A Future Beyond Ourselves:

Can Self-Oriented Prospection Bridge Responsibility for Future Generations?

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Abstract

Can contemplating one's future foster a sense of collective responsibility towards the future of humanity? Across eight high-powered studies (N_{Total} = 9570 US participants), we investigate for the first time the interplay between self-oriented prospection and responsibility for future generations, shedding light on theoretical and practical implications for ethical decision-making. In a reanalysis of existing data, five original studies, two supplemental studies, and an internal meta-analysis, we consistently observe a connection between Future Self-Continuity (FSC, i.e., the amount of overlap people perceive between their present and future selves) and Consideration of Future Consequences (CFC, i.e., thinking about how present actions impact one's own future) with increased feelings of responsibility for, perceived efficacy to impact, and identification with future generations. Furthermore, we find that people who prioritize the core tenants of the longtermism philosophy by prioritizing action benefitting future generations, additionally engage in greater self-oriented prospection. Our results contribute to discussions of tendencies to prioritize present over future generations (e.g., intergenerational discounting), offering promising insights for efforts to improve long-term collective welfare.

Keywords: consideration of future consequences, future self-continuity, responsibility, future generations, morality

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In an increasingly interconnected world facing unprecedented existential challenges that threaten humanity's future, such as climate change, pandemic disease, and artificial intelligence (AI), the imperative to safeguard the well-being of future generations is receiving considerable attention across philosophy (e.g., longtermism; Greaves & MacAskill, 2019; Ord, 2020), the social and physical sciences (Blaser, 2018; Caviola et al., 2021; Caviola et al., 2022; Law et al., 2023; Syropoulos, & Markowitz, 2021a; Syropoulos et al., 2020), and society at large (Hunter & Hewson, 2020; McLamb, 2022). However, a present-oriented bias often manifests in human morality and prosocial behavior. Critically, such prevailing bias may work against attempts to encourage present-day actions aimed at addressing threats that will mainly impact future generations. Specifically, while people generally feel responsible for the needs and well-being of the present generation, they tend to feel less responsible for the needs and well-being of future generations (Coleman & DeSteno, 2023; Hauser et al., 2014; Law et al., 2023; Syropoulos & Law et al., 2023a, 2023b; Wade-Benzoni, 2008; Wade-Benzoni et al., 2008; Wade-Benzoni, 2009; Wade-Benzoni & Tost, 2009).

As a result, a closely related avenue of investigation has yielded encouraging insights into individual differences that serve to mitigate the prevalent present-oriented biases in morality and prosociality. Notably, motivations linked to leaving a legacy (Bang et al., 2017; Grolleau et al., 2020; Syropoulos & Markowitz, 2021b; Zaval et al., 2015), expressions of gratitude toward past generations (Barnett et al., 2019; Watkins & Goodwin, 2020), and the adoption of longtermist beliefs (e.g., people's well-being is equally important regardless of when in time they're living; Law et al., 2023; Syropoulos & Law et al., 2023a, 2023b) have been found to predict future-oriented attitudes (e.g., moral concern, responsibility for future generations) and behaviors (e.g.,

generosity). This emerging body of research delving into factors that moderate the prevailing bias towards present-oriented moral thinking and behavior is beginning to illuminate potential pathways through which real-world pro-future action might be nurtured. However, it's important to note that bias in moral future-thinking still remains pronounced (Law et al., 2023), resonating with a broader tendency to overlook the interests and needs of future generations (e.g., underinvestment in pandemic prevention prior to the COVID-19 pandemic; Maani & Galea, 2020).

Similar to the general lack of care people show for future *others*, people at times show present-oriented bias towards *themselves* as well. For example, people show a pronounced tendency to favor smaller rewards in the present compared to larger rewards in the future (i.e., Delay Discounting; Rachlin & Jones, 2008; Tuen et al., 2023). Nonetheless, this tendency varies between individuals, with some people showing considerable care for their future well-being, predicting self-beneficial, future-oriented behavior. For instance, individual variation in perceptions of overlap between one's present and future self (Future Self-Continuity; FSC; Hershfield, 2011; Hershfield et al., 2009), as well as in paying consideration to the future consequences of one's present actions (Consideration of Future Consequences; CFC; Strathman et al., 1994), have both been shown to influence positive longer-term outcomes for one's future self. However, the connection between how much people care for their future selves and future others has not yet been addressed. Based on preliminary research suggesting a shared foundation between self-oriented prospection and other-oriented future responsibility, it becomes evident that exploring the interplay of individual differences such as FSC and CFC in the context of ascribing responsibility and moral valuation to future generations holds the potential to offer a more comprehensive theoretical understanding of the mechanisms that can counteract present-oriented biases in morality and prosociality. Likewise, exploring these relationships can enrich

practical insights into fostering a brighter future for humankind through informing the development of future interventions targeting these mechanisms.

Self-Oriented Prospection

Human cognition is uniquely characterized by the capacity for subjective and symbolic self-reflection, setting us apart from other species (e.g., Gallup, 1982). Our ability to envision and anticipate our future selves empowers us to guide present actions toward desired future outcomes (Polkinghorne, 1991; Sedikides et al., 2023). Central to this capacity is the phenomenon of Future Self-Continuity (FSC), encompassing the vivid imagination of one's future self and a sense of similarity with it (Hershfield, 2011; Hershfield et al., 2009). FSC varies across individuals and correlates with self-beneficial future-oriented behaviors, such as academic diligence (Blouin-Hudon & Pychyl, 2015), prudent financial decisions (Hershfield et al., 2009; Zeng & Ouyang, 2020), health-conscious behaviors like exercise (Rutchick et al., 2018) and reduced tendencies to discount the subjective value of future rewards (i.e., temporal discounting; Faralla et al., 2021). Experimental manipulations can increase FSC within individuals, which can in turn influence attitudes and behaviors, such as an aversion to committing unethical behavior (Hershfield et al., 2012). Furthermore, the development of FSC is rooted in the capacity to vividly envision one's future self, foster an identity with it, and possess a sense of efficacy over future outcomes (Blouin & Pychyl, 2017; Hershfield & Bartels, 2018; McCue et al., 2019; Molouki & Bartels, 2017).

Consideration of Future Consequences (CFC; Strathman et al., 1994), which involves foresight over the potential outcomes resulting from one’s present actions, is another aspect of self-oriented future-thinking which, like FSC, varies across individuals and forecasts a multitude of self-beneficial future-oriented behaviors and outcomes (Strathman et al., 1994). For instance, higher levels of CFC predict positive longer-term outcomes including academic success

(Joireman, 1999), health-conscious decisions like smoking cessation (Murphy & Dockray, 2018; Strathman et al., 1994), wise financial decision-making (Joireman et al., 2005), and reduced temporal discounting (Daugherty & Brase, 2010). Analogously to FSC, CFC correlates positively with the ability to vividly envision one's future self (Rebetez et al., 2016; Stephan et al., 2018) and perceived efficacy over positively impacting one's future outcomes (Azizli et al., 2015; Sirois, 2004). Indeed, FSC and CFC tend to correlate positively, although weakly, with each other, suggesting some overlap in these abilities (Sokol & Serper, 2018b).

To summarize, the self-oriented future-thinking constructs of future self-continuity (FSC; Hershfield et al., 2009) and consideration of future consequences (CFC; Strathman et al., 1994) predict an array of behaviors that promote favorable outcomes for oneself. Moreover, both align with the ability to vividly imagine one's future self and heightened efficacy in shaping one's future through present actions. However, the possibility of applying such self-oriented future-thinking phenomena, such as FSC and CFC, to the realm of others' future well-being presents a valuable avenue for further investigation.

Can Self-Oriented Prospection Garner Responsibility for Protecting Future Generations?

Future Self-Continuity (FSC) and Consideration of Future Consequences (CFC) predominantly focus on self-oriented prospection, with existing research mostly examining their impact on self-related outcomes. However, a compelling possibility arises that both constructs might influence individuals' feelings of responsibility and moral consideration for future generations. Both self-oriented prospection and the acknowledgment of responsibility for future generations inherently involve forward-thinking elements. Recent investigations indicate that the ability to vividly envision distant futures is linked to moral consideration and intentions for prosocial behavior directed towards future generations (Law et al., 2023) and distant individuals more broadly (O'Connor & Fowler, 2022). This, coupled with findings connecting FSC and CFC

to the ability to vividly imagine hypothetical futures (Molouki & Bartels, 2017; Rebetez et al., 2016; Stephan et al., 2018), suggests a potential shared foundation for considerations regarding both oneself and others in the future. Hence, FSC and CFC might correlate with heightened feelings of responsibility and moral valuation for future generations.

In addition to the points raised above, it's worth emphasizing that possessing a stable and robust sense of self-identity, an integral component of FSC (Hershfield et al., 2009), has consistently demonstrated a strong association with heightened levels of empathy and prosocial behavior directed towards others (Krol & Bartz, 2022). Moreover, FSC has been found to predict increased positive self-regard and overall life satisfaction (Sokol & Serper, 2018a), factors that have been shown to contribute to the cultivation of empathy and prosociality (Xiao et al., 2018). While explicit research on the direct link between FSC and other-oriented responsibility is currently absent, evidence connecting self-identity to empathy and prosocial behaviors underscores the likelihood of a positive association. A plausible mechanism for this association may lie in the possibility that individuals with high FSC might possess an expansive sense of identity that transcends the boundaries of self to encompass others, even those in distant contexts (e.g., remote future generations).

Notably, people typically consider their future selves similarly to strangers (Mitchell et al., 2011; Pronin & Ross, 2006; Pronin et al., 2008). However, individuals with elevated FSC display a departure from this trend, viewing their future selves as an extended continuation of their present selves (Hershfield et al., 2011). This implies that individuals with high FSC may exhibit an exceptional capacity for embracing a sense of identity across temporal expanses. Indeed, research has linked a broader sense of identity with others, such as a connection with all of humanity (see McFarland et al., 2012), to an increased moral regard for future generations (Syropoulos & Law et al., 2023b). In sum, the convergence of these findings significantly

bolsters the plausibility that FSC contributes to a heightened sense of identity with future others, which in turn may play a pivotal role in shaping individuals' moral responsibilities towards future generations.

Finally, both FSC and CFC have established connections with an individual's sense of efficacy in positively shaping their own future (e.g., Azizli et al., 2015; Sirois, 2004). Broader efficacy to impact the future has shown links to prosocial behaviors and intentions directed toward future others, including support for environmental initiatives, charitable donations, and longtermist beliefs (Bradley et al., 2020; Hornsey et al., 2021; Syropoulos & Law et al., 2023a). Notably, FSC and CFC could potentially extend beyond fostering efficacy for one's own future to fostering efficacy for positively influencing the lives of people living in the distant future. This shift in perceived efficacy might then have a cascading effect, influencing an individual's sense of responsibility to actively contribute to the well-being and protection of future generations.

The Current Research

The current research aims to systematically investigate the potential associations between Future Self-Continuity (FSC), Consideration of Future Consequences (CFC), and the responsibility (RFG) and moral value (MFG) people ascribe to future generations through a series of interrelated studies. Study 1 entails a secondary analysis examining the relationship between CFC and RFG, shedding light on whether a focus on future consequences can influence feelings of responsibility for future generations. In Study 2, both CFC and FSC are explored as predictors of both RFG and MFG, broadening the investigation's scope to encompass moral values for the distant future. Building on these findings, Study 3 employs a mediation model to scrutinize the potential mechanisms through which CFC and FSC might influence RFG and MFG, potentially uncovering underlying psychological processes that bridge self-oriented future-thinking and concern for future generations. Studies 4A and 4B experimentally manipulated

CFC, FSC and the two proposed mediators seeking to shift responsibility to future people. Study 5 examined whether longtermists (people who believe that future generations are deserving of as much as moral worth as people living today) scored higher in CFC, FSC and the two proposed mediators. These studies investigate the intricate relationships between self-oriented prospection, concern for future generations, and moral value for the future, extending knowledge in the budding domain of moral future-thinking with practical implications for efforts to protect the future of humanity.

Data files, code and surveys (for all primary analyses) can be found on the Open Science Framework (OSF) https://osf.io/xfkdq/?view_only=fc07f6a6ff024dbe9a684cf8733d0aa2.

Table 1.

Information for all studies

Study Number	Type	Sample	Pre-registered	N_{Total}	N_{woman}	M_{age}
1	Secondary analysis	MTurk	No	2244	1302	33.21
2	Correlation	CloudResearch	Yes	289	137	43.59
3	Correlation	Prolific	No	345	169	40.31
S1	Experiment	CloudResearch	Yes	432	189	41.81
S2	Experiment	Prolific	No	1260	601	41.43
4A	Experiment	Prolific	Yes	1598	758	37.13
4B	Experiment	Prolific	Yes	2674	1274	40.90
5	Cross-Sectional	Prolific	Yes	728	348	36.17

Study 1

Our first study was a secondary analysis of existing datasets obtained from published work (see Syropoulos et al., 2020; Syropoulos & Markowitz, 2021). These papers examined whether gratitude relates to responsibility for future generations (Syropoulos et al., 2020) and to consideration of future consequences (Syropoulos & Markowitz, 2021). However, our interest in the reanalysis was in determining how consideration of future consequences relates to the amount of responsibility people feel for protecting future generations. To that end we estimated a

meta-correlation coefficient using the methodology suggested by Goh and colleagues (2016). Detailed information about the specific samples can be found in either of the aforementioned papers. Below we provide a brief overview of the sample across all studies specific to this investigation.

Methods

Participants

A total of 2244 participants was aggregated across the 5 samples. Since we had direct access to these datasets, and this was a secondary analysis of published data, we opted to only remove multivariate outliers on the two measures of interests, which results in a different sample size from that of the two aforementioned investigation. Multivariate outliers were excluded based on a distance score (h) which was estimated for each study specifically by regressing participant's randomly generated identification number on RFG and CFC, for alpha of .001. For sample specific information see Table 2.

Measures

CFC. Seven items from Strathman et al. (1994; e.g., "I consider how things might be in the future, and try to influence those things with my day to day behavior.") were used to capture CFC. Responses were captured on an 1-5 Likert scale (1 = extremely uncharacteristic of me, 5 = extremely characteristic of me)

RFG. RFG in these studies focused mostly on the context of climate change, and how responsible people felt towards protecting future generations within this domain. Further, these studies focused on sacrifices made by past generations focusing on a specific environmental issue, manipulating perceptions of past generation, and finding a null effect in this case. Past work on this data suggests that collapsing across conditions does not influence any correlational results (see Syropoulos et al., 2021; Syropoulos & Markowitz, 2020).

Thus, we used items that sought to eliminate the confounding context of climate change (and broader umbrella of proenvironmentalism). We did so by only using RFG items that were broadly phrased. Thus, for three samples, the following two items were thus retained for analyses: "I feel obligated towards future generations," and "I feel responsible to protect future generations.". We averaged these items into a single construct (RFG) which was highly reliable.

However, for two of the samples these items were not included, and thus we opted to use the original four items used in the investigation "My generation needs to look after itself first and worry about future generations second (Reverse coded)." "I'm willing to sacrifice in my own life (e.g., buy less stuff), if it will help people living in the future (assuming other people are willing to sacrifice as well)," "People living today have an obligation to protect future generations, even if it means tightening our belts now," and "To what extent do you truly feel it is your personal responsibility to save resources for future generations?".

Responses were captured on a 6-point Likert scale (1 = Completely/Strongly disagree, 6 = completely/Strongly agree). For both versions of the construct, the average of these items was also reliable reliability estimates see Table 2.

Results

Across 2244 participants and 5 different samples the average correlation between CFC and RFG was moderate to strong in magnitude (r = .48, Z = 24.88, p < .001, 95% C.I. [.45, .51]). The correlations ranged from .31 to .55 (see Table 2).

Table 2.

Information for the sample of each study, reliability and correlation coefficients.

Sample type	Study type	N	% Female	RFG version	a_{RFG}	a_{CFC}	$r_{CFC\text{-}RFG}$
MTurk	Correlational	509	65%	2-item	0.88	0.84	0.49*
MTurk	Experimental (null)	355	62%	2-item	0.88	0.84	0.47*
MTurk	Experimental (null)	338	56%	2-item	0.87	0.84	0.31*
MTurk	Experimental (null)	434	58%	4-item	0.72	0.82	0.51*

MTurk	Experimental (null)	608	51%	4-item	0.81	0.81	0.55*

Note. * $p < .001$.

Discussion

Secondary analyses from five different samples suggest that consideration of future consequences and responsibility for future generations have a moderate to strong positive correlation, suggesting that those who are more likely to think about the future consequences of their own action, are also more likely to feel responsible for protecting future generations of people. Importantly, these correlations could be inflated due to the salience of intergenerational decisions and issues (i.e., climate change) from the experimental context of the studies. In subsequent studies we alleviated this concern by replicating this pattern of association devoid of any other context.

Study 2

In our second study, which was pre-registered (https://aspredicted.org/Y6J_QM4), we reevaluated the association of consideration of future consequences with responsibility for future generations. We also considered an additional future-oriented individual difference that has been shown to predict concern for one's own future, namely future self-continuity. Furthermore, we also examined the amount of moral value people ascribe to future generations as an additional outcome.

Methods

Participants

A starting sample of 299 participants was recruited via Amazon Mechanical Turk (MTurk). After excluding 10 participants for failing the attention check, 289 participants remained.

Materials

Participants completed the following measures in a randomized order.

CFC. The 7-item CFC scale, which was identical to Study 1 (α = .87).

FSC. The FSC scale (α = .94) was a measure which consisted of six items asking how connected and similar people feel to themselves at 1, 5, and 10 years in the future on a 7-point Likert scale from *1 (not at all)* to *7 (very much)*.

RFG. The RFG scale (α = .85; Syropoulos et al., 2020) consisted of four items (e.g., "People living today have an obligation to protect future generations, even if it means tightening our belts now"). Three of the four items used a 7-point Likert scale from *1 (strongly disagree)* to *7 (strongly agree)* and one item (i.e., To what extent do you truly feel it is your personal responsibility to save resources for future generations, even if it means making do with less in your own life?) used a 7-point Likert scale from *1 (definitely not my responsibility)* to *7 (definitely my responsibility)*.

MFG. The MFG scale was a measure generated by the research team, consisting of one item that asked to what extent people agreed that "morally speaking, we should put a lot of emphasis on the well-being of people who will live hundreds of years from now, even to the point of valuing their lives equally with the lives of people today" on a 7-point Likert scale from *1 (strongly disagree)* to *7 (strongly agree)*.

Results

Supporting our hypothesis, both CFC ($r = .50$, $p < .001$) and FSC ($r = .28$, $p < .001$) positively correlated with RFG. Similarly, CFC ($r = .34$, $p < .001$) and FSC ($r = .27$, $p < .001$) were both positively correlated with MFG. Estimating linear regressions with both CFC and FSC in the model, we found that both CFC ($\beta = 0.56$, $p < .001$, 95% C.I. [0.43, 0.69]) and FSC ($\beta = 0.13$, $p = .011$, 95% C.I. = [0.03, 0.24]) related to increased RFG (Adjusted $R^2 = 0.26$) controlling for each other, with CFC having a larger association. The same pattern of results was

found for MFG (Adjusted $R^2 = 0.14$), such that both CFC ($\beta = 0.42$, $p < .001$, 95% C.I. [0.25, 0.59]) and FSC ($\beta = 0.22$, $p = .002$, 95% C.I. [0.09, 0.36]) related to increased scores.

Discussion

Our findings suggest that both consideration of future consequences and future self-continuity significantly relate and independently contribute to both how responsible people feel for protecting future generations and how much they morally value future generations. Having established a robust pattern of correlations, we next attempted to causally link individual future concern with concern for future generations through an experimental paradigm.

Study 3

Considering the results of Studies 1 and 2, we theorized that if future self-continuity and consideration of future consequences do not directly impact responsibility for future generations, but are related positively to the construct, it's possible that some underlying mechanisms might be at play. We considered two possible mechanisms that both consideration of future consequences and future self-continuity could positively impact. The first was intergenerational identification. It's possible that people who identify more with themselves in the future could also identify more with future people in general. The second is intergenerational efficacy, otherwise stated as the belief that our actions now can influence the well-being of future generations. If people consider the future outcomes of their own actions then they might also be more likely to consider the future consequences of their actions on future people. Both arguments have been raised as potential mechanisms in intergenerational decision-making (e.g., Wade-Benzoni & Tost, 2009), but importantly, neither has been examined as a direct consequence of self-oriented prospection.

Methods

Participants

A starting sample of 350 participants was recruited via Prolific. After excluding 1 participant who had a duplicate IP address, and another 4 who failed our attention check, 345 participants remained. A sensitivity analysis (using G*power3, Faul et al., 2007) with power set to .80 suggested we could meaningfully detect correlations as small as $r = .15$.

Materials and Procedure

Participants completed the following measures: CFC (identical to Study 2, $a = .80$), FSC using a single-item, 7-point overlapping circles measure, RFG (identical to Study 2, $a = .92$), MFG (identical to Study 2). Participants also responded to six new items. Three items, generated by the research team ("Our actions today can greatly influence the well-being of future generations", "We can make a difference to the world that future generations will inhabit", "The future where everyone can live a joyous life is impacted by our decisions today.") captured efficacy for future generations ($a = .92$). Each item was captured on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Identification with future generations was also captured with 3 items. Two items ("To what extent do you feel connected to future generations of people?", "It is easy for me to put myself in the shoes of future generations of people.") were captured on the same slider scale ranging from 0 (not at all) to 100 (extremely). The third item mirrored that of FSC, but instead of one's self, the other entity was framed as "future generations of people"). In our analyses, we transformed scores for the first two items to be on a 7-point scale by using the following formula: ((original score - 0) / (100 - 0)) * (7 - 1) + 1) and averaged the three items. The resulting construct was reliable ($a = .89$). Participants completed the two predictor, mediator and outcome variable in pairs, in a randomized order, with the two measures within each group also shown in a randomized order.

Results

Replicating the results of Studies 1-2, higher CFC and FSC related to increased RFG and MFG. RFG and MFG also correlated positively and strongly with each other, while FSC and CFC did so moderately. As hypothesized, FSC and CFC related to increased efficacy and identification with future generations, although notably the correlations between CFC and efficacy were significantly stronger than that of FSC (*Fisher's Z* = 3.93, $p < .001$).

Table 4.

Bivariate correlations between all measures

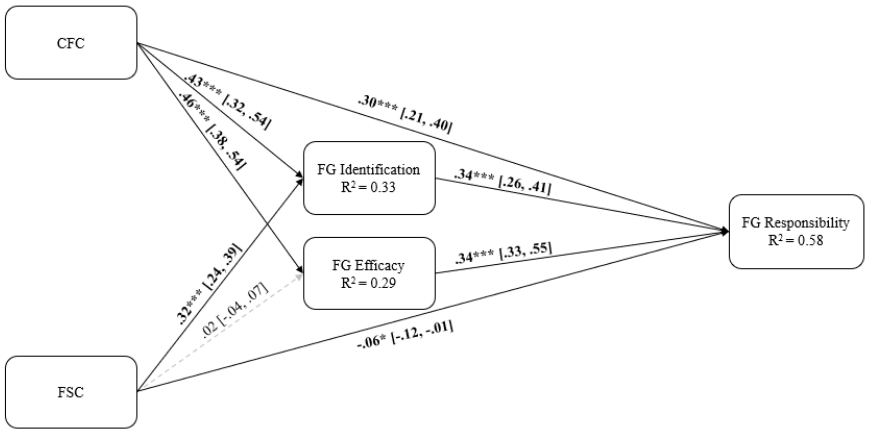
	M	SD	CFC	FSC	FG Efficacy	FG Identification	RFG	MFG
CFC	5.22	1.12	--					
FSC	4.28	1.69	0.28**	--				
FG Efficacy	5.79	0.98	0.53**	0.17*	--			
FG Identification	3.74	1.42	0.44**	0.47**	0.44**	--		
RFG	4.99	1.36	0.62**	0.25**	0.64**	0.60**	--	
MFG	4.98	1.37	0.49**	0.17**	0.54**	0.52**	0.74**	--

Note. * $p < .01$, ** $p < .001$

Although no arguments for a causal mechanism can be drawn, a mediation test with CFC and FSC as parallel predictors, efficacy and identification as parallel mediators, and the average of RFG and MFG ($a = .85$) as the outcome, estimated with the *proc calis* command, supported our argument for a potential indirect effect. Importantly FSC had a non-significant indirect effect via efficacy ($b = .01$, $p = .614$, 95% C.I. [-.02, .03]), but a significant indirect effect via identification ($b = .11$, $p < .001$, 95% C.I. [.07, .14]). CFC had a significant indirect effect via both efficacy ($b = .20$, $p < .001$, 95% C.I. [.14, .26]) and identification ($b = .14$, $p < .001$, 95% C.I. [.09, .19]).

Figure 1.

Path model depicting the unstandardized coefficients with 95% C.I. for the mediation test



Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

Results from a correlational study suggest that both consideration of future consequences and future self-continuity relate to increased responsibility towards future generations of people. Crucially, although both consideration of future consequences and future self-continuity also relate to increased perception that our actions can positively influence future generations of people (efficacy) as well as identification with future generations of people (identification), when we examined these associations in a more robust manner in a mediation model, we found that future self-continuity related only to identification, while consideration of future consequences to both proposed mediators, which in turn both positively related to responsibility to future generations. In this model, the association between future self-continuity and responsibility to future generations was negative, and nearly non-significant, possibly suggesting that the two mediators account for most of the variance in the outcome. Significant indirect effects were also observed.

Study 4A

In our next study we sought to experimentally manipulate consideration of future consequences and future self-continuity using the manipulations that were validated in Studies S1 and S2 (see Supplementary Materials). We sought to determine whether inducing self-

oriented prospection would increase the two proposed mediators of identification with future generations and perceived efficacy for our actions for future generations. We also considered the possibility for a direct effect on responsibility for future generations, as well as potential indirect effects via increased endorsement of the two proposed mediators. This study was pre-registered, https://aspredicted.org/SJF_P3S.

Methods

Participants

A starting sample of 1656 participants was recruited via Prolific. Although we were aiming to recruit 1650 participants, six participants completed the survey but dropped out of the study prior to receiving compensation on Prolific. After excluding 5 participants who had a duplicate IP address, and another 50 who failed our attention check, 1598 participants remained. This sample size was in line with our a-priori power analysis (see pre-registration).

Materials and Procedure

Participants were randomly assigned to one of three conditions. In each condition they had to complete a short writing task. For CFC this task was adapted from a previous study (Hershfield et al., 2012). For the FSC condition this task was created by the research team. Both were independently validated (see Studies S1 and S2 in the Supplementary Materials).

In the CFC condition (N = 516) they responded to the following prompt: “Think about a time when you had to make a sacrifice to your immediate happiness in order to achieve a future outcome. Write about what you did to prioritize your future well-being and how you considered the future consequences of your actions.”

In the FSC condition (N = 536) they responded to the following prompt: “In many important ways, people remain the same over time. Recent research in psychology has found that at their core, people are very similar from one period of time to another. Please think about what

you will be like in 25 years and list all of the ways in which you think you will be similar to how you are now."

In the control condition (N = 546) they responded to the following prompt: "People tend to have a day-to-day routine. This includes activities they do during the day and before they go to bed. Please think about what your daily routine is and describe it below."

Participants then completed the following measures in a randomized order: CFC (identical to Study 3, a = .77), FSC (identical to Study 3), RFG (identical to Study 3, a = .89), MFG (identical to Study 3), efficacy for positively influencing future generations (3 items, identical to Study 3, a = 0.89), and identification with future generations (3 items, identical to Study 3, but all captured on 7-point scales, a = 0.87).

Results

All variables were positively associated with each other, replicating results from our previous studies (see Table S2 in the Supplementary Materials). Per our pre-registered analytical plan, we first examined differences for the CFC and FSC condition relative to the control condition. Given the strong correlation between RFG and MFG (r = 0.64, p < .001), per our pre-registration we averaged the two measures.

FSC vs. Control

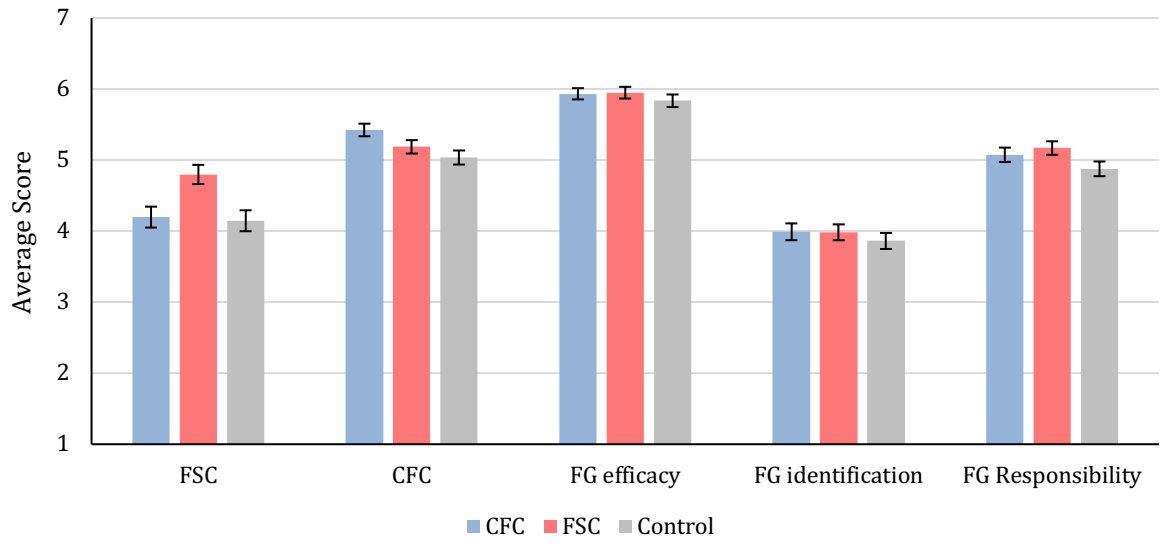
Participants in the FSC condition reported greater FSC (t(1073.3) = 6.39, p < .001, d = 0.39), and CFC (t(1078) = 2.15, p = .031, d = 0.13), although the latter finding was unexpected and smaller in magnitude. Contrary to our pre-registered hypothesis, no significant effect was observed on perceived efficacy for positively influencing future generations (t(1080) = 1.84, p = .065, d = 0.11) or identification with future generations (t(1080) = 1.50, p = .133, d = 0.09). However, a significant difference in the pre-registered direction was observed for responsibility to future generations (t(1073.6) = 3.98, p < .001, d = 0.24).

CFC vs. Control

Participants in the CFC condition reported greater CFC ($t(1051.7) = 5.71$, $p < .001$, $d = 0.35$), but not FSC ($t(1060) = 0.48$, $p = .631$, $d = 0.03$), as expected. Contrary to our pre-registered hypothesis, no significant effect was observed on perceived efficacy for positively influencing future generations ($t(1052.6) = 1.62$, $p = .105$, $d = 0.10$) or identification with future generations ($t(1060) = 1.55$, $p = .122$, $d = 0.09$). However, a significant difference in the pre-registered direction was observed for responsibility to future generations ($t(1060) = 2.65$, $p = .008$, $d = 0.16$).

Figure 2

Bar graph with 95% C.I. depicting mean differences by condition



Discussion

Study 4 partially supported our hypotheses. We successfully manipulated consideration of future consequences and future self-continuity using a writing task, finding direct effects on responsibility to future generations. However, we did not observe any effects on our proposed mediators. Considering the non-significant results on the mediators, we deviated from our pre-registration and did not test for the potential indirect effect of condition on the outcomes via

increased perceived efficacy for positively influencing future generations and identification with future generations.

Study 4B

In our next experiment we sought to both replicate the results of Study 4A, via a direct pre-registered replication and to expand on them by seeking to manipulate efficacy for positively influencing future generations and identification with future generations. To do so, we adapted the manipulations from consideration of future consequences (for efficacy) and future self-continuity (for identification) and compared them to a control condition. This study was pre-registered, https://aspredicted.org/Z24_N6Y.

Methods

Participants

A starting sample of 2750 participants was recruited via Prolific. After excluding 19 participants who had a duplicate IP address, and another 57 who failed our attention check, 2674 participants remained. This sample was in line with our a-priori power analysis (see pre-registration).

Materials and Procedure

Participants were randomly assigned to one of five conditions. In each condition they had to complete a short writing task. The tasks for the CFC (N = 540), FSC (N = 564), and Control (N = 569) conditions were identical to Study 4A.

In the efficacy condition (N = 465) participants responded to the following prompt: "Think about a time when you had to make a sacrifice to your immediate happiness in order to help future generations of people. Write about what you did to prioritize the well-being of future people and how you considered the consequences of your actions for future generations."

In the identification condition (N = 536) they responded to the following prompt: "In many important ways, generations of people remain the same over time. Recent research in psychology has found that at its core, societies are very similar from one period of time to another. Please think about what you think future generations of people will be like in 25 years and list all of the ways in which you think future generations of will be similar to present generations of people."

Participants then completed the following measures in a randomized order: CFC (identical to Study 4A, a = .80), FSC (identical to Study 4A), RFG (identical to Study 4A, a = .89), MFG (identical to Study 4A), efficacy for positively influencing future generations, for which 1 item was removed (2 items, a = 0.89), and identification with future generations, for which only the overlapping circle items was included.

Results

All variables were positively associated with each other, replicating results from our previous studies (see Table S2 in the Supplementary Materials). Per our pre-registered analytical plan, we first examined differences for the CFC and FSC condition relative to the control condition. Given the strong correlation between RFG and MFG (r = 0.66, p < .001), per our pre-registration we averaged the two measures. Means and standard deviations can be found in Table 5.

FSC vs. Control

Participants in the FSC condition reported greater FSC (t(1118) = 6.87, p < .001, d = 0.41) compared to the control. However even though our manipulation worked, no significant effect was observed for responsibility to future generations (t(1131) = -1.06, p = .288, d = 0.06), failing to replicate the findings of Study 4A.

CFC vs. Control

Participants in the CFC condition reported greater CFC ($t(1103.4) = 3.97$, $p < .001$, $d = 0.24$) compared to the control. However even though our manipulation worked, no significant effect was observed for responsibility to future generations ($t(1107) = 0.01$, $p = .995$, $d = 0.0003$), failing to replicate the findings of Study 4A.

Efficacy vs. Control

Relative to the control, participants in the efficacy (for positively influencing future generations) condition scored significantly higher on CFC ($t(1032) = 2.48$, $p = .010$, $d = 0.16$), identification with future generations ($t(1032) = 2.19$, $p = .029$, $d = 0.14$), and responsibility to protect future generations ($t(1032) = 2.38$, $p = .017$, $d = 0.15$). However, no significant effect was observed for efficacy ($t(939.3) = 0.52$, $p = .601$, $d = 0.03$), which limits our confidence in the treatment's validity as a manipulation of efficacy for positively influencing the lives of future people. It's possible that the treatment instead acted more as a manipulation of identification with future people, by making salient times in which one's actions helped future people.

Identification vs. Control

No significant differences were found in responsibility to future generations ($t(1103) = 0.24$, $p = .813$, $d = 0.01$), efficacy for positively influencing future generations ($t(1103) = 0.13$, $p = .896$, $d = 0.01$), or identification with future generations ($t(1103) = 1.44$, $p = .150$, $d = 0.09$). These results suggest that our manipulation was not effective at shifting identification with future people.

Table 5.

Means and standard deviations for the five conditions

	Control	CFC	FSC	Efficacy	Identification
FSC					
M	4.52	4.58	**5.17**	4.58	4.50
SD	1.68	1.73	1.49	1.74	1.73
CFC					
M	5.24	**5.50**	5.13	**5.42**	5.18
SD	1.13	1.01	1.20	1.12	1.18

Responsibility for protecting future generations					
M	5.05	5.05	4.98	**5.23**	5.07
SD	1.19	1.23	1.28	1.16	1.20
Efficacy for positively influencing future generations					
M	5.93	5.91	5.92	5.96	5.94
SD	0.96	1.00	1.03	1.07	0.99
Identification with future generations					
M	3.70	3.80	3.87	**3.92**	3.84
SD	1.64	1.56	1.56	1.65	1.63

Note. Bolded values highlight significant differences relative to the control condition.

Discussion

Study 4B failed to replicate the effects of the consideration of future consequences and future self-continuity manipulations on responsibility for protecting future generations. Importantly, we are confident that our manipulations were valid, as they shifted the intended constructs. These results suggest that at least in a causal manner, it's not clear whether increasing consideration of future consequences and future self-continuity will necessarily result in more responsibility for protecting future people.

Our attempts to manipulate efficacy for positively influencing future generations and identification with future generations were also met with limited success. Our efficacy manipulation shifted identification with future people but not efficacy. Further, it shifted consideration of future conseqeunces, and responsibility for protecting future people. Given the inconsistent experimental results in Studies 4A-4B, as well as the overall small effect sizes, we cannot confidently claim that experimentally manipulating any of the target predictors will result in increases in responsibility for protecting future people; however, people who tend to score higher on these constructs also tend to score higher on constructs relevant to protecting future generations.

Study 5

Despite the mixed results of Study 4B, an interesting finding was that manipulating whether people thought they could positively influence the lives of future generations also

increased consideration of future consequences. That is, feeling more efficacious about helping future *others* led participants to prioritize their future *selves* more. Seeking to examine this phenomenon further, we examined whether individuals who should be more concerned about future generations also scored higher on consideration of future consequences and future self-continuity. To examine this, we utilize the Longtermism Beliefs Scale (LBS; Syropoulos, Law et al., 2023b). This measure, developed using language directly from books on longtermism (MacAskill, 2022; Ord, 2020), has been shown to be capable of empirically identifying longtermists, with findings suggesting that longtermists score significantly higher on a host of psychological outcomes and longtermist behavioral measures (Syropoulos, Law et al., 2023a; 2023b). This study was pre-registered, https://aspredicted.org/2CH_XP6.

Methods

Participants

A starting sample of 754 participants was recruited via Prolific. Although we were aiming to recruit 750 participants, four participants completed the survey but dropped out of the study prior to receiving compensation on Prolific. After excluding 2 participants who had a duplicate IP address, and another 24 who failed our attention check, 728 participants remained. This sample size was in line with our a-priori power analysis (see pre-registration).

Materials and Procedure

Participants completed the following measures in a randomized order: CFC (identical to Study 3, a = .81), FSC (identical to Study 3), RFG (identical to Study 3, a = .88), MFG (identical to Study 3), efficacy for positively influencing future generations (identical to Study 3, a = 0.90), and identification with future generations (identical to Study 3, a = 0.87).

The only new measure was the LBS. The LBS is a 7-item measure (a = 0.96). Importantly, each item was shown four times, with the four different versions of the item

completed simultaneously. These four versions asked participants to respond to a particular item (for the full scale see the Supplementary Materials), with four different timeframes/timepoints in mind (1,000, 10,000, 100,000, and 1,000,000 years in the future). Scores were captured on slider scales ranging from 0 = strongly disagree – 100 = strongly agree. Following the methodology of Syropoulos and colleagues (2023a; 2023b) We identified participants as longtermists based on the following criteria: (1) scoring higher than 75 the mean for the closest timeframe (i.e., 1000 years), and (2) having the same (or a higher) score for all other timeframes. These criteria reflect the longtermist philosophy which states that future people matter equally, regardless of when they leave, and that their lives should matter as much as ours today (MacAskill, 2022).

Results

All measures were positively correlated with each other (see Table S4 in the Supplementary Materials). As hypothesized, longtermists (N = 155) scored significantly higher on all outcomes compared to the general population (N = 573). Results are summarized in Table 6.

Table 6.

Comparisons of longtermists and the general population for all outcomes

	Longtermists (N = 155)		General population (N = 573)				
Outcome	M	SD	M	SD	t-test	p	d
FSC	4.63	1.74	4.16	1.65	t(726) = 3.05	.002	0.28
CFC	5.80	1.07	4.98	1.17	t(261.62) = 8.19	<.001	0.73
FG Efficacy	6.50	0.68	5.75	1.02	t(363.77) = 10.84	<.001	0.87
FG Identification	4.43	1.29	3.64	1.33	t(726) = 6.57	<.001	0.60
FG Responsibility	5.80	1.00	4.77	1.21	t(287.28) = 10.80	<.001	0.93
Longtermism	92.09	6.67	50.41	20.84	t(709.47) = 40.77	<.001	2.69

Note. t-tests with df that include a decimal had unequal variances, in these cases we used the Satterthwaite approximation to account for unequal variances.

Discussion

Our final study illustrates that those who endorse the longtermist philosophy, namely the belief that future people, no matter when they live, have the same moral worth as those who live today, and that we today have an obligation to help ensure a flourishing future for future people, also report greater self-continuity and consideration of the future consequences of their actions.

Meta-Analysis of Associations

Across all of our studies, we were able to amass data from a total of 9156 participants. Given this large sample size, and the multiple number of studies, and conditions per study, we estimated an internal meta-analysis of our studies following the guidelines set by Goh and colleagues (2016). Our goal was to determine what the average correlation between CFC and FSC was with responsibility to protect future generations, perceived efficacy to positively influence future generations, as well as identification with future generations. Further, we also examined the association between perceived efficacy to positively influence future generations, as well as identification with future generations and responsibility to future generations respectively.

Results suggest that FSC had a small positive association with perceived efficacy (r = .14 [.10, .18], Z = 7.15, p <.001), a small-to-moderate association with responsibility (average of RFG and MFG) (r = .23 [.19, .27], Z = 10.93, p < .001), and a strong positive association with identification (r = .41 [.38, .44], Z = 21.72, p < .001). CFC had significant and positive associations with efficacy (r = .50 [.47, .53], Z = 27.51, p < .001), identification (r = .41 [.38, .45], Z = 21.07, p < .001) and responsibility (r = .48 [.45, .51], Z = 24.88, p < .001). Finally, both efficacy (r = .57 [.54, .59], Z = 32.12, p < .001) and identification (r = .56 [.53, .58], Z = 31.47, p < .001) strongly correlated with responsibility.

General Discussion

The present studies provide novel insights into how self-oriented prospection contributes to other-oriented attitudes about future generations. Specifically, across a reanalysis of existing data (Study 1), five high-powered studies (Studies 2-5), and two supplemental experiments (Studies S1-S2), we demonstrate clear and consistent evidence that Consideration of Future Consequences (CFC) and Future Self-Continuity (FSC) are positively associated with feelings of responsibility for protecting, perceived efficacy to positively impact, and an expansive sense of identification with future generations. In other words, individuals who possess a stronger sense of continuity with their future *selves* and who are inclined to consider the consequences their actions may have on *their own* future outcomes, are more likely to exhibit attitudes associated with protecting future *others*. Importantly, these associations were consistently observed across numerous studies featuring large sample sizes, reinforcing the robustness of the discovered patterns (see results from the meta-analysis above).

Across four experiments (Studies S1-S2 and 4a-4b), manipulations of CFC and FSC consistently led to increased levels of the intended constructs. However, while significant condition differences in responsibility for future generations were observed for both CFC and FSC in Study 4a, this pattern did not replicate in Study 4b. Furthermore, mixed evidence across these two experiments raises questions about the potential mediating role of intergenerational identification and efficacy in the relationship between self-oriented prospection and responsibility for future generations, which was initially observed in a cross-sectional design in Study 3. Finally, in Study 5, we found that longtermists, identified by their scores on the Longtermism Beliefs Scale (LBS; Syropoulos & Law et al., 2023b), scored higher than general population participants on FSC, CFC, intergenerational identification, efficacy beliefs, and, importantly, responsibility for future generations. These findings highlight the complexities

inherent in these relationships and open up avenues for future research to delve deeper into their exploration.

Notwithstanding the complexities revealed in Studies 4a and 4b, the findings of the present studies contribute to and build upon a growing body of research that addresses the challenges posed by prevailing tendencies to prioritize present over future generations in moral valuation and prosocial behavior (Hauser et al., 2014; Law et al., 2023; Syropoulos & Law et al., 2023a, 2023b; Wade-Benzoni, 2008; Wade-Benzoni et al., 2008; Wade-Benzoni, 2009; Wade-Benzoni & Tost, 2009). As concerns about existential threats to future well-being mount across scientific disciplines and society at large, recent investigations into variables that may guide actions to mitigate such risks reveal that motivations related to legacy-building (Bang et al., 2017; Grolleau et al., 2020; Syropoulos & Markowitz, 2021b; Zaval et al., 2015), expressions of gratitude toward past generations (Barnett et al., 2019; Watkins & Goodwin, 2020), and alignment with the longtermism philosophy (Law et al., 2023; Syropoulos & Law et al., 2023a, 2023b) predict future-oriented attitudes (e.g., moral concern, responsibility for future generations) and behaviors (e.g., generosity). However, what sets our studies apart is their revelation of a novel link between caring for one's own future and caring for the futures of others.

Implications, Limitations and Future Directions

While this investigation significantly advances our understanding of the relationships between self-oriented prospection and other-oriented pro-future attitudes, there are noteworthy limitations that call for further investigation in future research. The present studies unmistakably show that individuals with higher levels of FSC and CFC tend to feel a stronger sense of responsibility for future generations. However, the mechanisms underlying this relationship remain largely open and ripe for further investigation. Study 3's cross-sectional findings suggest

a potential mediating role of intergenerational identification and efficacy beliefs in the consistent relationship between self-oriented prospection and responsibility for future generations. Yet, our attempts to manipulate these predictors and mediators in studies 4a and 4b yielded inconsistent results, raising doubts about their causal role. While manipulating FSC and CFC increased the intended constructs, these changes did not lead to increased identification or efficacy in Study 4a, nor to heightened responsibility for future generations in Study 4b, preventing an investigation of indirect paths through the proposed mediators. Additionally, the manipulation of efficacy beliefs in Study 4b resulted in elevated CFC, identification with future generations, and responsibility, while the manipulation of identification did not yield significant changes in any outcomes.

Nevertheless, consistent with prior research linking an expansive sense of identity and efficacy beliefs regarding future impact to pro-future outcomes (Syropoulos & Law et al., 2023b; Bradley et al., 2020; Hornsey et al., 2021; Syropoulos & Law et al., 2023a), intergenerational identification and efficacy beliefs showed consistent positive associations with responsibility for future generations. Future research could benefit from employing more robust and focused manipulations of these potential mediators, including ones not examined in our current studies, like future optimism and emotions such as awe. This subsequent work has the potential to further enhance our comprehension of the connections between self-oriented future thinking and other-oriented attitudes concerning future generations. These insights could, in turn, provide practical strategies for motivating individuals to consider the welfare of those living in the decades, centuries, and even millennia ahead. Another important consideration revolves around the inconsistencies observed in the presence of direct effects within our experimental findings. While our successful manipulations of FSC and CFC yielded direct effects on responsibility for future generations in Study 4a, these effects did not replicate in Study 4b. This discrepancy prompts us to ponder the degree to which experimentally induced augmentations in CFC or FSC

can genuinely contribute to an amplified sense of responsibility toward future generations. Although our research unveiled robust associations between FSC and CFC with responsibility, perceived efficacy, and identification with future generations, suggesting the potential for interventions targeting these constructs to promote a more pro-future ethical stance, our experimental inductions did not uniformly mirror these associations.

Consequently, it is plausible that our experimental inductions, despite their effectiveness in influencing self-report measures of self-oriented prospection, may not fully encapsulate these attributes in the same way they naturally manifest as individual differences. This insight underscores the need for further exploration into the interplay between experimentally induced enhancements and the subtleties of future-oriented prospection as it is naturally experienced. One potential pathway to delve into these uncertainties lies in the realm of longitudinal research, using designs that incorporate manipulations capable of fostering more enduring impacts on Future Self-Continuity (FSC) and Consideration of Future Consequences (CFC). Nevertheless, by shedding light on the complex nature of future-oriented thinking, we hope to inspire further research that can ultimately inform strategies for promoting sustainable and responsible behaviors for the benefit of generations to come.

Our findings align with other recent research connecting individual differences in future-thinking ability to pro-future attitudes and behaviors, indicating the possibility of a common basis for considering both individual and collective futures. This connection arises from the inherent forward-thinking nature of self-oriented prospection and recognizing other-oriented future responsibilities. Recent studies have demonstrated that general future-thinking abilities, such as the capacity to vividly envision distant futures, are associated with moral consideration and prosocial intentions towards individuals living in distant future generations (Law et al., 2023) and distant individuals more broadly (O'Connor & Fowler, 2022). Moreover, earlier

research has established links between FSC and CFC and the ability to vividly imagine hypothetical futures (Molouki & Bartels, 2017; Rebetez et al., 2016; Stephan et al., 2018). Combining these insights with the present study's findings, which highlight the relationship between FSC, CFC, and increased feelings of responsibility for future generations, implies a potential shared cognitive framework that underpins envisioning both one's own future and the collective future we share as a species. Future research might look to address cognitive and neural overlap between self- and other-oriented prospection to more deeply explore these intriguing similarities (Meyer et al., 2019; Mitchell et al., 2011).

Yet another direction future research might explore is whether the observed patterns could operate in the opposite direction of that which we investigated in the present studies. While we were primarily interested in whether garnering heightened future-thinking regarding oneself could in turn influence attitudes about future others, the inverse of this pattern is equally plausible. That is, cultivating responsibility for future generations could have downstream consequences for how one thinks about and plans accordingly for their own future. Future investigations may examine this approach to the directionality of these effects. Importantly, forthcoming efforts in this vein could further elucidate the shared benefits of protecting our individual and collective futures.

Finally, although the sample sizes employed in the present studies were large (N_{Total} = 9570), all of the subjects lived in the United States and existed in the present day. Thus, it is unclear whether and how the observed results will translate across international boundaries, cultures, and time. Ongoing and future research may look to address potential cultural and societal influences on the observed effects (see Ji et al., 2021; Martinez & Winter, 2022), as well as whether the same patterns observed here will replicate or perhaps even be more pronounced in the future, when existential threats facing humanity may be all the more salient.

Conclusion

In conclusion, the present studies offer substantial insights into the interplay between self-oriented prospection, other-oriented pro-future attitudes, and their potential implications for the betterment of our collective future. The consistent associations observed between Future Self-Continuity (FSC) and Consideration of Future Consequences (CFC) with responsibility, perceived efficacy, and identification with future generations underscore the relevance of these constructs in shaping ethical orientations that transcend temporal boundaries. While our pre-registered and highly-powered experimental manipulations of FSC and CFC yielded mixed results, the direct effects observed in Study 4a point towards the potential of these constructs to influence attitudes toward future generations in a causal manner. The complexities unveiled by our research highlight the multifaceted nature of these relationships and call for future investigations into the underlying mechanisms and moderators that govern these associations. Despite these limitations, our findings contribute to the ongoing discourse concerning the challenge presented by tendencies people generally exhibit in prioritizing present over future generations in moral valuation and prosocial behavior. By establishing a link between caring about one's own future and extending that care to future others, our work advocates for a holistic and interconnected approach to ethical decision-making regarding future outcomes for our species. Moving forward, the practical and theoretical implications of our findings invite further inquiry, encouraging researchers to explore strategies for promoting more responsible and inclusive consideration of future generations.

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