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## Planting the Seeds of Sustainability: The Promise of Dynamic Norms

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### **Planting the Seeds of Sustainability: The Promise of Dynamic Norms**

Climate change poses an increasingly dangerous threat to human life, necessitating widespread behavior change to mitigate its effects. Thus, targeting children, whose habits and norms are still forming, may offer a promising solution. Here we explore how children reason about norms and emphasize the potential of dynamic norms—norms that highlight behavioral shifts over time—to promote sustainable behavior. While research demonstrates the efficacy of dynamic norms in motivating adults to adopt climate-friendly behaviors, little is known about their influence on children. We begin by reviewing evidence that adults conform to dynamic norms largely because they perceive a change as socially significant and expect its popularity to rise. Building off these insights, we delve into developmental work on children’s understanding of social norms, focusing on how their sensitivity to others’ actions might attune them to dynamic norms. We then review literature on children’s capacity for future thinking to see whether they may be capable of predicting future norm trends. We conclude by identifying pressing open questions and suggesting research directions aimed at nurturing sustainable behavior in childhood.

### Planting the Seeds of Sustainability: The Promise of Dynamic Norms

Climate change is one of the most pressing issues that humanity is facing—and causing. Encouraging people to change their behavior to be more climate friendly can help lower carbon emissions, but behavior change is challenging. Many sustainable behaviors, like reducing or eliminating meat consumption and driving electric-powered vehicles, are not the norm. Despite environmentalists' attempts to promote pro-environmental behaviors, the prevailing environmentally unfriendly social norms around the world remain a barrier to climate action.

Perhaps an effective solution would be to encourage pro-environmental behaviors before environmentally harmful ones become too socially ingrained, in which case it might be helpful to focus on children<sup>1</sup>. Children will suffer the consequences of climate change more than anyone else. Indeed, they may suffer from compounding effects of climate change and other stressors, particularly in the earliest years of life (Cuartas et al, 2024; Vergunst & Berry, 2022). Research targeting children, then, is both a potential solution for humanity at large and, also, protective of their futures.

As it happens, children as young as age three hold positive views of environmentally friendly behaviors and negative views of environmentally harmful behaviors (e.g., Geraci et al., 2024; Kahn & Friedman, 1995; Margoni & Surian, 2017; Stern et al., 2021). What is more, behavioral habits formed in childhood can persist into adulthood (e.g., as in the case of food choices; see Mikkilä et al., 2005). Although children may not have the level of autonomy to make all kinds of environmentally consequential decisions, such as what kind of vehicle (gas or

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<sup>1</sup> To be clear, we are not suggesting that children should solve the climate crisis nor are we suggesting that children changing some of their individual behaviors is a silver bullet that will remedy climate change. Rather, we argue that children can be powerful agents of change in their communities and deserve to be included in conversations about how to fix a problem that will ultimately affect them the most.

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3 electric) their caregivers transport them in, they still have control over some decisions, such as  
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5 turning water off when brushing their teeth. Thus, leveraging insights from research examining  
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7 the development of norm psychology can potentially aid efforts to promote sustainable behavior  
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9 in children.  
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12 Here we seek to bridge work from developmental science and social psychology in the  
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14 service of promoting new research that can be leveraged to foster sustainable behaviors among  
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16 children. We begin by exploring research in social psychology on norm change that points to a  
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18 promising path for promoting sustainable behavior among adults: by framing norms *dynamically*.  
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20 Next, we review insights from developmental science—primarily from research conducted in the  
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22 United States and other Western countries—and focus specifically on the processes that seem to  
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24 be central to adults' reasoning about dynamic norms. We then outline how future research can  
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26 uncover whether, and how, children become sensitive to dynamic norms and conclude with a  
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28 discussion of how such work might have implications for promoting sustainable behavior.  
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### 32 33 **The Power of Dynamic Norms in Adulthood** 34

35 Norms change. What was once commonplace, like using plastic bags to carry groceries,  
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37 now seems outdated, with reusable bags becoming the new standard. Despite extensive research  
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39 on norms in social psychology and related fields (Legros & Cislighi, 2020), little attention has  
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41 been paid to how people think about, and respond to, changing norms (Bicchieri & McNally,  
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43 2018). That said, research has started to examine the processes underlying people's reasoning  
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45 about norm change and its behavioral consequences. This emerging work indicates that  
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47 presenting norms as dynamic, rather than static, can influence people's beliefs and behaviors  
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49 (e.g., Sparkman & Walton, 2017). Whereas a dynamic norm highlights how behaviors have  
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51 changed over time (e.g., that an increasing number of people refrain from using single-use  
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3 plastics), a static norm simply describes the current prevalence of a behavior (e.g., the number of  
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5 people that refrain from using single-use plastics).  
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8 Research has found that adults are more likely to adopt non-normative behaviors when  
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10 they are framed dynamically than statically (Sparkman & Walton, 2017; Sparkman et al., 2021;  
11  
12 also referred to as trending and non-trending norms, see Mortensen et al., 2019). For example,  
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14 one study found that undergraduates were more likely to choose meatless meals after reading  
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16 information regarding reducing meat consumption that was framed dynamically (e.g., “In the last  
17  
18 5 years, 30% of Americans have now started to make an effort to limit their meat consumption”)  
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20 than statically (e.g., “30% of Americans make an effort to limit their meat consumption”).  
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22 Similarly, signage in college dorms encouraging water conservation when doing laundry was  
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24 more effective when framed dynamically (e.g., “Most residents are changing, now most use full  
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26 loads”) than statically (e.g., “Most residents use full loads”), which even lead to sustained water  
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28 conservation over time.  
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33 The effectiveness of dynamic norms has been demonstrated across a range of behaviors,  
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35 including health-related ones like smoking cessation (Ma & Reynolds-Tylus, 2024). Among the  
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37 reasons why these effects likely arise is because people (1) perceive these changes as significant  
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39 to others and (2) anticipate that these behaviors will continue to grow. With respect to the first  
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41 point, adults think others are changing their behavior because that change is important to them  
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43 (Sparkman & Walton, 2019). And, with respect to the second point, adults expect that an  
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45 increasingly prevalent behavior will continue to grow in prevalence (such that adults will  
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47 “preconform” to counternormative yet increasing behaviors; Malta et al., 2024; Sparkman &  
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49 Walton, 2017, 2019).  
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54 Can dynamic norms influence children’s sustainable behaviors? This is the question at  
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3 the heart of our review. Reasoning about dynamic norms could be difficult for children, as it  
4 involves holding multiple pieces of information in mind (e.g., how a norm has changed, who is  
5 engaging in it, whether it conflicts with personal preferences, its future trajectory, etc.). Here we  
6 will review various insights from developmental science, mainly from children tested in the  
7 United States and other Western countries (unless otherwise noted), which indicate that children  
8 may possess the component pieces needed to reason about dynamic norms. We start by  
9 examining how children respond to others' actions and what motivates their social conformity,  
10 an important foundation to establish if children, like adults, would attend to dynamic norms  
11 because they believe that others value those changes. Next, we explore children's prospective  
12 reasoning abilities, which could serve as a basis for an early form of "preconformity."  
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14 Ultimately, our goal is to stimulate research that not only deepens our understanding of norm  
15 development but also guides efforts to support sustainable behavior in childhood.  
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### 31 **Children's Tracking of Others: A Path to Dynamic Norm Sensitivity**

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33 Changing a norm is not simply a matter of adopting something new—it also means  
34 letting go of what is familiar. Take recycling: children must learn to use a recycling bin and stop  
35 using the trash can. This makes norm change more complex than starting from scratch, as it  
36 demands unlearning as much as learning. These norm shifts can start with individuals—so-called  
37 "trendsetters" (Bicchieri, 2017)—but more commonly they result from social alignment. To  
38 promote sustainable behaviors in children, we need to understand how they perceive norm  
39 change. What patterns do they pick up on, and whose behavior influences them most?  
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49 In this section, we first focus on two important social considerations that children rely on  
50 when deciding whether a behavior is catching on: who is doing it and how common it seems.  
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54 These considerations matter if children, like adults, adopt dynamic norms because they care  
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3 about what is important to others. Then, we connect these ideas to children's actual behavior  
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5 (i.e., their behavioral conformity) in the remaining sub-sections.  
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### 7 **The Importance of "Who"**

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10 Although children can create their own norms (e.g., Göckeritz et al., 2014; Hardecker et  
11  
12 al., 2017; Nobes, 1999), they are often imparted onto them by others. Think back to the case of  
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14 starting to recycle. Children may experience the changing norm through seeing many of their  
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16 peers begin to recycle or by seeing adults in their environment doing so. Importantly, children do  
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18 not always treat these two sources of information equally.  
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22 With age, children differentially evaluate a norm depending on whether it was created by  
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24 peers or adults. For example, four- and five-year-olds believe that a norm created by an adult  
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26 should be followed with greater fidelity than a norm created by another child, whereas six- and  
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28 seven-year-olds believe both norm types should be followed at the same rate (Hardecker et al.,  
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30 2017; Riggs & Young, 2016). Other studies have shown that children ages four to seven track the  
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32 history of a norm when deciding who has the authority to change it (Zhao & Kushnir, 2018; for  
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34 similar evidence obtained from children tested in China, see Guo et al., 2024). If, for example,  
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36 one child decided a norm for a group, participants agreed that only that child had the authority to  
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38 change the norm. However, when a norm was decided by a group consensus, participants tended  
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40 to believe that an individual could not change the norm (Zhao & Kushnir, 2018).  
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45 Overall, these findings suggest that children actively consider the source and origin of  
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47 norms. Indeed, they do not simply accept norms but evaluate who introduced them and how they  
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49 were established. Encouraging sustainable behaviors like recycling, via dynamic norm  
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51 messaging, should therefore consider whether norms come from peers, adults, or a broader  
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53 consensus, as we discuss below.  
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## The Role of Consensus

Imagine a classroom where more and more children begin recycling, but not everyone does so. A younger child might hesitate to join in because, from their point of view, a behavior is not a “real” norm unless everyone agrees to it. Consistent with this impression, one study found that three-year-olds did not accept a new game rule if a single person disagreed to it (Schmidt et al., 2016b). Even in the case of a vast majority (90%) agreeing to a rule, children still did not see the rule as an established norm (Schmidt et al., 2016b). Relatedly, four- and five-year-olds will conform to an action more when they see actors unanimously conform to a rule of a game than when they see a majority (i.e., all but one) conform (Hardecker et al., 2023). This need for total consensus poses a challenge when introducing sustainable behaviors (especially to young children), as such behaviors often begin with only a subset of individuals.

Yet unanimity may become less influential with age. For example, seven-year-olds, but not three- to five-year-olds, will conform to a non-unanimous group majority (Morgan et al., 2015). Seven-year-olds’ conformity to a non-majority might suggest they only need a majority agreeing to a norm to see it as established. Following this point, children ages six to nine are more likely to conform to a norm that is followed by a non-unanimous majority (i.e., 4 out of 5 others) than one followed by a minority (i.e., 1 out of 5 others; see Deutchman et al., 2023). This developmental shift may mark the emergence of dynamic norm sensitivity, a point we consider in greater detail below. Yet knowing how many people are doing something does not tell us why children themselves choose to follow suit—that is the next piece of the puzzle.

## Social Importance of Conformity

Recognizing that a norm is changing is one thing; when and why children conform to changing norms is quite another. Examining this latter issue can clarify whether children think

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3 about dynamic norms like adults do—because they notice others doing so and value it. But  
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5 changing behavior may demand more effort or even conflict with what children already know or  
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7 prefer. For example, walking to school (to lower carbon emissions from motor vehicles) is more  
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9 time-consuming and effortful than getting a ride from a caregiver or using public transportation.  
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11 But if a norm to walk emerges, children might conform due to the social pressure they feel. After  
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13 all, a social desire to conform may be one reason why children would alter their behavior.  
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17 By many accounts, research examining why people conform started with the seminal  
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19 conformity experiment, which found that adults will conform to an incorrect, unanimous  
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21 majority, even when they think the majority is providing an incorrect response to basic  
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23 perceptual discrimination questions, which highlights the desire to conform, or “fit in” (Asch,  
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25 1956). Conforming to something that is clearly wrong because the majority declares it is correct  
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27 is referred to as strong conformity. Attempts to replicate this paradigm in three- and four-year-  
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29 olds find that, like adults, children can be swayed to conform to an incorrect answer when  
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31 following a unanimous peer majority (Haun & Tomasello, 2011; Walker & Andrade, 1996; also  
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33 see Corriveau & Harris, 2010 and Corriveau et al., 2013, which compare Asian-American and  
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35 Caucasian-American children).  
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40 Despite conforming and providing an obviously incorrect response, children learn to  
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42 recognize that strong conformity serves a social purpose. Five-year-olds, but not three-year-olds,  
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44 endorse strong conformity in third party actors for the purpose of the actors’ group affiliation  
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46 (Cordonier et al., 2018). Interestingly, children’s actual behavior shows the opposite pattern:  
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48 three-year-olds may conform more than five-year-olds (Flynn et al., 2018). Other work has  
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50 shown that children appear to be susceptible to strong conformity, specifically due to a desire to  
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52 adhere to a social group’s behavior and not necessarily because they believe the majority to be  
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3 correct (Haun & Tomasello, 2011). If this translates to environmental norms, particularly ones  
4 which are not obviously “right” or “wrong,” then they should conform to potentially unappealing  
5 sustainable behaviors for the sake of social belonging. Indeed, children ages six to nine years  
6 appear to believe that the more others are engaging in a behavior, the more they *should* engage in  
7 that behavior themselves (Deutchman et al., 2023). For example, children might believe that  
8 their social group is embracing a new norm of eating less meat and therefore be more inclined to  
9 conform to this dietary change than they otherwise would be.

### 19 **Overcoming Personal Preferences**

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21 Conformity may be common, but it can also be hard. If a norm does not align with one’s  
22 personal preferences, then that could decrease someone’s desires or efforts to conform. Some  
23 environmentally friendly behaviors may even counter children’s (and adults’) personal  
24 preferences. As an illustration, typical diets in some societies, like the United States, often  
25 include a large proportion of meat consumption. At the same time, people may conform to a  
26 vegetarian or vegan diet due to social pressures (e.g., Hammami et al., 2023; Sparkman &  
27 Walton, 2017), which indicates that people will engage in behaviors that counter their personal  
28 preferences.

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40 There is some evidence that suggests that children will conform to norms that conflict  
41 with their personal preferences. Children may dislike and try to avoid vegetables, for example,  
42 but one study found that providing six- to 11-year-olds with information about other children’s  
43 high vegetable consumption led to higher vegetable consumption (Sharps & Robinson, 2015).  
44  
45 Looking at younger children, three-year-olds in a tea-party scenario will select a normative snack  
46 option (e.g., a vegetable) more than their own personal preference (e.g., a cookie), despite the  
47 normative option being less appealing (Li et al., 2021).  
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3 Other work has also demonstrated conformity in children ages three to five when a norm  
4 conflicts with their beliefs or preferences (Flynn et al., 2018). Such findings that children will opt  
5 to conform to their peers instead of selecting their own preferences illustrate that norms have the  
6 power to make children weigh the behaviors of others above their own desires, much like what  
7 we see in adults. This is promising data for dynamic norms regarding environmental behaviors –  
8 because they are social in nature and could therefore be more flexible (for evidence of norm  
9 flexibility in five-year-olds, see Köymen et al., 2014), perhaps children are more likely to  
10 conform to such behaviors than ones that are more obviously correct or incorrect.  
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22 Overall, this work points to the power that social norms have in influencing children's  
23 decisions – even influencing children to forego their personal preferences in favor of something  
24 else that is more normative. What is more, we have alluded to the feed-forward effects of  
25 changing individual behaviors on others in one's social group(s) (e.g., Bicchieri, 2017; Miller &  
26 Prentice, 2016). In other words, children not only conform to norms, but they also promote  
27 conformity in others.  
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### 35 **Evaluating (Non-)Conforming Agents**

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37 Clearly, children see social value in conforming to norms, but what happens when others  
38 do not conform? Say a new norm of composting is established. It is likely that others in a group  
39 would notice if someone threw food waste in the trash. If one wants to conform to a social group  
40 or signal affiliation, it would be best to not perform any such norm violations or transgressions.  
41 This is important because children from age five, if not before (see Botto & Rochat, 2019), are  
42 concerned with managing their reputation (e.g., Engelman & Rapp, 2018; Heyman et al., 2021).  
43 Thus, children are motivated to avoid others' negative evaluations and even punishment by  
44 adhering to appropriate social norms.  
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3 In addition to reputational concerns about their own conformity, children use norm  
4 conformity when evaluating others. When children as young as age three believe a norm is  
5 established, they will protest against, and even punish, others for violating that norm (e.g.,  
6 Schmidt et al., 2016a, Smetana, 1981; Wyman et al., 2009). Environmental norms are no  
7 exception: four- to six-year-olds in China punish others who do not conform to certain  
8 environmental norms such as not littering (Hu & Wu, 2022). Research has also shown that  
9 children ages four to 12 generally rate environmental transgressions, such as not adhering to a  
10 recycling norm, as negative (e.g., Collado & Sorrel, 2019; Hahn & Garrett, 2017; Hussar &  
11 Horvath, 2011). Thus, children use normative information to inform not only their own  
12 behavioral decisions, but also how they treat and evaluate others.  
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26 Given these findings, why would children decide to engage in sustainable, albeit  
27 uncommon, behaviors if nonconformity often leads to punishment or negative evaluations? It is  
28 important to note that nonconformity is not always negatively evaluated. Indeed, some  
29 nonconformists can be positively evaluated depending on their intentions. For example, four- to  
30 six-year-olds differentially evaluate nonconformists depending on whether they are trying to  
31 affiliate with an ingroup or an outgroup (Yang & Roberts, 2024). In this study, children showed  
32 positive evaluations of nonconformists whose goal was to be inclusive. In a study examining  
33 beliefs of vegetarian and non-vegetarian children aged seven to 10, participants (including the  
34 vegetarians) only negatively judged others for eating meat if they had previously stated an  
35 intention to not eat meat (Hussar & Harris, 2010). Thus, children also track others' intentions  
36 when evaluating (non)conformity. Thinking back to the example of introducing a new norm of  
37 recycling, if children vocalize an intention to engage in a new recycling behavior, they would  
38 likely face worse evaluations for not doing so than if they had not vocalized their intention –  
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3 even if it is still counternormative. Although it is clear that children are capable of making  
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5 nuanced evaluations of others, many questions abound regarding when and how children decide  
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7 to deviate from established norms in addition to how they evaluate nonconformists to a changing  
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9 norm (or “trendsetters”, see Bicchieri, 2017 for a review on how such individuals can drive norm  
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11 change in adulthood).  
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15 Taken together, this work shows that, in general, children will conform to social norms  
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17 and believe that others should conform, too. In some cases, however, children appear to see  
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19 value in nonconforming when an agent’s intentions are good. If children see others failing to  
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21 conform to existing environmentally unfriendly norms, they may have positive views of this so  
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23 long as their intentions are clear. These findings provide a stepping stone for asking questions  
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25 about what happens when children start nonconforming, or how children reason about dynamic  
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27 norms.  
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### 30 31 **Summary**

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33 In this section, we examined how children navigate norm change by weighing who  
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35 initiates a norm and how widespread it is. These cues help them decide when to conform, even  
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37 when doing so conflicts with personal preferences. This work maps onto one known reason for  
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39 adults’ sensitivity to dynamic norms: concern with others’ views. We now turn to a second  
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41 possible mechanism—“preconformity”—and review research on children’s prospective  
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43 reasoning abilities to explore how it may also drive dynamic norm sensitivity in childhood.  
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### 46 47 **Children’s Prospective Reasoning: Another Path to Dynamic Norm Sensitivity**

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49 Studies that utilize dynamic norms with adults have been able to promote sustainable  
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51 behaviors, even when they are counternormative, in part because adults assume the presented  
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53 trends will continue increasing into the future until the behavior is normative (Sparkman &  
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3 Walton, 2017). Thus, beyond perceived importance to others, another reason for deciding to  
4 participate in a changing norm is its future status. Because many sustainable behaviors do not  
5 have any tangible or immediate benefits (e.g., reducing meat consumption does not lead to a  
6 noticeable increase in air quality), prospection is an important factor when deciding to engage in  
7 sustainable behaviors (Ebreo & Vining, 2001; Joireman et al., 2004). Yet it is unclear whether  
8 children would predict a changing norm to continue its trend into the future or whether they  
9 would solely focus on the current state of a norm.  
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19 Although we do not know how children may predict future trends per se, research has  
20 studied children's capacity for future-oriented thinking abilities (e.g., planning, delaying  
21 gratification, preparing for future events; see Atance, 2008 and Atance, 2015 for reviews).  
22 Three-year-olds have minimal future-oriented cognitive abilities, which appear more  
23 substantially around ages four to five (Atance & Jackson, 2009; Suddendorf, 2017). Work on  
24 episodic foresight, the ability to project oneself into the future and reason about events and  
25 outcomes, points to large gains over early and middle childhood in children's ability to prepare  
26 for future events and even multiple future possibilities (Suddendorf, 2017). For example, at age  
27 six, but not age five, children intentionally spend their time doing tasks that would be relevant  
28 for future activities (Brinums et al., 2018; Brinums et al., 2021). Thus, children may gain the  
29 capacity to think about future consequences of environmental actions that directly impact  
30 themselves between the ages of four to six. Perhaps more importantly, children at these ages  
31 begin to think more deeply about the consequences of conforming—or not—to a social norm.  
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49 Following this point, environmental actions not only affect oneself but also those around  
50 us, and we tend to notice how others act when making decisions. We have already discussed  
51 research showing that social norms influence children's behavior and can, at times, even override  
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3 their personal preferences (e.g., Flynn et al., 2018; Li et al., 2021). This may be especially  
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5 powerful for scenarios which describe a norm changing within a child's in-group, as the dynamic  
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7 norm work in adults has suggested that people are more willing to change their behavior because  
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9 they view that behavior as important to the groups to which they belong (Sparkman & Walton,  
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11 2017).  
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15 Importantly, young children appear to consider what others will think in the future when  
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17 making decisions. For example, children appear to think about how their actions impact others'  
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19 future states by ages four to five (e.g., Moore et al., 1998; Thompson et al., 1997). One study  
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21 examined three- to five-year-olds' ability to delay gratification for themselves as well as their  
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23 ability to delay shared gratification with an experimenter to test children's future-oriented  
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25 altruism (Thompson et al., 1997). Four- and five-year-olds were better than three-year-olds at  
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27 delaying both self and shared gratification, suggesting that children begin to consider the future  
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29 desires of others at this age. Around these same ages, children also develop the ability to engage  
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31 in calculated prospective reciprocity—they will incur a cost in the present that benefits another  
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33 person with the intention of that person benefitting them sometime in the future (Grueneisen et  
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35 al., 2023).  
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41 When it comes to environmentally friendly behaviors, which indirectly benefit other  
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43 people, engaging in them may involve incurring a cost with the potential expectation that others  
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45 would reciprocate such sustainable behaviors in the future. To the extent that children recognize  
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47 that adhering to environmentally friendly norms have benefits that go beyond their social  
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49 spheres, they may be more inclined to participate in a growing, sustainable norm. In fact, some  
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51 evidence suggests that children tend to show greater biocentric reasoning (i.e., the belief that  
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53 nature itself has rights and value) with age (e.g., Kahn, 1999; Severson & Kahn, 2010).  
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## Summary

In this section, we considered how children's emerging ability to think ahead may contribute to a sensitivity to dynamic norms. While adults adopt sustainable behaviors (via dynamic norm messaging) partly because they foresee those behaviors coming mainstream, children's developing prospective reasoning only blossoms between ages four to six. Indeed, research on planning, delay of gratification, and episodic foresight shows a marked jump in future-oriented cognition after age four. However, this work has not yet examined how children may think about or generate expectations for future norms or trends. Building on these findings and open questions—as well as those from the preceding section—we now move to our final section, where we outline concrete ways to test children's sensitivity to dynamic norms.

### Children and Dynamic Norms: A Research Agenda

Here we outline two key avenues for future research aimed at clarifying whether dynamic norm framing can foster children's engagement in sustainable behaviors. First, we consider whether such framing shapes children's evaluations and reasoning about social norms. Second, we examine whether this framing can prompt actual behavioral change, even in contexts where sustainable actions remain non-normative.

### Evaluations

To address whether children are sensitive to dynamic norm framing, a study could present children with two novel norms, one framed statically (e.g., "Most children at this school color before recess") and the other framed dynamically (e.g., "Most children at this school have changed their minds and have now started to color before recess"). Participants could then indicate which norm they would rather follow. We predict that children will prefer dynamic over static norms, and that this preference would be present by age seven.

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3 This prediction follows from research that we reviewed in previous sections (e.g., the  
4 development of an appreciation for a non-unanimous majority, Deutchman et al., 2023; Morgan  
5 et al., 2015) and other work pertaining to cognitive processes that may contribute to how  
6 children think about changing norms. For example, children make gains around ages seven and  
7 eight in their ability to inhibit decisions made automatically and engage in more controlled  
8 thinking (e.g., Iani et al., 2014; Williams et al., 1999). More controlled thinking could mean that  
9 children are taking the time to consider norm change over time and not just the current state of  
10 the norm. Indeed, we have suggested that changing a norm may involve inhibiting a habitual  
11 response in favor of aligning with a changing norm. Inhibiting the habitual behavior would be  
12 easier for older children (i.e., age seven and up), due in part to more advanced and controlled  
13 thinking.  
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28 Moreover, sensitivity to dynamic norms must include recognizing the prominence of a  
29 behavior in a group, or reasoning about whether a majority or minority of a group is doing  
30 something, and how the behavioral prevalence is changing. Children's ability to reason about  
31 proportions strengthens between the ages of six and 10 (e.g., Jeong et al., 2007), which lends  
32 further support to the possibility that an understanding of dynamic norms emerges during this  
33 period of development. An appreciation for non-unanimity is especially imperative in the context  
34 of the current analysis because it is unlikely that any environmentally friendly behaviors will be  
35 unanimously followed immediately. For example, at what point would children notice that fewer  
36 of their peers are opting for meat-based lunches?  
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49 It is therefore possible that children become sensitive to norm dynamics by age seven  
50 because they show increased flexibility for norms by this time in development (e.g., Guo et al.,  
51 2024; Köymen et al., 2014; Zhao & Kushnir, 2018), can inhibit behaviors more readily, and can  
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3 better reason about proportion. If and when children are found to be sensitive to dynamic norms,  
4 such work should clarify that they are not simply focusing on the endpoints of the dynamic  
5 information (i.e., where a norm started or ended) instead of the overall change itself. For  
6 example, children could side with the majority of their peers who use reusable water bottles  
7 simply because the majority is doing so and not because it has gained popularity over time.  
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15 Beyond considering whether a norm has recently changed, children may also use  
16 predictions for a norm's future state in their evaluations. For example, would they believe an  
17 increasingly common norm will continue to rise in popularity or stay stagnant? Do children  
18 predict a drop off after a peak, like a fad's trajectory? Examining this would shed light on if and  
19 how children incorporate prospective thinking into their evaluations. At the same time, children  
20 may not engage in future thinking regarding norm trends at all or may simply see such trends as  
21 transient, or fad-like. Determining the independent and interactive contributions of the two  
22 mechanisms we have focused on in this review (i.e., concerns with others' views and  
23 pre conformity) is therefore important.  
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### 35 **Behavior**

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37 Documenting children's sensitivity to dynamic norms would be in the service of trying to  
38 capitalize on this sensitivity to induce sustainable behaviors. To test whether this might be the  
39 case, research might consider whether dynamic norm framing influences children's actual  
40 engagement in behaviors with environmental consequences, like food choices, recycling, or other  
41 environmental trade-off tasks. Recent work has suggested that vegetarianism/veganism (i.e., food  
42 choice) is indeed increasing in prevalence amongst adolescents and likely children (see Patelaki  
43 et al., 2019). Testing children's choice between a normative, unsustainable option and a  
44 counternormative, sustainable option can provide data in a real-world context. One such  
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3 experiment could introduce children to a counternormative food choice framed statically (e.g.,  
4 “When kids come in and get to pick their lunch, a few choose the veggie nuggets”) or  
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6 “When kids come in and get to pick their lunch, some kids are changing their  
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8 dynamically (e.g., “When kids come in and get to pick their lunch, some kids are changing their  
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10 minds and starting to choose the veggie nuggets”). Participants could then be encouraged to take  
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12 either a counternormative option or a normative option (e.g., chicken nuggets). Here, we predict  
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14 that children would prefer the normative snack choice regardless of framing, but that children  
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16 would be more likely to select the counternormative snack choice in the dynamic norm condition  
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18 around age seven or eight. This logic follows from what we have reviewed above, namely that  
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20 children see value in a nonunanimous majority (Deutchman et al., 2023; Morgan et al., 2015)  
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22 and can better inhibit behavior (Iani et al., 2014; Williams et al., 1999) at this age.  
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27 Given these various findings, we believe that children could behaviorally comply with  
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29 dynamic norms by seven or eight years of age. Research, of course, is needed test this prediction,  
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31 but it is worth noting that intervention research might serve as a particularly illuminating analysis  
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33 of whether dynamic norms can change children’s behavior. For example, educational or after-  
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35 school program settings could be ideal settings for such research due to the potential to highlight  
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37 social groups and see changes in action. There is already some evidence of this type of  
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39 intervention promoting behavior change in children slightly older than the ages we have  
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41 primarily focused on in this review (i.e., ages nine to 14; see Smit et al., 2021).  
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46 It seems, then, that children’s behavioral compliance to dynamic norms likely follows a  
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48 similar developmental trajectory to their evaluations regarding them. Of course, dissociations  
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50 between the two are also possible. On the one hand, behavioral compliance could emerge first.  
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52 Specifically, if younger children are more likely to behaviorally comply than older children (e.g.,  
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54 Flynn et al., 2018), then this compliance could set the stage for children’s emerging (evaluative)  
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3 sensitivity to dynamic norms. On the other hand, it might be the case that children's evaluative  
4 sensitivity to dynamic norms precedes their behavioral compliance to them. After all, there are  
5 multiple cases in the developmental literature showing that children's sensitivity to something  
6 (e.g., detecting fairness) precedes their engagement in it (e.g., acting fairly, see Chernyak et al.,  
7 2018; Smith et al., 2013). Uncovering potential associations and dissociations between children's  
8 evaluations and behaviors in the context of dynamic norms present many open, and interesting,  
9 questions.

### 19 **Conclusion**

20  
21 The climate crisis needs to be addressed sooner than later, so attempting to do so from  
22 multiple means is essential. Here we have outlined how we may be able to promote positive  
23 judgments toward, and participation in, sustainable behaviors in early and middle childhood by  
24 capitalizing on insights from developmental science and social psychology. Not only does this  
25 review set the stage for new research on dynamic norms that can shed new light on the  
26 development of norm psychology more broadly, but such work also holds the potential to be  
27 translated into practice that can be instrumental in the fight against climate change.

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29 Supporting our claim that encouraging sustainable behaviors in children is fruitful, a few  
30 studies have suggested that childhood is an ideal time to intervene. For example, research has  
31 indicated that the best time to change and reduce a particular environmentally unfriendly  
32 behavior, meat consumption, is in early to middle childhood, as social norms about meat-eating  
33 are not strong at this age (Piazza et al., 2023). Survey data collected from parents who tried to  
34 encourage plant-based diets in their children support this claim: parents believed that it was  
35 easier to promote plant-based diets the younger that children were (Ukropcova, 2023). Consistent  
36 with this point, children's environmental norms have been shown to relate to their actual  
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3 behaviors. One study found that eight- to 10-year-olds' awareness of social norms about certain  
4 environmental behaviors (i.e., recycling) relates to their engagement in those behaviors (Matthies  
5 et al., 2012). Furthermore, studies that show that parental norms are predictive of children and  
6 adolescents' environmental behaviors point to social norm learning as a way in which they  
7 acquire these norms (e.g., Grønhøj & Thøgersen, 2012; see Ando et al., 2015 for a cross-cultural  
8 comparison between German and Japanese families). Additionally, there is emerging evidence  
9 that children's environmental attitudes and environmentally friendly behaviors increase through  
10 middle childhood and peaks around age 12 before starting to decline (Krettenauer et al., 2020; Li  
11 & Kaida, 2024; Otto et al., 2019). Capitalizing on this growing environmental concern by  
12 promoting sustainable social norms could offer some protection for waning environmental  
13 concern in adolescence (e.g., Krettenauer et al., 2020; Li & Kaida, 2024; Otto et al., 2019;  
14 Świątkowski et al., 2024). Whether this capitalization is effective across cultures is an open  
15 question, but it is worth noting that this work has been conducted in countries including Canada,  
16 China, Germany, Japan, Spain, and the United States.

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Beyond learning about new environmental norms, actively participating in them can  
allow children to be a powerful force in creating a climate-friendly future. Having more  
childhood experiences in nature is related to more negative ratings of environmentally harmful  
behaviors (e.g., Collado & Sorrel, 2019), and it is also predictive of environmentalism in  
childhood and beyond (Collado et al., 2015; Wells & Lekies, 2006). As an added benefit, there is  
evidence of success in child-to-adult intergenerational learning in this context and several others  
(Lawson et al., 2018). Specifically, children seem to be able to increase their parents' concern  
about climate change when provided with a curriculum designed to do just that (Lawson et al.,  
2019). Of course, this is not to say that children should bear the responsibility of the actions of

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3 those who came before them, but instead, that children are a powerful force in creating positive  
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5 change in their communities and for the future.  
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8 **Data Availability Statement**  
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10 Data sharing is not applicable to this article as no new data were created or analyzed.  
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