early childhood development, or if they worked in a government position that touched on these issues. We did not screen out people who were skeptical of climate change. Table 1 shows the demographics of our sample.

These interviews were designed to allow researchers to capture broad sets of assumptions, or cultural mindsets, that participants used to make sense of the connections between climate change and early childhood development. We analyzed these interviews using analytical techniques from cognitive and linguistic anthropology to examine the implicit understandings, assumptions, and patterns of reasoning that people use—often without knowing it—to think and make decisions about this issue. Analysis centered on ways of understanding that were shared across participants, as cultural mindsets research is designed to identify common ways of thinking that can be identified across a sample. While there was no fixed rule or percentage used to identify what counts as *shared*, mindsets reported were typically found in a majority of interviews.

Table 1: Cultural Mindsets Interviews: Demographic Information across All 20 Participants

Gender

Men	50%
Women	50%
Non-binary	0%

Age

18–29	10%
30–44	30%
45–59	35%
60+	25%

Political views

Democrat/Lean Democrat	45%
Republican/Lean Republican	40%
Other/Independent/Do Not Lean	15%

Parental status

Has Children	65%
No Children	35%

Residence/location

Rural	25%
Suburban	40%
Urban	35%

Educational attainment

HS or Less	20%
Some College	25%
College Degree	35%
Post-college	20%

Race/ethnicity

White	50%
Hispanic or Latino/a	25%
Black or African American	15%
Other (e.g., Asian, AIAN)	10%

Marital status

Single	55%
Married	45%

Income

$0–39,999	25%
$40–69,999	30%
$70–99,999	30%
$100–149,999	10%
$150K+	5%

Field Frame Analysis

To understand how advocacy communications are currently being framed, we conducted a narrative scan and analysis of public-facing communications materials from 16 organizations working at the intersection of climate change and early childhood development (i.e., the climate and early childhood development field). These organizations were among those suggested to FrameWorks for review by members of the project Advisory Board and were selected for inclusion based on their engagement with both topics named above. They include representatives of professional associations, nonprofit advocacy groups, cross-disciplinary coalitions, government agencies, and academic institutions based in the United States.

Media Content Analysis

To understand the way that the media portrays the impacts of climate change on early childhood development, FrameWorks researchers did a media content analysis (MCA), using both quantitative and qualitative techniques. An MCA is designed to give insight into how issues are being framed in news and social media, and we analyzed this with a view to how the mindsets we had identified might be adopted, used, and reinforced in the media.

1. Quantitative Analyses

Climate Change and Children's Health or Development

First, researchers used the social listening platform Pulsar to conduct a search of all news media on the platform over the period of a year, from October 2023 to October 2024. Table 2 shows the full search terms and the number of articles that were returned in the search:

Table 2: Search Terms

Topic	Search Term	Number of Articles
Climate change	("climate change" OR "climate crisis" OR "climate impact" OR "climate disaster" OR "climate breakdown" OR "climate emergency")	5,275,435
Climate change and children	("climate change" OR "climate crisis" OR "climate impact" OR "climate disaster" OR "climate breakdown" OR "climate emergency") AND ("children" OR "child" OR "childhood" OR "infant" OR "toddler" OR "prenatal" OR "pregnant" OR "pregnancy" OR "before birth" OR "early childhood" OR "birth")	219,485
Climate change, children and their health or development	("climate change" OR "climate crisis" OR "climate impact" OR "climate disaster" OR "climate breakdown" OR "climate emergency") AND ("children" OR "child" OR "childhood" OR "infant" OR "toddler" OR "prenatal" OR "pregnant" OR "pregnancy" OR "before birth" OR "early childhood" OR "birth") AND ("development" OR "health")	96,620

The results were presented in Figure 1.

Heat Waves and Children's Health or Development

We used Pulsar to search X for posts about heat waves that also mention children and their health, wellbeing, or development. This search was conducted because researchers wanted to choose a topic related to climate change that resonates with people who may be posting on social media, and in the cultural mindsets interviews, heat was the most frequently mentioned weather event related to impacts on children. The search was conducted using Pulsar, from May 1 to September 30 (summer) of each year from 2019 to 2024, inclusive. The specific Boolean search term used was:

> *("heat wave" OR "extreme heat" OR "high temperature" OR "scorching heat" OR "it's hot") AND ("children" OR "child" OR "childhood" OR "infant" OR "toddler" OR "prenatal" OR "pregnant" OR "pregnancy" OR "before birth" OR "early childhood" OR "birth") AND ("development" OR "health" OR "well-being" OR "learning" OR "school") AND ("LOCATION US") AND ("LANG en")*

2. Qualitative Analyses

To understand how media frame early childhood development and climate change in the United States, we conducted two separate qualitative content analyses of online news articles and posts on X. Through the first analysis, we aimed to understand how the news media portrayed climate change's impact on children's health and development in 2024. The second analysis looked specifically at how extreme heat (e.g., heat waves and heat domes) has been framed in news articles and X posts over the course of six summers (2019–2024). We chose to investigate media discourses on extreme heat because it constitutes an observable and *close-to-home* climate event that has significantly impacted the lives of people in the United States. In 2023, for example, we saw a record number of heat-related deaths and the highest number of heat waves since 1936.

Research Questions

We used the following research questions to guide our searches and our qualitative analysis:

A. Climate Change and Early Childhood Development in Online News

1. How are news articles framing the connection between climate change and early childhood development?

   a. How do these articles frame the impacts of climate change on early childhood development?

      i. How are they discussing direct or indirect impacts of climate change on early childhood development (e.g., What types of impact? What is the mechanism by which they impact kids?)?

      ii. How are narratives of the impacts of climate change oriented toward structural change? How are these issues presented as structural, interpersonal, or of current or historical relevance?

   b. How do these articles frame action against climate change?

      i. Does the media frame the need for action as urgent?

      ii. How are children connected to this urgency, if at all?

      iii. What solutions are being suggested (e.g., mitigation vs. adaptation)?

        iv. Who has what role in these actions (e.g., children, parents, communities, schools, government)?

    c. Are equity issues discussed, and if so, how are they framed?

        i. What types of equity issues are mentioned (e.g., racism, poverty)?

        ii. How are they discussing the reasons that some groups of children are more or less affected than others?

    d. To what extent do these articles refer to the specific needs of young children and pregnant people in the face of climate change?

        i. How are these needs contrasted with other groups?

        ii. What are the reasons why young children and pregnant people are more affected than other groups?

B. Extreme Heat and Early Childhood Development in Online News and X

1. How are online news media and X users framing the connections among heat waves, climate change, and child development?

    a. How do articles/tweets connect climate change to heat waves?

    b. How is climate skepticism or denial framed in articles about these heat waves (if it is mentioned at all)?

    c. How are children, specifically young children, talked about in relation to the impacts of heat waves? (E.g., What types of impacts are discussed? What are the mechanisms by which they affect children? What are the reasons that children are adversely affected or more affected than other groups?)

    d. How are pregnant people talked about in relation to the impacts of heat waves?

    e. What groups of children are framed as being adversely affected by heat waves (and climate change broadly)?

    f. In which contexts do media narratives have a clear solutions focus? Do certain types of frames bring in solutions most often? Do certain issues most often or least often connect to solutions? What types of solutions are suggested?

    g. How are narratives of the impacts of these heat waves (or climate change) oriented toward structural change? How are these issues presented as structural, interpersonal, or of current or historical relevance?

2. How is the discourse of heat waves changing over time?

Sampling

A. Climate Change and Early Childhood Development in Online News

We qualitatively analyzed 50 online news articles published between January 9, 2024, and December 8, 2024. We identified these articles on Pulsar using the following Boolean expressions:

> *("climate kids"~4 OR "climate childhood"~4 OR "climate children"~4 OR "climate infant"~4 OR "climate pregnant"~4 OR "climate toddler"~4 OR "climate prenatal"~4 OR "climate birth"~4) AND ("change" OR "crisis" OR "disaster" OR "breakdown" OR "emergency") AND ("development" OR "health" OR "well-being" OR "learning") AND ("LOCATION US") AND ("Alabama" OR "Alaska" OR "American Samoa" OR "Arizona" OR "Arkansas" OR "California" OR "Colorado" OR "Connecticut" OR "Delaware" OR "Florida" OR "Georgia" OR "Guam" OR "Hawaii" OR "Idaho" OR "Illinois" OR "Indiana" OR "Iowa" OR "Kansas" OR "Kentucky" OR "Louisiana" OR "Maine" OR "Maryland" OR "Massachusetts" OR "Michigan" OR "Minnesota" OR "Mississippi" OR "Missouri" OR "Montana" OR "Nebraska" OR "Nevada" OR "New Hampshire" OR "New Jersey" OR "New Mexico" OR "New York" OR "North Carolina" OR "North Dakota" OR "Northern Mariana Islands" OR "Ohio" OR "Oklahoma" OR "Oregon" OR "Pennsylvania" OR "Puerto Rico" OR "Rhode Island" OR "South Carolina" OR "South Dakota" OR "Tennessee" OR "Texas" OR "Utah" OR "Virgin Islands" OR "Vermont" OR "Virginia" OR "Washington" OR "West Virginia" OR "Wisconsin" OR "Wyoming") AND ("LANG en")*

This initial search yielded 2,000 online news articles. From this initial corpus, we took three consecutive random samples, containing 100 articles each. For each sample, a FrameWorks researcher used purposeful sampling to identify relevant articles. Articles that made explicit reference to the effects of climate change on children and/or pregnant people were included, while articles that simply mentioned children and/or pregnant people and climate change without elaborating on the effects of the latter on the former were excluded.

B. Extreme Heat and Early Childhood Development in Online News and X

We analyzed 50 online news articles related to children and extreme heat published in the summer of 2024 and 250 posts on X from the summers (May 1 to September 30) of the years 2019, 2020, 2021, 2022, 2023, and 2024. We identified news articles and X posts using the following Boolean expressions on Pulsar:

> *("heat wave" OR "extreme heat" OR "high temperature" OR "scorching heat" OR "it's hot") AND ("children" OR "child" OR "childhood" OR "infant" OR "toddler" OR "prenatal" OR "pregnant" OR "pregnancy" OR "before birth" OR "early childhood" OR "birth") AND ("development" OR "health" OR "well-being" OR "learning" OR "school") AND ("LOCATION US") AND ("LANG en")*

This initial search yielded approximately 18,060 results: ~15,000 online news articles and 3,060 posts. A FrameWorks researcher used purposeful sampling to identify relevant articles and posts. From this initial corpus, we took a random sample of 100 news articles and 100 posts from each of the years 2019 to 2024. For each sample, a FrameWorks researcher used purposeful sampling to identify relevant articles and posts. Articles and posts were selected if they mentioned children and heat waves. Articles were excluded if they were about heat waves and/or climate change impacts outside of the United States. They were also excluded if they were duplicates of another article or if the article mentioned heat only in passing. For example, an article about a drug mentioned that the drug should not be used by patients who are likely to experience extreme heat, strenuous exercise, or dehydration. The same article later mentioned that children should take the

drug only under adult supervision. This article, for instance, was not included. For the X posts, some were excluded if they were simple weather advisories or if they were about climate-related issues outside of the United States. X posts with at least 15 likes or 5 retweets or posted by users with at least 900 followers were included in the study.

Analysis for the Media Content Analysis

Our analysis involved three stages. First, we combined an inductive and deductive coding method to identify patterns in the data. For both analyses, researchers relied partially on codebooks, which we developed from the cultural models' phase of this project. When data were not adequately captured by existing codes, researchers then developed their own codes. Then, we used axial coding to determine relationships between codes. Finally, we interpreted our findings in relation to the research questions listed above.

Limitations of the Media Content Analysis

News media remains an important source of information, shaping public mindsets. However, it is unclear from this research *how* the news articles analyzed might be received by the public and how they shape mindsets around climate change and early childhood development. Similarly, it is unclear from this research how posts on X might shape public mindsets—first, because in this research we did not investigate the ways in which users regard such posts, second, because discourses on X are not necessarily representative of how the majority of those living in the United States understand extreme heat events, the climate, and children's health and development. Nevertheless, this media content analysis allows us to gain a sense of the types of messages that members of the public may be interacting with, which could inform future research on how they receive, shape, and negotiate such messages.

Endnotes

1. We use the term *climate change* in our research because it is the most commonly used term used to describe the way that the environment changes as a result of human activity. Although there is active debate in the field about what term to use, we aimed to explore how people think about this phenomenon, so exploring the most common term can help us better understand how the public is currently thinking. Most participants in this project understood climate change as caused by human activity, although some skepticism did arise. A future step in this research process would be to develop frames to shift people's thinking about climate change, which could also involve exploring which terms might be best to talk about this phenomenon.

2. Perera, F. P. (2022). *Children's Health and the Peril of Climate Change.* Oxford University Press.

3. For more information about the science of how climate change impacts early childhood development, there are a number of helpful resources including the series *Growing Up in a Warming World*, which covers the specific ways that water (https://developingchild. harvard.edu/resources/briefs/growing-up-warming-world/) and wildfire smoke (https://developingchild.harvard.edu/resources/briefs/wildfire-smoke-early-childhood-development/) affect early childhood development. Other resources include Frederica Perera's book on the subject: *Children's Health and the Peril of Climate Change;* and the *American Academy of Pediatrics' policy statement Climate Change and Children's Health: Building a Healthy Future for Every Child* (https://doi.org/10.1542/peds.2023-065504).

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6. Pineda, D., & Peterson, B. (2025, January 25). As schools in LA reopen, parents worry about harmful ash from wildfires. *AP News.* https://apnews.com/article/california-fires-children-schools-toxic-ash-3295ce74c5b4d41d7db6a08428ddd2e

7. Ibid.

8. Reyes-Velarde, A., & Kuang, J. (2025, January 17). 'It all ended in a second': Thousands of low-income and immigrant workers lost jobs in LA fires. *CalMatters.* https://calmatters.org/environment/wildfires/2025/01/la-fires-workers-lost-jobs/

9. Bailey, C., Miracle, V., & Friedman, M. (2025, January 19). For historically Black Altadena, the combined wildfire loss of generational wealth and personal heirlooms is indescribable. *CNN.* https://www.cnn.com/2025/01/19/us/altadena-california-wildfire-black-community/index.html

10. FrameWorks Institute. (2024, February 1). *Fast frames: Alternatives to vulnerability framing* [Video]. https://www.frameworksinstitute.org/articles/fast-frames-episode-3/

11. Ibid. See also Note 12.

12. Moyer, J., Lyew, D., John, J. E., Hestres, L. E., Vierra, K., & Volmert, A. (2023). *Where we thrive: Communicating about resident-centered neighborhood revitalization.* FrameWorks Institute. https://www.frameworksinstitute.org/app/uploads/2023/03/PB-brief-03.17.23.pdf

About FrameWorks

The FrameWorks Institute is a nonprofit think tank that advances the mission-driven sector's capacity to frame the public discourse about social and scientific issues. The organization's signature approach, Strategic Frame Analysis®, offers empirical guidance on what to say, how to say it, and what to leave unsaid. FrameWorks designs, conducts, and publishes multi-method, multi-disciplinary framing research to prepare experts and advocates to expand their constituencies, to build public will, and to further public understanding. To make sure this research drives social change, FrameWorks supports partners in reframing, through strategic consultation, campaign design, FrameChecks®, toolkits, online courses, and in-depth learning engagements known as FrameLabs. In 2015, FrameWorks was named one of nine organizations worldwide to receive the MacArthur Award for Creative and Effective Institutions.

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