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ARTICLE

Cultivating multigenerational moral expansion: Interventions cultivate moral concern for future generations in boundless and zero-sum contexts

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Abstract

In three studies ($N = 8775$) including two pre-registered experiments and a pre-registered cross-national replication across five countries, we tested whether intergenerational appeals that emphasize our responsibility to protect future generations can expand our moral circle to include distant future people within the boundaries of moral regard. Importantly, asking participants to roleplay as a leader of a committee protecting future generations (Studies 1–2) and having them partake in a philosophical thought exercise emphasizing reduction of intergenerational harm (Studies 1–3) increased moral concern felt towards future generations. This was noted when moral expansiveness was construed as limitless (Study 1) and zero-sum (Studies 2–3). When moral concern was construed as zero-sum, moral concern attributed to ingroup members was re-allocated to future generations. Spillover effects for present entities were also noted. The present evidence illustrates that intergenerational appeals have the potential to expand our moral circle, increasing moral regard felt towards future people and potentially even shaping our moral concern expressed towards present entities.

KEYWORDS
impartiality, intergenerational concern, longtermism, moral expansiveness, moral trade-offs

> "If future generations are to remember us with more gratitude than sorrow, we must achieve more than just the miracles of technology. We must also leave them a glimpse of the world as it was created, not just as it looked when we got through with it."
>
> Lyndon B. Johnson

INTRODUCTION

Humanity continues to achieve the miracles of technology at an ever-increasing pace (Marr, 2024). But climate scientists (IPCC, 2023), ethicists (MacAskill, 2022; Ord, 2021), and politicians (Bose & Shepardson, 2023; United Nations, 2021) warn that our relentless progress may also sow the seeds of our greatest vulnerabilities. From the accelerating climate crisis and dwindling biodiversity to the existential risks posed by artificial intelligence, bioengineered pandemics, and nuclear proliferation, the choices we make today—both collectively and individually—will shape the survival and well-being of future generations (Bostrom, 2002; Moynihan, 2020). As we push the boundaries of innovation, we are faced with an urgent question: how can humanity secure a future that balances progress with responsibility, ensuring that our advancements do not jeopardize the very foundations of life on Earth? Burgeoning lines of inquiry suggest that the answer may be largely psychological.

Social psychology, which has long focused on understanding the biases that drive people to prioritize the needs and rights of those close to them over distant others often in greater need (e.g., Brewer, 1979; Sherif, 1961), is now uncovering the psychological barriers that constrain how deeply people consider the long-term impacts of their present-day decisions on future generations. This emerging research reveals that limitations in human imagination (Coleman & DeSteno, 2024; Law, Syropoulos, Coleman, et al., 2024), a lack of affinity with socially and temporally distant beneficiaries (Wade-Benzoni, 2008), uncertainty about the future (Law, Syropoulos, O'Connor, & Young, 2024) and hesitations to prioritize future well-being over present needs (Law, Syropoulos, Young, & O'Connor, 2024) collectively drive people to discount the moral worth of those to come. Moral worth, the ethical value assigned to an entity that guides how much their interests, rights and well-being are considered in moral decision-making (Crimston et al., 2016; Graham et al., 2017; Singer, 1981), has consistently been one of the most reliable predictors of prosocial behaviour towards both present and future targets (Paek et al., 2024; Syropoulos, Law, Amormino, & Young, 2024). Expanding the circle of moral regard across generational boundaries may therefore be critical to ensuring that humanity better balances the needs of society both today and tomorrow when they make decisions with potentially long-term ethical consequences (Anthis & Paez, 2021). Here, across three experiments, we harness intergenerational appeals targeting intergenerational concern to transcend the multigenerational moral boundary.

The multigenerational boundary in the expanding moral circle

The concept of the moral circle, rooted in ethical philosophy, captures the historical trend of expanding moral consideration beyond immediate social groups to encompass increasingly distant and diverse entities, including marginalized outgroups and non-human animals (Lecky, 1869; Singer, 1981). This 'moral expansiveness' framework has been adapted in psychology to explore individual differences in both the size and depth of people's moral concern – how many entities people include within their moral circles and the extent of ethical regard afforded to those entities (Crimston et al., 2016, 2018; Graham et al., 2017; Pinker, 2012; Waytz et al., 2019). Psychological research into moral expansiveness has shown that, while individual variation exists (see Rottman et al., 2021), people tend to place close family and friends at the centre of their moral circles, with moral concern diminishing as entities become more distant, progressing from acquaintances to outgroups, and further outward to animals and nature. Some entities, like murders and terrorists, people tend to place outside the moral boundary all together, affording these entities no moral regard whatsoever. Recent research reveals that many people place distant future generations – the countless scores of people who will inherit the Earth we leave behind – at the outer fringes of their moral circles or, in some cases, entirely beyond the moral boundary (Law, Syropoulos, Coleman, et al., 2024). This is especially concerning, as moral valuation remains a critical driver of beneficent behaviour towards others (Boggio et al., 2023; Wilks et al., 2021, 2024) and humanity's current actions face growing scrutiny for their potential to threaten the existence and welfare of future generations (Bostrom, 2002; Greaves & MacAskill, 2019).

Though potentially troubling, the fact that the needs and rights of future generations remain a moral and perceptual blind spot is perhaps unsurprising. Humans are inherent cooperators, but the adaptive capacity to work together evolved primarily in the context of small and closely knit social groups comprising mostly kin (Curry et al., 2019; Hamilton, 1964; Trivers, 1971). As such, a range of psychological capacities, such as uncertainty aversion (Frederick, 2003; Law, Syropoulos, O'Connor, & Young, 2024), concern for moral reputation (Law, Syropoulos, Young, & O'Connor, 2024) and reluctance to delay rewards or share resources with distant others (Jones & Rachlin, 2009; Wade-Benzoni, 2008), function adaptively to promote survival and in-group cooperation in the near term but contribute to the hesitancy people exhibit in extending moral worth towards the numerous, albeit hypothetical and distant, future generations to come. Moreover, human psychology is constrained by limitations in imagination – a cognitive function crucial for supporting prosocial behaviour among closer parties (Gaesser et al., 2018; Gregory et al., 2024; O'Connor & Fowler, 2023) – that hinder our ability to vividly envision the distal future (Tamir & Mitchell, 2011).

Collectively, the growing body of research on the psychology of intergenerational beneficence highlights a multitude of barriers that impede individuals from prioritizing the welfare of future generations. Nonetheless, human social networks have become increasingly interconnected across time (Dunbar & Shultz, 2007; Foley & Gamble, 2009), and research in social psychology has made significant progress in extending the moral boundary to include socially distant outgroups, stigmatized humans and even non-human animals (Batson & Ahmad, 2009; Kirby et al., 2024; Kirkland et al., 2023; Sherif, 1961; Zaki, 2018; Zaki & Cikara, 2015). Building on this progress, we propose the field can work towards crossing the multigenerational moral boundary, as humanity's temporal impact on the world stretches farther into the future.

Expanding the multigenerational moral circle

Emerging research from U.S. samples on 'impartial intergenerational beneficence' (IIB) – the inclination to feel equal intergenerational concern for the welfare of all future generations, regardless of their temporal distance – reveals that while uncommon, this trait is exhibited by an estimated three to 20 percent of individuals (Syropoulos et al., 2025; Syropoulos, Law, Amormino, & Young, 2024). Individuals who exhibit this trait, or who score higher on the underlying individual difference variable used to measure it, 'intergenerational concern' (IC), tend to manifest attitudes and behaviours that promote long-term well-being, such as pro-environmental actions and showing support for forward-thinking public policies. These individuals also demonstrate more expansive moral circles, encompassing not only future generations but also socially distant groups in the present (Syropoulos, Law, & Young, 2024a). Encouragingly, research shows that IC can be cultivated through simple yet impactful intergenerational appeals, such as role-playing exercises that foster responsibility for future generations and thought exercises derived from longtermist philosophical teachings (see Greaves & MacAskill, 2019) emphasizing the moral consistency in caring for future people regardless of whether they are near or distant in time (Syropoulos, Law, & Young, 2024b, 2024c). This research suggests that, just as the moral circle has expanded to encompass entities across physical and social distances, it may also be extending across the generational divide. And, by employing intergenerational appeals, the moral circle could potentially expand further to include distant entities, both in the present and in the future.

The Current studies

Recent research offers preliminary evidence that the moral circle can expand intergenerationally. For instance, Paek et al. (2024) found that prompting people to reflect on their legacy (Bang et al., 2017; Wade-Benzoni et al., 2010; Zaval et al., 2015) increases moral concern for future generations. However, this work assessed concern for future generations in isolation, without contextualizing them alongside

present entities such as family, friends, or nature, which can highlight critical present–future tradeoffs that often constrain beneficence (Syropoulos et al., 2025). Furthermore, the existing research has treated moral concern as an unlimited resource, though some theoretical perspectives on moral expansion suggest it may be finite (Graham et al., 2017; Waytz et al., 2019), necessitating assessment in the context of zero-sum allocation decisions that could further constrain the moral inclusion of future generations when they are considered alongside closer entities in the present day. Other existing research (Syropoulos, Law, & Young, 2024a) has linked individual differences in intergenerational concern to the size and depth of the multigenerational moral circle but its correlational nature leaves questions of causality unanswered. Moreover, most studies in the emerging psychology of intergenerational prosociality focus on U.S. samples, leaving unexplored how efforts to extend moral regard to future generations might vary globally. Given the global effort required to address humanity's greatest challenges, understanding the psychological factors that expand and contract the multigenerational moral circle across nations is essential.

Here, across two pre-registered experiments and a cross-national replication including subjects from five countries worldwide, we begin to work towards a psychology of multigenerational moral expansion. Namely, we (1) expand moral valuation outward to include distant future generations by leveraging interventions targeting intergenerational concern (IC) through philosophical appeals and imaginative roleplaying exercises that emphasize future-oriented efficacy and responsibility, (2) advance beyond prior correlational studies to demonstrate causality between heightened IC and more expansive moral circles, (3) test the effectiveness of interventions in boosting moral worth in both positive-sum and zero-sum tradeoff contexts and (4) replicate our findings with participants from every habitable continent, highlighting the global viability of multigenerational moral expansion. By addressing these gaps, our research provides a roadmap for fostering moral concern that transcends both intergenerational and present-day social boundaries, ensuring humanity's ethical responsibilities are met not just for today, but for the generations yet to come.

Importantly, in the present research, we treat IC as the mediator and moral concern as the outcome. This decision is grounded in both preliminary – albeit correlational – evidence and theoretical discussions suggesting that intergenerational concern is not merely a reflection of broader moral expansiveness but a key psychological mechanism that enables its extension across time (Law, Syropoulos, Coleman, et al., 2024; Syropoulos et al., 2025; Syropoulos, Law, & Young, 2024a). Dominant frameworks of moral circle expansion contend that moral concern has historically expanded outward from close others to distant groups and eventually to non-human entities within the natural environment (Crimston et al., 2016; Singer, 1981). Emerging evidence suggests that this expansion also occurs across temporal boundaries, extending moral consideration to future generations (Law, Syropoulos, Coleman, et al., 2024). As such, the moral circle framework captures this progression, accounting for both the breadth and depth of people's concern for and obligation towards entities beyond the self, spanning social and temporal distances – from close to distant, human to non-human and present to future.

Intergenerational concern, however, is distinct from general moral expansiveness in both its psychological composition and scope. While it applies specifically to future generations, it integrates both a recognition of their moral worth and a sense of efficacy – the belief that one's actions can meaningfully shape their well-being (Syropoulos et al., 2025). Without this efficacy component, individuals may be less inclined to extend moral concern forward in time, particularly when future needs are weighed against present concerns. However, if people first come to recognize that their actions directly impact future generations, they may be more inclined to include future individuals within their moral regard, even when considering obligations to present-day entities. Thus, we test whether increasing IC through interventions designed to cultivate intergenerational efficacy and responsibility influences the extent to which future generations are incorporated within one's moral circle alongside a range of entities spanning a range of social distances in the present. By targeting IC as a precursor to moral expansion across time, we aim to provide empirical support for its role as a psychological bridge that connects present-day moral reasoning with long-term ethical obligations.

All materials relevant to each of the three studies are available on the Open Science Framework, HTTPS://OSF.IO/WXNBD/?VIEW_ONLY=98478AEDD1B845BCA7E39499C04E9C69.

STUDY 1

Our first study advances prior correlational research linking intergenerational concern to moral valuation for future generations (Syropoulos, Law, & Young, 2024a) by allowing for causal inference through an experimental approach to manipulating intergenerational concern. Moreover, we build on existing intervention efforts towards multigenerational moral expansion (see Paek et al., 2024) by employing a more nuanced measure of valuation within the moral circle. Namely, our measurement approach allows participants to evaluate entities from the distant future alongside present-day entities across varying degrees of social closeness. This design provides a more conservative and calibrated test of the *relative* moral standing of future generations compared to earlier studies, which exclusively focused on future generations as outcomes (Paek et al., 2024).

Specifically, we implemented two interventions based on prior psychological research on impartial intergenerational beneficence. We hypothesized that participants randomly assigned to these interventions would report significantly greater (H1) intergenerational concern, as measured by the Impartial Intergenerational Beneficence Inventory, and (H2) moral concern for future generations, as measured by a version of the Moral Expansiveness Scale adapted to include intergenerational targets alongside a host of targets in the present day (Syropoulos, Law, & Young, 2024a). Furthermore, given evidence for H1 and H2, we hypothesized (H3) that intergenerational concern would mediate an indirect effect of condition on moral expansiveness through increased longtermism beliefs. Although our primary focus was on the impact of interventions on moral concern for future generations, existing research suggests that concern for present and future societal needs is not in competition but positively associated, as concern across different dimensions of psychological distance – whether spatial, social, or temporal – may rely on a shared social-cognitive architecture (Syropoulos et al., 2025; Syropoulos, Law, & Young, 2024a; Wade-Benzoni & Tost, 2009). Thus, as an exploratory question, we also considered whether increasing concern for future generations within the moral circle might have spillover effects, enhancing concern for socially distant targets in the present as well. All aspects of the study were preregistered: https://aspredicted.org/1SM_5RZ.

Methods

Participants

A total of 1600 participants were recruited via Prolific. An a priori power analysis for independent samples *t*-tests (i.e., two-tailed tests to compare each intervention condition to the control condition) targeting a small effect size ($d = 0.20$) with 90% power and an alpha level of 0.05 indicated that 530 participants per experimental condition were required, yielding a total target sample size of $N = 1600$. After applying exclusion criteria (i.e., the removal of participants with duplicate IP addresses), 1582 participants remained. Demographic details for all studies are provided in Table 1.

Procedure

We included two previously validated intervention procedures designed to cultivate intergenerational concern by engaging participants in different yet complementary ways (see Syropoulos, Law, & Young, 2024c). Both interventions emphasize the philosophical principles of longtermism, which serve as the theoretical foundation for the construct of intergenerational concern and the broader framework

TABLE 1 Demographic information for all studies.

Parameter	Study 1	Study 2	Study 3
N_{total}	1582	1588	5605
N_{male}	774	788	2401
N_{female}	773	772	3119
N_{White}	1100	1027	—
N_{Black}	273	259	—
N_{Asian}	148	236	—
$N_{Democrat}$	800	787	—
$N_{Republican}$	305	331	—
$N_{Independent}$	441	427	—
M_{age}	41.63	43.14	34.16
SD_{age}	13.67	13.23	11.85
Countries	USA	USA	Argentina ($n = 521$), Australia ($n = 1373$) Philippines ($n = 1028$), South Africa ($n = 1320$) United Kingdom ($n = 1363$)
Pre-registered	Yes	Yes	Yes

Note: '—' Indicates that the question was not asked in the survey.

of impartial intergenerational beneficence (Syropoulos et al., 2025). While they differ in their approach, both interventions are intended to heighten participants' sense of efficacy, the belief that their actions can meaningfully impact future generations, and responsibility, the moral imperative to do so. Specifically, the Harm Reduction Thought Experiment (HRTE) condition prompts individuals to consider the moral consistency of preventing harm across time, while the Future Generations Committee (FGC) condition immerses participants in a leadership role where they must formulate structural solutions to safeguard future generations. By including both, we aimed to assess whether different framings around a philosophical appeal to intergenerational concern, one emphasizing harm prevention and the other institutional action, converge in promoting concern for future generations, and ultimately, where within the moral circle people place long-term future targets, even when considering their concern for future generations alongside their concern for present-day alternatives already in need today.

Baseline (control) condition

Participants were randomly assigned to one of three conditions. In the baseline/control condition ($N = 578$), no information was displayed to participants, and they only completed the outcome measurements.

Harm reduction thought experiment condition

In the Harm Reduction Thought Experiment condition (HRTE, $N = 566$), participants engaged in a thought exercise adapted from MacAskill's (2022) *What We Owe The Future*, which outlines the philosophical tenets of the 'longtermism' ethical philosophy. Participants began the exercise by imagining themselves hiking in a forest. During the hike, they were instructed to imagine that their water bottle fell and shattered, scattering shards across the path. Shortly after, they were told to imagine they then heard the sound of a child approaching and realized the child would walk along the same path littered with the broken shards. Participants were then asked: 'Would you pick up the shards?' (Yes/No). Regardless of their response, they were then prompted to explain their reasoning. The scenario continued with this reflection: 'When deciding whether to clean up the shards, does it matter when the child will cut herself? Should it make a difference whether it happens in a week, a decade, or a century from now? No. Harm is harm, whenever it occurs.'

Next, participants were introduced to the core principles of longtermism:

1. 'Future people, no matter when they live in the future, matter. Their lives have just as much value as our lives today.'
2. 'An untold number of people will live after us. We have to think beyond the immediate or short-term consequences of our actions and consider how those actions might affect future generations.'
3. 'We, the present generation, can make the lives of future people better. It is our moral responsibility to ensure that we do our best to protect future people who have no voice today.'

Finally, participants were invited to reflect on these principles by writing a brief essay in response to the following prompt: "In the space below, please take 2–3 min to reflect on what you just read. Specifically, please write what you think you can do today to help ensure a better future for those who will come after you."

This intervention is designed to cultivate intergenerational concern by prompting participants to recognize the moral relevance of future individuals and their own capacity to positively impact them (see Syropoulos, Law, & Young, 2024c). By framing harm prevention as equally important regardless of when it occurs, the exercise encourages participants to extend their concern for others beyond the present. The subsequent introduction to longtermist principles further reinforces this by highlighting the vast number of future lives that can be affected by present actions. Finally, the reflection task fosters both a sense of efficacy, by prompting participants to consider how their actions can meaningfully shape the future, and a sense of responsibility to do so.

Future generations committee condition

In the Future Generations Committee (FGC, $N = 439$) condition, participants were informed about a newly passed bipartisan law called 'The Well-being of Future Generations Act.' They were provided with the following description: 'It requires state and federal governing bodies in the United States to think about the long-term impact of their decisions, to work better with people, communities and organizations to achieve this outcome with the ultimate goal of preventing persistent problems from harming the quality of lives of future generations.' The specific goals of the act were then outlined. Participants were instructed to imagine themselves as the head of a committee established under this act, called the 'Future Generations Committee.' They were presented with the same three longtermism principles as those in the HRTE condition and tasked with writing a brief speech reflecting on these principles and the committee's goals.

Unexpectedly, despite the random assignment to conditions, only 28% of participants were allocated to the FGC condition, compared to 36% each in the Baseline and HRTE conditions. This uneven distribution suggests that the FGC task may have been more cognitively demanding, potentially contributing to a higher dropout rate.

This intervention is designed to cultivate intergenerational concern by immersing participants in a leadership role where they must articulate a vision for safeguarding future generations (see Syropoulos, Law, & Young, 2024c). By positioning them as decision-makers responsible for shaping long-term policies, the exercise reinforces both a sense of efficacy by prompting them to consider how institutional actions can meaningfully impact the future and a sense of responsibility to advocate for future generations. The speech-writing task further solidifies these effects by requiring participants to actively engage with longtermist principles, translating abstract commitments into concrete plans for future-oriented action.

Measures

Intergenerational concern

Regardless of condition participants then completed the following measures in a fixed order. First, they completed the Impartial Intergenerational Beneficence Inventory (IIBI; Syropoulos et al., 2025). This measure consisted of 28 items (e.g., 'It is important that we reduce existential and extinction risks to humanity and promote sustainable development goals to ensure the long-term

TABLE 2 One-way ANOVAs for the primary (intergenerational concern and MES for future generations) and exploratory (MES to human outgroups, nature, ingroup) outcomes in Study 1.

Outcome	One-way ANOVA
Intergenerational concern	$F(2, 1580) = 19.72$, $p < .001$, $\eta_p^2 = .024$
MES future generations	$F(2, 1576) = 10.92$, $p < .001$, $\eta_p^2 = .014$
MES human outgroups	$F(2, 1573) = 6.11$, $p = .002$, $\eta_p^2 = .008$
MES nature	$F(2, 1572) = 1.50$, $p = .223$, $\eta_p^2 = .002$
MES ingroup	$F(2, 1570) = 0.97$, $p = .379$, $\eta_p^2 = .001$

survival of future generations'; $\alpha = 0.98$), presented as seven statements repeated across four different timeframes: 1000 years, 10,000 years, 100,000 years and 1000,000 years into the future. Future-oriented terminology within each statement was bolded, and participants were instructed to respond to all statements four times – once for each timeframe – on the same survey page. To ensure meaningful responses for the more temporally distant timeframes, participants were asked to assume that humanity would survive that long. Previous work validating this scale has demonstrated that participants' scores for more temporally distant timeframes tend to be significantly lower than those for closer timeframes. The average score across all timeframes was calculated to capture intergenerational concern.

Moral expansiveness

Moral expansiveness was measured with the Moral Expansiveness Scale (MES; Crimston et al., 2016). Individuals were given a brief description of the concept of moral circles and were then asked to group different entities into one of four circles or boundaries of moral regard, each being associated with a score corresponding to the level of moral worth they ascribed to the given entity: outside the moral boundary (= 0), fringes of moral concern (= 1), outer circle of moral concern (= 2) and inner circle of moral concern (= 3).

A total of 30 entities were shown. Our primary outcome concerned the items focused on future generations. The four items for future people were phrased as follows: 'a person living 100/1000/10,000/100,000 years from now' ($a = 0.90$). From the remaining 26 entities, 3 focused on ingroup and family ($a = 0.74$), 3 on technology/AI ($a = 0.85$), 10 on nature and animals ($a = 0.95$) and 10 on outgroup members/marginalized groups ($a = 0.92$).

Results

One-way ANOVAs were conducted to evaluate differences between the three conditions.[1] These are reported in Table 2. Planned comparisons evaluating differences between each intervention condition and the control were subsequently estimated with independent samples *t*-tests.

Treatment effects on intergenerational concern

Both the FGC ($t(1015) = 3.52$, $p < .001$, $d = 0.22$) and the HRTE ($t(1142) = 6.16$, $p < .001$, $d = 0.36$) conditions significantly increased intergenerational concern compared to the baseline condition (see Figure 1).

[1]These tests were not pre-registered and were conducted because of feedback received during the revision process.

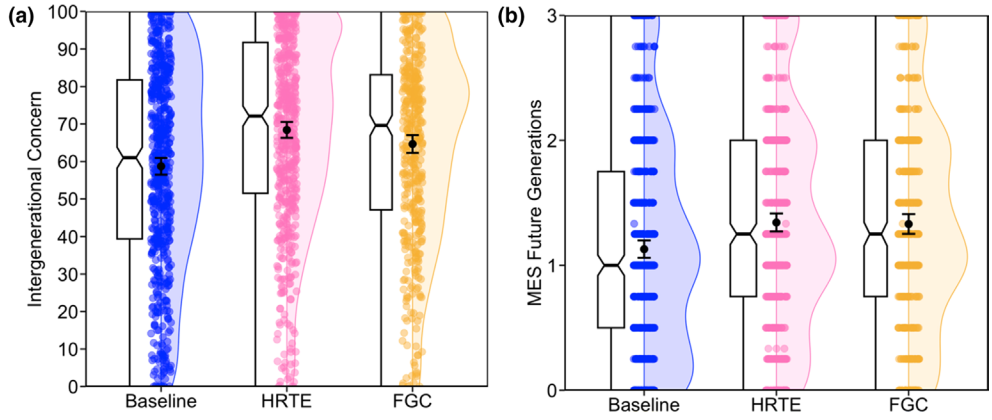

FIGURE 1 Treatment effects on intergenerational concern and positive-sum moral concern for future generations. Raincloud plots displaying effects of the two interventions, relative to the baseline control condition, on intergenerational concern on the IIBI (a), and moral concern for future generations on the adapted positive-sum MES (b). Moral concern in Study 1 was conceptualized as an unlimited resource. FGC, Future Generations Committee; HRTE, Harm Reduction Thought-Experiment.

Both effects remained statistically significant after controlling for age, political ideology, subjective socioeconomic status and religiosity. See Table S1 for the detailed results.

Treatment effects on moral expansiveness to future generations

Both the FGC ($t(1015) = 3.76$, $p < .001$, $d = 0.24$) and the HRTE ($t(1138) = 4.19$, $p < .001$, $d = 0.25$) conditions significantly increased moral expansiveness to future generations compared to the baseline condition (see Figure 1). Both effects remained statistically significant after controlling for age, political ideology, subjective socioeconomic status and religiosity (see Table S1). Interestingly, an exploratory analysis noted a significant effect of the FGC condition for moral expansiveness to outgroups ($t(1013) = 3.37$, $p < .001$, $d = 0.21$), with participants in the FGC condition ($M = 1.93$, SD = 0.64) reporting greater moral expansiveness to outgroups than participants in the baseline control condition ($M = 1.79$, SD = 0.66).

Indirect effects via increased intergenerational concern

An indirect effect test using the Process Macro (Hayes, 2013), Model 4, with 10,000 bootstrapped samples suggested that a significant indirect effect of condition (0 = Control, 1 = Treatment) on moral expansiveness to future generations via increased intergenerational concern was found for both the FGC ($b = 0.09$, 95% CI [0.04, 0.14], Outcome $R^2 = 0.22$) and the HRTE ($b = 0.16$, 95% CI [0.10, 0.21], Outcome $R^2 = 0.27$) conditions. The indirect effects remained statistically significant after controlling for age and political ideology (see Table S2).

Discussion

Our first study replicates and causally expands on prior correlational evidence (Law, Syropoulos, Coleman, et al., 2024; Syropoulos, Law, & Young, 2024a), illustrating that appeals to the longtermist philosophy can meaningfully increase moral expansiveness to future generations by way of intergenerational concern, even when the moral standing of numerous present-day entities is made salient.

Furthermore, in contrast to prior intervention efforts to cultivate multigenerational moral expansion (Paek et al., 2024), where moral valuation to future generations was measured in isolation, Study 1 demonstrated the efficacy of intergenerational appeals in a manner that more closely mirrors real-world intergenerational decision-making contexts, where efforts to safeguard the future must be weighed against the needs of present society. Intriguingly, the FGC condition demonstrated a notable spillover effect, significantly increasing moral expansiveness not only to future targets but to present-day outgroups as well. This aligns with arguments that broadening the moral circle to include specific entities can foster a wider expansion of moral concern towards other entities as a consequence (e.g., Pinker, 2012). Moreover, in contrast to prominent arguments levied against efforts to prioritize safeguarding the future (Crary, 2023), it suggests that appeals to expand moral circles to include the targets of tomorrow need not come at the expense of moral concern for the targets of today.

STUDY 2

Study 1 illustrated that manipulating intergenerational concern significantly increases moral expansiveness towards future generations even when the needs and rights of present and future targets must be considered simultaneously. These findings causally link intergenerational concern with the amount of moral regard afforded to future targets in the moral circle. Moreover, they demonstrate the efficacy of intergenerational appeals in fostering multigenerational moral expansion in a context more naturalistic than prior intervention research to date (Paek et al., 2024). Nonetheless, Study 1 does little to inform our understanding of potential trade-offs in moral concern that may more accurately reflect how people approach intergenerational decision-making in the real world.

Namely, some theoretical conceptualizations of moral expansiveness contend that moral concern, like time and money, is a limited resource (Graham et al., 2017; Waytz et al., 2019). Even if moral concern is unlimited, real-world decisions to prioritize the future are bound to require a degree of sacrifice in the present (Wade-Benzoni & Tost, 2009) – be it measurable by time invested demanding legislative action, money donated to future-oriented causes, or resource consumption forgone for the sake of intergenerational stewardship. If we were to conceptualize moral concern as a limited and finite resource, such that expressing moral regard for the rights and welfare of a given entity reduces the moral regard left to allocate towards others, do we observe similar results? Our second study tested this question, evaluating support for the same hypotheses tested in Study 1, this time in a context where moral concern is constrained as a zero-sum resource. All aspects of this study were pre-registered, https://aspredicted.org/49P_SZW.

Methods

Participants

A total of 1600 participants were recruited via Prolific. An a priori power analysis for independent samples t-tests (i.e., two-tailed tests to compare each intervention condition to the control condition) targeting a small effect size ($d = 0.20$) with 90% power and an alpha level of 0.05 indicated that 530 participants per experimental condition were required, yielding a total target sample size of $N = 1600$. After applying exclusion criteria (i.e., the removal of participants with duplicate IP addresses), 1588 participants remained.

Materials and procedure

Participants were randomly assigned to one of three conditions: (1) the Baseline/Control condition ($N = 601$), (2) the Harm Reduction Thought Experiment condition (HRTE, $N = 570$), or (3)

TABLE 3 One-way ANOVAs for the primary (intergenerational concern and MES for future generations) and exploratory (MES to human outgroups, nature, ingroup) outcomes in Study 2.

Outcome	One-way ANOVA
Intergenerational Concern	$F(2, 1585) = 12.03, p < .001, \eta_p^2 = .015$
MES Future Generations	$F(2, 1585) = 6.58, p = .001, \eta_p^2 = .008$
MES Human Outgroups	$F(2, 1585) = 0.24, p = .789, \eta_p^2 < .001$
MES Nature	$F(2, 1585) = 2.22, p = .109, \eta_p^2 = .003$
MES Ingroup	$F(2, 1585) = 5.20, p = .005, \eta_p^2 = .007$

the Future Generations Committee condition (FGC, $N = 417$). These conditions were identical to Study 1. As in Study 1, despite the random assignment to conditions, only 26% of participants were allocated to the FGC condition, compared to 38% and 36% each in the Baseline and HRTE conditions respectively, suggesting greater attrition, potentially due to fatigue, among participants in the FGC condition.

Following the intervention, regardless of condition, participants completed the remaining measures in a fixed order. First, they completed the IIBI ($a = 0.98$), which was identical to Study 1. Participants then completed an adapted version of the zero-sum moral expansiveness task used by Waytz et al. (2019), where they allocated 100 'moral concern points' to various entities. The entities were grouped as follows and points were summed within each category: ingroup (your immediate family, your extended family, your closest friends, your acquaintances); outgroup (strangers/people you never met, people in need); nature (all mammals, all other animals, plants and trees); and future generations (future generations less than 100 years in the future and future generations living more than 100 years in the future). A control item (non-living things in the universe, e.g., a rock) was included but not analysed.

Results

One-way ANOVAs were conducted to evaluate differences between the three conditions.[2] These are reported in Table 3. Planned comparisons evaluating differences between each intervention condition and the control were subsequently estimated with independent samples *t*-tests.

Treatment effects on intergenerational concern

Both the FGC ($t(1016) = 2.60, p = .009, d = 0.17$) and the HRTE ($t(1169) = 4.88, p < .001, d = 0.28$) conditions significantly increased intergenerational concern compared to the baseline condition (see Figure 2). Both effects remained statistically significant after controlling for age, political ideology, subjective socioeconomic status and religiosity (see Table S5).

Treatment effects on trade-offs in the moral circle

Both the FGC ($t(703.23) = -3.42, p < .001, d = 0.22$) and the HRTE ($t(1015.8) = 2.81, p = .005, d = 0.16$) conditions significantly increased moral expansiveness to future generations compared to the baseline

[2]These tests were not pre-registered and were conducted because of feedback received during the revision process.

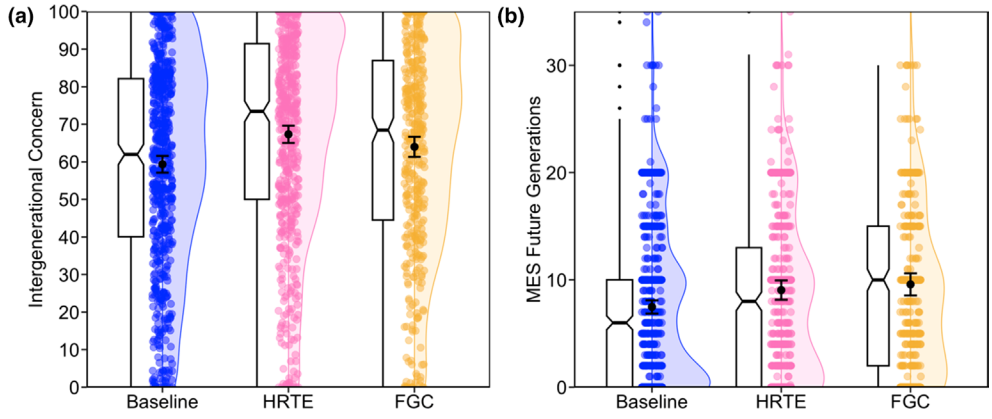

FIGURE 2 Treatment effects on intergenerational concern and zero-sum moral concern for future generations. Raincloud plots displaying effects of the two interventions, relative to the baseline control condition, on intergenerational concern on the IIBI (a), and moral concern for future generations on the adapted, zero-sum MES (b). The y-axis for panel (b) has been truncated for readability. Moral concern in Study 2 was conceptualized as a limited resource. FGC, Future Generations Committee; HRTE, Harm Reduction Thought-Experiment.

TABLE 4 Means and standard deviations for each condition.

	MES ingroup		MES outgroups		MES nature	
Condition	***M***	**SD**	***M***	**SD**	***M***	**SD**
Baseline	65.88	22.20	10.74	9.69	14.57	13.48
FGC	61.35	23.15	11.09	9.28	16.35	15.19
HRTE	62.80	24.27	10.69	9.59	15.77	13.59

condition (see Figure 2). Crucially, in both the FGC ($t(1016) = -3.15$, $p = .002$, $d = -0.20$) and the HRTE ($t(1145.9) = -2.27$, $p = .024$, $d = -0.13$) conditions, moral expansiveness to one's ingroup was significantly decreased (see Table 4). All aforementioned effects remained statistically significant after controlling for age, political ideology, subjective socioeconomic status and religiosity, except for the effect on moral expansiveness to the ingroup for the HRTE condition, which was rendered non-significant ($p = 053$). See Table S5 for the detailed results.

No significant effect of either condition was noted for moral expansiveness towards nature (FGC: $t(824.54) = 1.93$, $p = .054$; HRTE: $t(1169) = 1.52$, $p = .129$) or outgroups (FGC: $t(1016) = 0.58$, $p = .563$; HRTE: $t(1169) = -0.08$, $p = .937$), suggesting that intergenerational appeals may inspire people to allocate concern towards future generations that they otherwise would have allocated towards ingroups (see Table 2).

Indirect effects via increased intergenerational concern

An indirect effect test using the Process Macro (Hayes, 2013), Model 4, with 10,000 bootstrapped samples suggested that a significant indirect effect of condition (0 = Control, 1 = Treatment) on moral expansiveness to future generations via increased intergenerational concern was found for both the FGC ($b = 0.36$, 95% CI [0.09, 0.66]) and the HRTE ($b = 0.68$, 95% CI [0.40, 0.99]) conditions. For both conditions, the effects of condition and intergenerational concern explained 7% of the variance in moral expansiveness to future generations. The indirect effects remained statistically significant after controlling for age, political ideology, subjective socioeconomic status and religiosity. See Table S6 for the detailed results.

Discussion

Results from our second study demonstrate that, even when moral concern is conceptualized as a limited rather than a boundless resource, thereby forcing individuals to engage in moral trade-offs, intergenerational appeals increase the depth of moral concern individuals ascribe to future generations both directly and indirectly – via increased intergenerational concern. Notably, the boost in moral concern ascribed to future generations that results from the intergenerational appeals reduces the amount of moral concern ascribed to ingroups, but not to outgroups and nature. This pattern may reflect a shift in perceived obligation: at baseline, people feel a strong duty towards their ingroups (Law et al., 2022; McManus et al., 2020), but intergenerational appeals may prompt them to redirect this obligation towards targets perceived as more vulnerable, like future generations. At the same time, people may be reluctant to take points away from outgroups and nature, as these groups, like future generations, are already seen as morally deserving and in greater need of protection compared to the stability and security of ingroups.

STUDY 3

Study 3 was a replication of Study 2 across five countries. In addition to testing the same hypotheses as Studies 1 and 2, we also hypothesized that increases in moral concern for future generations due to the interventions would be accompanied by decreases in moral concern for ingroups. All aspects of the study were pre-registered, https://aspredicted.org/CSD_PDW. Deviations from the pre-registration are noted in the Methods for sampling procedures and in the Results for analytical decisions.

Methods

Participants

We pre-registered that we would recruit a sample of 1400 participants per country from the Philippines, South Africa and Argentina on Besample (https://researcher.besample.app/countries/), a company that allows respondents from countries across the world to participate in survey research. We also pre-registered that we would recruit a sample size of 1400 participants per country from Australia and the UK on Prolific. We elected to include one country each from the continents of Africa, Asia, Australia, Europe and South America, selecting the countries with the highest English literacy rates as indicated by their average score on the English Proficiency Index. This sample was based on an a-priori power analysis targeting a small effect size ($d = 0.15$) and power of 0.80 for a two-tailed independent-samples t-test with an alpha level of 0.05. Power analysis indicated 699 participants per condition (total $N = 1398$ per country).

After removing participants with duplicate IP addresses and participants who failed an English literacy check (for the non-English speaking countries), a total of 5602 participants remained. Notably, while final sample sizes for three out of five countries came close to the $N = 1400$ goal, sample sizes for Argentina and the Philippines fell short. Considering that Besample is a relatively new crowdsourcing platform, we believe that the desired sample size for these two countries was not attainable given the constrained breadth of the subject pool. We opted to terminate data collection after 5 months, driven by the observation that participation slowed to fewer than 1 participant per day by this point. Thus, this difference in the required sample size reflects a deviation from our pre-registration.

Materials and procedure

Participants were randomly assigned to one of two conditions. In the baseline/control condition ($N = 2902$, 52%), no information was displayed to participants, who only completed the measures of

TABLE 5 Measurement invariance tests for all variables included in the study.

Test for IIBI	SRMR	Δ SRMR	CFI	Δ CFI	McDonald's NCI	Δ McDonald's NCI	Indicators supported
Configural invariance	0.01	–	0.99	–	0.99	–	–
Metric invariance	0.10	0.09	0.98	0.01	0.96	0.03	1/3
Scalar invariance	0.23	0.13	0.97	0.01	0.93	0.03	1/3

the study. The Harm Reduction Thought Experiment condition (HRTE, $N = 2703$, 48%) was identical to Study 1. The Future Generations Committee condition was removed to accommodate the increased costs of running the study across multiple countries. Regardless of condition, participants then completed the following measures in a fixed order: the IIBI ($a = 0.94$; identical to Studies 1 and 2), the zero-sum measure of moral expansiveness (identical to Study 2).

Results

Measurement Invariance for the Impartial Intergenerational Beneficence Inventory

We first evaluated whether the IIBI reached measurement invariance between the countries in our investigation by conducting multi-group confirmatory factor analyses (CFAs) in SAS version 9.4. First, we conducted tests for configural invariance by specifying a fully unconstrained model in which factor loadings and intercepts were freely estimated. We then tested for metric invariance by specifying a partially constrained model in which factor loadings were fixed to be equal, but intercepts were freely estimated. Finally, we tested for scalar invariance by specifying a fully constrained model in which factor loadings and intercepts were fixed to be equal. Although changes in the Chi-Square statistic are often used to evaluate tests of measurement invariance, given its sensitivity to sample size (Chen, 2007; Kang et al., 2016), we opted to rely on fit indexes to evaluate measurement invariance instead, adhering to the recommendations made by Chen (2007). Chen (2007) suggests that for unequal sample sizes between groups, changes of ≤ 0.025 in Standardized Root Mean Square (SRMR) and of ≤ 0.010 in Comparative Fit Index (CFI) indicate invariance. We also followed recommendations by Kang et al. (2016), who suggest that changes of ≤ -0.010 in McDonald's Non-Centrality Index (NCI) indicate invariance.

Our results indicated evidence for configural invariance, as the scale had good model fit (see Table 5). Nonetheless, only partial evidence was observed for metric and scalar invariance, as only differences in the CFI were within the established and acceptable threshold. NCIs were close to the acceptable threshold, though changes in SRMR were far beyond it. Thus, we conclude that there is partial evidence for measurement invariance, though we do not have full confidence that the IIBI is construed identically across countries.

Treatment effects on intergenerational concern

All effects described below were robust to demographic controls (see Tables S8 and S9). We deviated from our pre-registration and conducted mixed regression models with participants nested in countries, estimating random intercepts that allowed for random variation in the outcome across countries. We considered this test to be more parsimonious and less repetitive. The treatment condition significantly increased intergenerational concern by 6 points ($b = 5.97$, 95% CI [4.87, 7.07], $p < .001$,

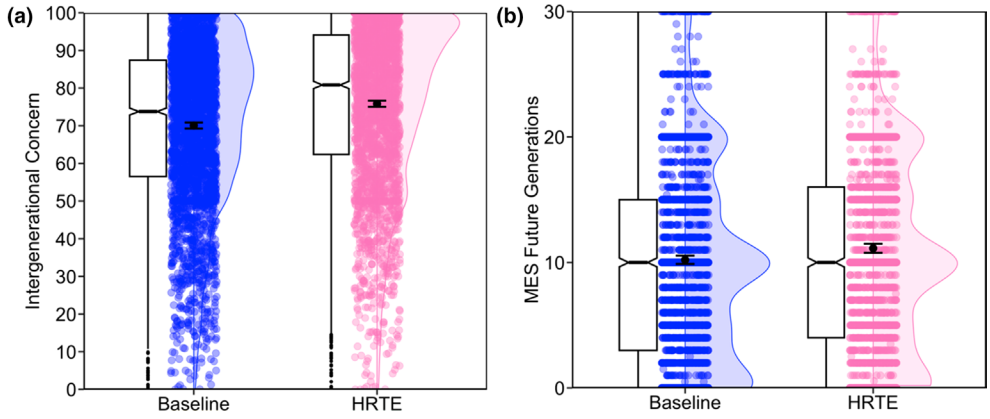

FIGURE 3 Treatment effects on intergenerational concern and zero-sum moral concern for future generations. Raincloud plots displaying effects of the intervention, relative to the baseline control condition, on intergenerational concern on the IIBI (a) and moral concern for future generations on the adapted, zero-sum MES (b). The *y*-axis for panel (b) has been truncated for readability. Moral concern in Study 3 was conceptualized as a limited resource. HRTE, Harm Reduction Thought-Experiment.

$d = 0.28$) compared to the control condition, which had an average score around 70 ($b = 70.37$, 95% CI [63.75, 76.98], $p < .001$; see Figure 3). Effects for each country were highly consistent (see Table S10).[3]

Effects of treatment on moral trade-offs in moral expansiveness

A similar mixed regression model was estimated for the measure of zero-sum moral concern allocated to future generations. Tests for effects on moral concern to future generations for each country are presented in the SOM (see Table S11), with significant effects emerging in 3 out of 5 countries. The treatment condition significantly increased moral concern allocated to future generations, albeit this effect was small in magnitude ($b = 1.00$, 95% CI [0.52, 1.47], $p < .001$, $d = 0.11$), compared to the control condition, which had an average score around 10 ($b = 10.21$, 95% CI [8.86, 9.20], $p < .001$; see Figure 3).

Additional exploratory analyses illustrated that this small increase in the allocated moral points to future generations was accompanied by a diminished allocation of moral points to ingroups ($b = -1.88$, 95% CI [−2.99, −0.79], $p < .001$, $d = 0.09$) but not to nature, which had a very small positive effect ($b = 0.81$, 95% CI [0.13, 1.48], $p = .019$, $d = 0.06$) nor outgroups, for which no significant difference was noted ($b = -0.09$, 95% CI [−0.58, 0.40], $p = .727$), replicating the pattern of results noted in Study 2.

Indirect effects via increased intergenerational concern

In line with our decision to run a mixed regression model, we also opted to run a mixed mediation model to evaluate whether increased intergenerational concern was the psychological mechanism (i.e., mediator) through which moral concern for future generations was increased. We estimated a 1-1-1 mixed regression mediation model with random intercepts for the mediator (intergenerational concern) and outcome (moral concern). We estimated this model in Mplus 8, using the Bayesian Estimator, which is the recommended practice for these models. Credible Intervals are thus produced instead of an associated p value. If the credible intervals do not include zero, we consider the effect meaningful,

[3]The only exception was Argentina, which was underpowered for our expected effect size, for which a near-significant effect was noted.

and the associated hypothesis to be supported. The treatment increased intergenerational concern ($b = 5.98$, 95% CI [4.85, 6.92]) and moral concern for future generations, even after controlling for intergenerational concern ($b = 0.74$, 95% CI [0.23, 1.09]). Intergenerational concern also predicted increased moral concern for future generations ($b = 0.06$, 95% CI [0.05, 0.07]). A significant indirect effect (treatment→intergenerational concern→moral concern) was noted ($b = 0.38$, 95% CI [0.29, 0.46]). Indirect effect tests for each country are provided in the SOM (see Table S12).

GENERAL DISCUSSION

As humanity continues to balance progress with intergenerational responsibility, the survival and well-being of future generations could depend on expanding our circle of moral regard across generational divides (Anthis & Paez, 2021). Across three experiments comprising subjects from all six habitable continents ($N = 8775$), we harness appeals targeting intergenerational concern to expand the multigenerational moral boundary. Our findings show that two interventions, one asking participants to role-play as leaders of a governmental committee representing future generations and another engaging them in a longtermist philosophical exercise emphasizing present responsibilities to reduce intergenerational harm, independently lead to greater prioritization of the rights and needs of future generations within their moral circles.

Broader implications and future directions

Prior research has identified widespread tendencies to devalue the rights and needs of future generations within the circle of moral regard (Law, Syropoulos, Coleman, et al., 2024; Wade-Benzoni, 2008; Wade-Benzoni & Tost, 2009). The present findings suggest these tendencies are not fixed. Instead, much like prior efforts in social psychology to expand the moral boundary outward to include socially distant present-day targets (Crimston et al., 2018; Kirby et al., 2024; Reed & Aquino, 2003), the multigenerational moral boundary is subject to expansion by way of brief and low-cost interventions. An exciting direction for future research is to explore whether intergenerational appeals lead to lasting changes in multigenerational moral expansion or influence concrete behaviours, such as increased monetary investments in future-oriented causes or support for future-focused legislation. Longitudinal studies could also provide valuable insights into whether the moral boundary progressively expands over time to include those yet to come, aligning with the philosophical perspective that humanity's moral circle has historically widened – from family to tribe, nation and eventually all sentient beings – and could continue to expand to encompass those who do not yet exist (Lecky, 1869; Pinker, 2012; Singer, 1981).

Importantly, building upon prior research harnessing appeals to boost multigenerational moral concern by way of inspiring legacy motivation (Paek et al., 2024), we find that intergenerational appeals are effective at increasing moral concern for future generations in contexts where future targets must be considered explicitly alongside a host of present-day targets (Studies 1–3) as well as when moral concern is conceptualized as a positive-sum (Study 1) and zero-sum (Studies 2–3) resource. These findings expand on the promise shown by existing efforts to extend the multigenerational moral boundary (Paek et al., 2024), demonstrating the efficacy of intergenerational appeals even in more naturalistic contexts where resources are limited, and when the needs of present and future society must be balanced (Law, Syropoulos, O'Connor, & Young, 2024; Syropoulos et al., 2025).

Furthermore, the interventions' effects were observed relatively analogously across nations, suggesting that multigenerational moral expansion may not be bound by cultural or national contexts and may reflect universal psychological mechanisms. Given that the challenges facing future generations, such as climate change, biodiversity loss and technological risks, are global in nature (Bostrom, 2002; IPCC, 2023; MacAskill, 2022), collective, cross-national solutions that prioritize intergenerational justice will likely be necessary to overcome them. The promise of the interventions

tested in the present investigation lies in their potential to build up a shared moral responsibility that transcends borders. Future, larger-scale cross-national research can more comprehensively explore whether these interventions can inspire tangible collaborative efforts across nations to address the vulnerabilities of future generations to guide humanity towards a more sustainable tomorrow. Additionally, such research can examine whether and to what extent the efficacy of intergenerational appeals varies across cultural dimensions, such as cultural tightness vs. looseness, collectivism vs. individualism and long-term vs. short-term orientation (Bearden et al., 2006; Hofstede, 2011; Triandis & Gelfand, 1998).

Beyond testing the intervention effects across countries, the design of Study 3 also allowed us to examine baseline differences in intergenerational concern (IC) and moral expansiveness across nations by analysing country-level variation in these outcomes within the control condition. These exploratory analyses (see Tables S13 and S15) revealed meaningful differences: IC was generally high across all countries, with particularly elevated levels in non-English-speaking nations such as the Philippines and Argentina compared to Australia and the UK. A similar pattern emerged for moral concern towards future generations, human outgroups and nature, with greater concern in non-WEIRD countries, whereas ingroup prioritization was higher in WEIRD contexts.

These differences may reflect cultural variations in interdependence and collectivism, which emphasize obligations to broader societal and intergenerational groups (Hofstede, 2011; Triandis & Gelfand, 1998). Prior research (Jaeger & Wilks, 2023) suggests that moral concern is shaped by both the characteristics of the target (i.e., the entity or beneficiary in question) and the judge (i.e., the person making the judgement). Our findings extend this framework by highlighting the influence of country-level factors, suggesting that the broader sociocultural context in which the judge is embedded may also shape how moral boundaries extend within and across generations. Future research should investigate the mechanisms underlying these differences, such as cultural orientations towards long-term thinking, communal responsibility and ingroup vs. outgroup dynamics (e.g., Atari et al., 2023; Hofstede, 2011), and explore whether these patterns hold across even more diverse national contexts.

The present research also builds upon existing inquiry into the psychology of impartial intergenerational beneficence. Prior work (Syropoulos, Law, & Young, 2024a) has established a relationship between intergenerational concern (IC), as measured by the Impartial Intergenerational Beneficence Inventory (IIBI), and moral concern for future generations, but no causal link has been tested. Our research addresses this gap by showing that IC mediates the effect of the interventions on moral concern for future generations. While conceptually related, these constructs are distinct: the IIBI measures IC in isolation and within a non-zero-sum framework, focusing exclusively on future generations, whereas the moral expansiveness measures we employ require participants to allocate concern across both future and present-day entities (including socially close individuals, socially distant groups and the natural world) at times in a zero-sum context. This distinction, which has been demonstrated in prior research validating the IIBI (Syropoulos et al., 2025), highlights how IC captures a focused sense of obligation to and efficacy to impact future generations, while multigenerational moral expansiveness reflects how future generations are prioritized relative to competing moral targets in the present. Also contributing to the growing literature on intergenerational beneficence, Study 3 serves as the first-ever test for the invariance of the IIBI across nations, providing insight into its cross-national validity. The configural invariance of the measure was supported. Nonetheless, mixed results were observed for its metric and scalar invariance, warranting additional future research to further cross-nationally validate the metric.

Perhaps among the most intriguing findings from the present investigation is that intergenerational appeals not only increase moral concern for future generations but also produce broader spillover effects, enhancing moral concern for other vulnerable groups, such as outgroups (in Study 1, where moral concern was limitless) and nature (in Studies 2 and 3, where moral concern was conceptualized as zero-sum). Relatedly, the increased concern for future generations came at the expense of ingroups, but not outgroups or nature. This pattern may reflect a shift in perceived obligation: while people typically feel a strong sense of duty towards their ingroups (Law et al., 2022; McManus

et al., 2020), intergenerational appeals may redirect this obligation towards entities perceived as more vulnerable and in need of protection, like future generations. At the same time, outgroups and nature may retain their share of moral concern because they, like future generations, are already seen as morally deserving and lacking in direct advocates. These findings further highlight the distinct psychological constructs captured by intergenerational concern (measured in isolation and non-zero-sum contexts) and moral expansiveness (which requires prioritizing future generations alongside present-day entities in zero-sum contexts). Together, our results suggest that fostering moral expansion across generational boundaries can yield wider benefits for promoting justice and care for both present and future vulnerable groups, while balancing these concerns against deeply rooted obligations to socially close others.

Limitations

Despite the numerous strengths of the present research, such as pre-registered experiments, built-in replications and cross-national samples, there are some limitations to consider. For one, the survey was conducted in English, which, while targeting countries with high English proficiency, may have influenced comprehension among non-native speakers. Additionally, while every habitable continent was represented, not all countries were, limiting the global generalizability of our findings. Moreover, the sample size for one country, Argentina, was relatively small, reducing the reliability of findings for that national context. Future research should address these limitations by including a more diverse range of countries, translating materials into native languages and ensuring robust sample sizes across all included nations.

The present research also demonstrated the effectiveness of interventions in fostering multigenerational moral expansion even in contexts where moral concern is methodologically constrained as a limited resource to reflect real-world trade-offs in allocating time and money between competing beneficiaries. While prior research has shown that these interventions can promote future-oriented behaviours, such as charitable donations to future-benefitting causes (Syropoulos, Law, & Young, 2024b), forthcoming work could explore whether they similarly inspire real-world resource allocations in trade-off contexts between present and future beneficiaries.

Another consideration is that the interventions tested in this research employed normative and obligatory language rooted in philosophical discourse on longtermism, raising the possibility that participants may have responded in a socially desirable manner or, conversely, experienced reactance if they found the language too forceful. While the observed increase in moral concern for future generations helps rule out the latter, the former remains an open question. However, prior research demonstrating that these interventions lead to real-world monetary sacrifices suggests their effects are likely robust (Law et al., 2023; Syropoulos, Law, & Young, 2024b, 2024c). Additionally, research indicating that people often view concern for future generations as morally misguided, particularly in trade-off contexts (Law, Syropoulos, Young, & O'Connor, 2024), suggests that baseline social desirability pressures may actually work against, rather than inflate, the observed effect. Nonetheless, future research should further investigate this by incorporating implicit measures of concern, behavioural outcomes that are less susceptible to demand characteristics, or linguistic framing manipulations to assess whether the effect is sensitive to variations in normative language.

Relatedly, another avenue for future research involves refining interventions to better isolate distinct psychological mechanisms underlying multigenerational moral expansion. The present interventions were designed to cultivate intergenerational concern through a shared pathway, enhancing both efficacy and responsibility through a philosophical appeal with framings that differed by condition (Syropoulos, Law, & Young, 2024c). While this allowed us to assess whether these two interventions converge in fostering intergenerational concern and, ultimately, in influencing where future generations are placed within the moral circle, it remains an open question which specific psychological features of these interventions are most responsible for driving their effects. For instance, it is possible that factors such as

concreteness (Trope & Liberman, 2010), imaginative vividness (Coleman & DeSteno, 2024), or harm-salience (Schein & Gray, 2018) differentially contribute to moral expansion by way of intergenerational concern. Future studies could develop more discrete interventions targeting these dissociable features to better understand and contrast the effectiveness between specific drivers of intergenerational concern and multigenerational moral expansiveness.

Finally, although prior theory and empirical work have emphasized that intergenerational concern likely shapes the inclusion of future generations within the moral circle rather than the reverse (Syropoulos et al., 2025; Syropoulos, Law, & Young, 2024a), we explored the reverse pathway for completeness, despite having preregistered the original direction. Notably, reversing the mediator and outcome yielded similarly significant effects (see Table S13), suggesting that the relationship may be bidirectional. While the preregistered model aligns with theoretical expectations, these exploratory results open the door to future work testing whether expanding moral concern to include a wider range of entities, such as distant others, animals, or ecosystems, could in turn cultivate greater care for future generations. Clarifying the causal direction between these constructs further may reveal novel levers for promoting sustained, long-term moral engagement.

CONCLUSION

The present research demonstrates that intergenerational appeals can successfully expand the multigenerational moral boundary, increasing moral concern for future generations while yielding spillover effects on moral regard for other vulnerable groups, such as outgroups and nature. These findings highlight the potential of simple, low-cost interventions to foster greater intergenerational justice and promote a shared moral responsibility that transcends both time and social boundaries. As humanity faces global challenges requiring collective action, these insights offer a promising roadmap for ensuring the well-being of both current and future generations.

AUTHOR CONTRIBUTIONS

Kyle Fiore Law: Conceptualization; methodology; software; validation; resources; writing – original draft; writing – review and editing; visualization; funding acquisition. **Liane Young:** Writing – review and editing; resources; funding acquisition; supervision. **Stylianos Syropoulos:** Conceptualization; methodology; software; data curation; investigation; formal analysis; supervision; visualization; project administration; resources; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

All materials relevant to each of the three studies are available on the Open Science Framework, https://osf.io/wxnbd/?view_only=98478aedd1b845bca7e39499c04e9c69.

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