

The belief in a decline in cooperation in the USA and China

Corresponding Author: Dr Yi Liu

This file contains all editorial decision letters in order by version, followed by all author rebuttals in order by version.

Version 0:

Decision Letter:

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Dear Ms Liu,

Thank you for your patience during the peer-review process. Your manuscript titled "The belief in a decline in cooperation in the USA and China" has now been seen by 3 reviewers, and I include their comments at the end of this message. They find your work of interest but raised some important points. We are interested in the possibility of publishing your study in Communications Psychology, but would like to consider your responses to these concerns and assess a revised manuscript before we make a final decision on publication.

We therefore invite you to revise and resubmit your manuscript, along with a point-by-point response to the reviewers. Please highlight all changes in the manuscript text file.

Editorially, we consider it necessary that you address the methodological comments and improve the presentation of the work. To be precise, the paper needs to make it clear how the study extends, confirms, or contradicts previous findings. We do not allow explicit novelty claims (describing the study as "first", "novel", or "unprecedented") or claims that other "research does not exist". Instead, we ask authors to clearly describe the contribution of their work in relation to the literature.

We are committed to providing a fair and constructive peer-review process. Please don't hesitate to contact us if you wish to discuss the revision in more detail.

I am attaching an Editorial Requests Table that details critical reporting requirements for the revised manuscript. Please attend to each item and ensure your manuscript is fully compliant. If your revised manuscript is not aligned with these requests on major issues, such as those concerning statistics, it may be returned to you for further revisions without re-review.

Please submit the following items:

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- Point-by-point response to the referees' comments
- Cover letter (as a separate document)
- <https://www.nature.com/documents/nr-reporting-summary.pdf> Nature Research Reporting Summary
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Additional guidance is available in our style and formatting guide Communications Psychology formatting guide.

We hope to receive your revised paper within 8 weeks; please let us know if you aren't able to submit it within this time so that we can discuss how best to proceed. If we don't hear from you, and the revision process takes significantly longer, we may close your file. In this event, we will still be happy to reconsider your paper at a later date, provided it still presents a significant contribution to the literature at that stage.

We would appreciate it if you could keep us informed about an estimated timescale for resubmission, to facilitate our planning.

We look forward to seeing the revised manuscript and thank you for the opportunity to review your work.

Best regards,

Marika

Marika Schiffer, PhD
Chief Editor
Communications Psychology

REVIEWER EXPERTISE:
social psychology, cross-cultural psychology

REVIEWER REPORTS:

Reviewer #1 (Remarks to the Author):

this manuscript presents a careful and well-executed contribution to the literature on perceptions of social change. It addresses an important question—how people perceive the trajectory of cooperation over time—and does so using a thoughtful, multi-method design that combines behavioral expectations, trait-based judgments, and explanatory attributions across two major cultural contexts. The study is ambitious in scope, and several methodological choices are commendable, such as triangulating the belief-in-decline construct and extending temporal estimates into the future (2030). That said, the conceptual foundations of the manuscript require clarification, and the novelty of the empirical contribution is somewhat limited:

Major remarks:

1. Conceptual Clarification between trust and cooperativity

Despite a clear sentence late in the Discussion - "Social trust refers to a generalized belief in the benevolence of others, whereas cooperation refers to actual behavioral engagement in situations of interdependence... Trust can facilitate cooperation, but people may also cooperate for strategic, reputational, or institutional reasons - even without high trust" (p. 7) - the manuscript leaves these constructs partially conflated in earlier sections. Throughout the Introduction the terms "morality," "trust," and "cooperation" appear side-by-side as "key ingredients" of one another; yet it remains ambiguous whether they are being treated as parallel indicators, hierarchical antecedent-outcome pairs, or mutually reinforcing facets of a single latent variable. Furthermore, some of the cited work use different conceptualizations - and thus different relations - between trust, cooperation and morality. Without a firm conceptual map at the outset, readers may struggle to interpret causal language later on, because it is never made explicit whether trust is hypothesised as (a) a psychological mechanism that shapes perceptions, (b) an objectively changing societal parameter, or (c) itself another perceived outcome.

For a clear example, compounding this ambiguity, the operationalisation of "cooperation-related traits" via the Communion-Agency (C-A) adjective lists embeds trust and morality directly inside the cooperation measure. Morality items ("fair," "honest," "just," "trustworthy," "reliable") and warmth items are themselves classic indicators (or explicit reference, in the case of trustworthy) of social trustworthiness; therefore sharp inferences about how perceived trust predicts perceived cooperation are potentially circular. The study thus risks re-labelling a single cognitive judgment in multiple ways rather than disentangling distinct constructs.

Lastly, the manuscript adopts an academic definition of social trust - "a generalized belief in the benevolence of others" - but does not verify that participants share this definition. Lay conceptions of trust often collapse benevolence and reliability with willingness to cooperate. When 65 % of respondents select "declining trust" as a main reason for falling cooperation, they may simply be restating the dependent variable in different words. A short manipulation check (e.g., asking participants to

define “trust in other people” before ranking reasons) or a wording that clearly distinguishes trust in intentions from expectations of cooperative behavior would help ensure that “trust” is not merely a synonym for “cooperation” in respondents’ minds.

2. “Causes” of perceived decline in trust.

A significant conceptual issue in the manuscript concerns the interpretation of participants’ selected explanations (e.g., declining trust, increasing stress) as causal drivers of their beliefs in declining cooperation. These selections were elicited through a ranking task that followed participants’ cooperation judgments, and they reflect retrospective self-reports, not real-time cognitive antecedents or experimentally controlled manipulations.

This distinction is crucial: people’s folk explanations or lay theories—what they say drove their beliefs—may not align with the actual psychological processes or environmental exposures that did. The reliance on self-generated attributions opens the door to ex post rationalization, memory distortion, or culturally available narratives, none of which provide causal evidence *per se*.

As such, describing these factors as “drivers” or “underlying causes” (as the manuscript often does) risks conflating salience with causality, and overstates the evidentiary strength of the data.

To avoid misleading causal inferences, we recommend the following:

1. Terminological Adjustment: Re-label the attribution variables as “perceived reasons,” “lay explanations,” or “folk attributions” rather than “drivers” or “causal factors.”
2. Wording Correction: Replace causal phrases (e.g., “X caused belief Y” or “X was a primary driver of decline perceptions”) with descriptive wording (e.g., “X was among the most frequently cited explanations” or “Participants most often attributed decline beliefs to X”).
3. Interpretive Framing: Clarify in the discussion that these results reflect popular narratives about social change, not verified causal relationships. The authors should note that true causal claims would require longitudinal data, natural experiments, or experimental manipulations of candidate mechanisms like trust or stress.

3. Positioning Relative to Prior Work

The manuscript would benefit from a clearer and more explicit articulation of how it builds on and extends prior research, particularly the influential work by Mastroianni and Gilbert (2023) on the “illusion of moral decline” and the two major cross-temporal meta-analyses by Yuan et al. (2022, 2024).

The empirical patterns reported here—such as the perceived linear decline in cooperation from the 1960s to the present—closely mirror those in Mastroianni & Gilbert (2023), where participants similarly rated earlier decades as more moral than the present. These parallels suggest that the present study functions in part as a replication, and this continuity should be acknowledged. At the same time, the current work makes meaningful extensions by:

- Shifting focus from general morality to cooperation, including both trait-based and behavioral proxies (e.g., the Prisoner’s Dilemma),
- Collecting future-oriented estimates (through to 2030), and
- Examining cross-national comparisons (U.S. and China) in both beliefs and attributions.

Similarly, the paper’s core premise—the gap between objectively increasing cooperation and subjectively perceived decline—is strongly supported by the findings of Yuan et al. (2022, *Psychological Bulletin*) and Yuan et al. (2024, *Acta Psychologica Sinica*), which provide meta-analytic evidence of rising cooperation among strangers in both the U.S. (1956–2017) and China (1999–2019).

These studies offer the behavioral foundation for the current investigation. Yet they are not prominently discussed or used to clarify the novelty of the current work.

To better position the contribution, the authors should:

1. Explicitly engage with prior findings in the Introduction. Briefly summarize the key findings of Mastroianni & Gilbert and Yuan et al., and clarify that the present work replicates core belief patterns while offering new insights into lay predictions and folk theories about social decline.
2. Clarify what is new:
 - o The inclusion of future projections (2030) is genuinely novel, and the finding that beliefs stabilize or even slightly rebound contrasts with the uniform decline seen in backward-looking perceptions.
 - o The use of game-based cooperation estimates, rather than only trait impressions, adds a behavioral flavor to the measurement of belief.
 - o The cross-cultural design, with attention to different attribution profiles (e.g., social media vs. education), enriches the field’s understanding of how these beliefs are socially situated.
3. Distinguish replication from extension: Help the reader understand which elements of the design and findings reinforce earlier results (e.g., the perceived decline trajectory), and which genuinely extend the literature (e.g., projected stabilization, cross-national attribution differences, behavioral estimation tasks).

Clarifying this would not only strengthen the paper’s contribution but also avoid the impression of conceptual redundancy or

ambiguous novelty. Properly positioned, this paper offers a useful bridge between actual behavioral change (as tracked in meta-analyses) and public narratives about that change—narratives which may shape everything from public trust to institutional legitimacy.

4. Theoretical paradox

The paper touches on but does not fully confront a striking paradox at the heart of its findings. If humans are conditional cooperators—adjusting their behavior in response to beliefs about others' cooperation—then widespread belief in declining cooperation should logically lead to lower cooperation. And yet, the behavioral data (from Yuan et al., 2022, 2024) show that cooperation has increased over time. This contradiction is not trivial. It suggests a disconnect between belief and behavior, or at least between retrospective beliefs and present-day expectations. The manuscript would benefit from engaging more directly with this tension. Is it possible that people are pessimistic about the past but relatively optimistic about the present? Or that other mechanisms (e.g., institutions, reputation, sanctions) override belief-based regulation of behavior? Addressing this paradox would not only clarify the theoretical stakes of the paper but also deepen its explanatory power.

Additional remarks

1. If we understood correctly the method paragraph (if not, ignore); participants likely judged the years in chronological order, which could inadvertently prime a sense of trajectory (e.g., a respondent might sense the “expected” pattern and project a decline). If the year order was fixed (e.g. oldest to newest), some respondents might extrapolate a linear decline across their judgments. It would be helpful if the authors clarified whether year order was randomized or fixed in ascending sequence. Randomizing the order of time-points (or counterbalancing sequences across participants) could ensure that any perceived decline is not an artifact of question order. Nonetheless, the clear linear trend observed suggests a genuine belief rather than just an anchoring effect, especially since Group 2 (with a different set of years) showed a similar linear decline.

2. We would recommend revising or qualifying the claim that “real-life cooperation has also risen,” (l.76) particularly as it currently relies on the Global Cooperation Barometer 2024 as evidence. The Barometer tracks cooperation at the institutional and international level - e.g., in domains such as trade, capital, innovation, climate, and public health - which reflects macro-level, policy-driven or mediated forms of cooperation. While important, these trends do not directly inform us about individual-level interpersonal cooperation, which is the focus of the rest of the study (e.g., behavior in prisoner's dilemma games or perceived prosociality of everyday others). Thus, the reference risks conflating structurally coordinated action between states or organizations with spontaneous, trust-based cooperation between individuals. A more appropriate parallel to the belief in declining interpersonal cooperation would require longitudinal data on everyday cooperative behavior (e.g., helping behavior, volunteering from the WVS) at the individual level.

3. Both samples come from paid online panels. Such panels skew toward younger, more urban, and more educated internet users. Without weighting or a census comparison, claims of a “widespread” belief cannot be generalized to off-line or older populations. Reporting demographic divergences and, if possible, re-estimating key effects with population weights would improve external validity.

Reviewer #2 (Remarks to the Author):

I learn a lot from this research, especially the experimental design. To elevate the significance of the manuscript, I hope the authors can clarify the following questions.

Prisoner's Dilemma Game is used to measure the perceived cooperation of individuals in the past (and future). I wonder how to infer that cooperation is declining from assessment of people over the 60 years. This research can only claim that people become more cooperative or less cooperative in their perception.

Although the authors mentioned Cooperation Databank as a benchmark of cooperation rate across years and cited Spadaro, G. et al. (2022), I wonder if they can explain more on how they retrieve the information from the databank or previous publication.

About the reasons for beliefs in a decline in cooperation, the authors report that Chinese participants listed trust, stress, wealth, and education as more important, while U.S. participants were more likely to select social media, face-to-face contact, technology, and religiosity as important causes. How do the authors come to the conclusion that a decline in trust, as well as an increase in stress, wealth, and individualism are perceived as key reasons for a decline in cooperation?

The authors find that individuals in both China and the USA exhibited increased levels of cooperation towards strangers in the prisoner's dilemma and other economic games over the past two and six decades. I wonder if this finding verifies any hypothesis.

Moreover, the authors argue that this finding has cross-societal generalizability although these two countries differ in key cultural and social dimensions. I wonder how to generalize this finding to other countries. Does it mean that we can find similar results in every country that is different from either China or the US?

Reviewer #3 (Remarks to the Author):

I co-reviewed this manuscript with one of the reviewers who provided the listed reports. This is part of the Communications Psychology initiative to facilitate training in peer review and to provide appropriate recognition for Early Career Researchers who co-review manuscripts.

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Version 1:

Decision Letter:

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Dear Dr Liu,

Your manuscript titled "The belief in a decline in cooperation in the USA and China" has now been seen by our reviewers, whose comments appear below. In light of their advice I am delighted to say that we are happy, in principle, to publish a suitably revised version in Communications Psychology.

We therefore invite you to revise your paper one last time to address the remaining concerns of our reviewers and a list of editorial requests. At the same time we ask that you edit your manuscript to comply with our format requirements and to maximise the accessibility and therefore the impact of your work.

EDITORIAL REQUESTS:

Thank you for attending to the Revision request table with such care. Formatting and reporting are mostly in good shape. A few issues remain. Please review our specific editorial comments and requests regarding your manuscript in the attached "Editorial Requests Table". Please outline your response to each request in the right hand column. Please upload the completed table with your manuscript files as a Related Manuscript file.

As a high-level point, many of the analyses and some aspects of the methods are only reported in the Supplementary Information file. While we do recommend keeping the overall length of the paper at 5000 words, we strongly believe that transparency of reporting needs to be prioritized over brevity. It is fine to exceed the word guidance for that purpose. I therefore strongly recommend to report all preregistered analyses in the main paper; moreover, analyses that support the elements of the Discussion should also be in the main paper, rather than the SI. Regarding the description of the Methods, at least the summary of sample characteristics should be moved to the main paper as well.

If you have any questions or concerns about any of our requests, please do not hesitate to contact me.

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We hope to hear from you within two weeks; please let us know if you need more time.

Best regards,

Marika

Marika Schiffer, PhD
Chief Editor
Communications Psychology

REVIEWERS' COMMENTS:

Reviewer #1 (Remarks to the Author):

The revised manuscript demonstrates substantial improvement and addresses many of the concerns raised in the previous round of review. The explanations are clearer, the discussion is more developed, and the additional analyses strengthen the overall contribution. In our view, the manuscript is now suitable for publication in Communications Psychology.

The comments below are therefore intended as constructive suggestions rather than requirements. They are offered in the spirit of further clarification and theoretical sharpening, and the authors should feel free to decide which points they wish to address and which they prefer to leave aside.

1. Years in chronological order

Although the authors conducted useful robustness checks, including cross-validation across two groups with distinct year sets and treating year as a categorical variable in ANOVAs, these analyses do not fully eliminate the possibility of order effects, because year and trial position remain perfectly confounded in both groups. These checks nonetheless provide reassuring evidence that the observed trend is unlikely to be driven by a small number of anomalous years or by idiosyncrasies of a particular subsample.

Accordingly, the current wording that these checks “rule out” order effects may be slightly overstated. A more cautious formulation (e.g., replacing “rule out” with “substantially weaken” or “undermine”) and an explicit acknowledgment of this remaining limitation would improve precision.

2. Actual vs. perceived cooperation rates in the prisoner’s dilemma game

We note that the procedure for computing the cooperation rate for the year 2030 using CoDa is reported in Supplementary Material Section 16. Did the authors also compute actual cooperation rates in the prisoner’s dilemma game for the historical years? If so, reporting both the actual cooperation rates and the perceived cooperation rates measured in the present study would provide an informative comparison. Such an analysis would further support the central claim regarding a subjective “illusion of cooperation decline,” by directly documenting potential discrepancies between belief and behavior.

3. Theoretical paradox

In response to the theoretical tension between beliefs about declining cooperation and observed cooperative behavior, the authors suggest that (a) general beliefs about societal-level cooperation do not directly affect behavior toward a specific individual, and (b) beliefs in a decline in cooperation matter most for interactions with strangers, large communities, or abstract institutions.

This line of reasoning is plausible and potentially important. However, in the current manuscript, the empirical or theoretical grounding for this distinction remains relatively limited. The argument would benefit from either additional supporting evidence or clearer theoretical anchoring.

Moreover, many interactions with strangers still involve identifiable individuals (e.g., targeted charitable giving to a specific homeless person). Clarifying which forms of cooperation are expected to be sensitive to beliefs about declining cooperation would sharpen the theoretical contribution.

Relatedly, several claims in the manuscript may be stronger than what the current evidence warrants, for example:

- “Additionally, expecting little cooperation from others can create a self-fulfilling prophecy...” (p. 10), and
- “A belief in a decline in cooperation can seriously undermine one’s own cooperation...” (Conclusion).

If the authors maintain the position that beliefs about cooperation primarily affect interactions with large-scale or impersonal entities, it may be useful to frame these claims more cautiously and to explicitly identify future research directions. In particular, future work could examine real-world cooperative behaviors outside economic games, especially cooperation toward abstract institutions or large communities, and test whether these behaviors show the proposed declining pattern.

At the same time, it may be worth considering an alternative hypothesis: cooperation toward large-scale institutions may have increased over time due to improvements in norms and institutional quality, even as people believe cooperation is declining. Under this view, actual cooperative behavior and the “illusion of cooperation decline” would be partially independent phenomena shaped by distinct mechanisms.

Specifically, actual cooperation may be calibrated to current ecological and institutional affordances, whereas the perceived decline in cooperation may stem from evolved threat-detection or risk-avoidance mechanisms that heighten sensitivity to norm violations in the present, producing an idealized view of the past without necessarily affecting behavior.

4. Social trust and perceived changes in cooperation

To illustrate that laypeople may not sharply distinguish trust from cooperation, the authors note that “participants reported to perceive a consistent decline in social trust...” and refer to Supplementary Figure S9. If we understand correctly, this description appears to correspond instead to Supplementary Figures S10 and S11. This may simply be a citation error, but it would be helpful to verify and correct the reference.

Reviewer #2 (Remarks to the Author):

The authors have addressed generalizability issue by analyzing weighted data. They also honestly agree that the Prisoner's Dilemma game only reflects the subjective perception of cooperation. Besides, they explain how these data is collected. Therefore, I would like to recommend this paper to the journal.

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We would like to thank the editor and all the reviewers for their encouraging remarks and constructive criticism, which have led to a substantial revision of the paper. We believe we have carefully addressed all issues, small and large, and believe that these revisions have resulted in a more balanced and scholarly introduction, a clearer results section, and a more thoughtful and comprehensive discussion section.

All changes made in the manuscript are tracked and uploaded as an additional supplementary file. Besides, we listed the detailed responses below and copy-and-pasted the revised text next to our responses (a quotes and in italics) with the page numbers and line numbers of the version without markups.

We hope that you find our revisions easy to navigate and the resulting manuscript suitable for publication in Communications Psychology.

Comments from Reviewer 1

1. Conceptual Clarification between trust and cooperativity

Despite a clear sentence late in the Discussion - “Social trust refers to a generalized belief in the benevolence of others, whereas cooperation refers to actual behavioral engagement in situations of interdependence... Trust can facilitate cooperation, but people may also cooperate for strategic, reputational, or institutional reasons - even without high trust” (p. 7) - the manuscript leaves these constructs partially conflated in earlier sections. Throughout the Introduction the terms “morality,” “trust,” and “cooperation” appear side-by-side as “key ingredients” of one another; yet it remains ambiguous whether they are being treated as parallel indicators, hierarchical antecedent-outcome pairs, or mutually reinforcing facets of a single latent variable. Furthermore, some of the cited work use different conceptualizations - and thus different relations - between trust, cooperation and morality. Without a firm conceptual map at the outset, readers may struggle to interpret causal language later on, because it is never made explicit whether trust is hypothesised as (a) a psychological mechanism that shapes perceptions, (b) an objectively changing societal parameter, or (c) itself another perceived outcome.

For a clear example, compounding this ambiguity, the operationalisation of “cooperation-related traits” via the Communion–Agency (C-A) adjective lists embeds trust and morality directly inside the cooperation measure. Morality items (“fair,” “honest,” “just,”

“trustworthy,” “reliable”) and warmth items are themselves classic indicators (or explicit reference, in the case of trustworthy) of social trustworthiness; therefore sharp inferences about how perceived trust predicts perceived cooperation are potentially circular. The study thus risks re-labelling a single cognitive judgment in multiple ways rather than disentangling distinct constructs.

Lastly, the manuscript adopts an academic definition of social trust - “a generalized belief in the benevolence of others” - but does not verify that participants share this definition. Lay conceptions of trust often collapse benevolence and reliability with willingness to cooperate. When 65 % of respondents select “declining trust” as a main reason for falling cooperation, they may simply be restating the dependent variable in different words. A short manipulation check (e.g., asking participants to define “trust in other people” before ranking reasons) or a wording that clearly distinguishes trust in intentions from expectations of cooperative behavior would help ensure that “trust” is not merely a synonym for “cooperation” in respondents’ minds.

Authors' response: To address this issue, we have revised the manuscript in two respects: (1) we clarified the conceptual definitions and relationships among cooperation, trust, and morality in an earlier section of the Introduction (Page 2, Lines 67-84); (2) we added an additional paragraph to the Discussion section, in which we discussed that laypeople may not always differentiate trust from cooperation as clearly as researchers do while presenting our supplementary analyses on perceived trust trends (Pages 9-10, Lines 461-474). We believe that these two newly added paragraphs, together with an existing paragraph that describes the partial conceptual overlap between "trustworthiness" items in the Communion–Agency scale and generalized social trust scale in the Discussion section (see Page 9, Lines 445-460), can jointly address your concerns. For brevity, we only pasted the revised paragraphs below, while the existing paragraph can be found in the Discussion section.

“Similarly, research showed that people perceive declines in social trust and morality—which have been considered two important ingredients of cooperation^{18,19}. Social trust is often described as the willingness to accept vulnerability based on positive expectations or beliefs regarding others’ benevolent intentions or behavior²⁰⁻²². Given that cooperation requires individuals to engage in behaviors to promote mutual benefit at personal cost with a risk of being exploited²³, greater social trust often encourages people to take the risk of cooperating with others¹⁸. By analyzing people’s responses

in national surveys and trust scales administered in the past several decades, researchers found that Americans reported a decline in beliefs about others' benevolence (i.e., social trust) ²⁴ from 1960 to 2012 ^{13,25}. A similar decline in social trust has been observed in China between 1998 and 2016 ^{26,27}.

Morality is often conceptualized in terms of normative evaluations involving fairness, honesty, or justice. From an evolutionary perspective, norm-based morality can be understood as a psychological adaptation that helped cooperation evolve in small-scale and large societies ²⁸. A recent study examined beliefs about morality across 60 nations. Researchers analyzed 177 survey items that asked representative samples of a total of 220,772 Americans (from 1949 to 2019) and 58 items from 59 other nations (from 1996 to 2007, 354,120 participants). They found that around 85% of participants perceived a decline in morality, honesty, goodness, and trustworthiness (not including data from China) ¹⁵." (Page 2, Lines 67-84)

"We also examined participants' perceptions of social trust across decades. As shown in Supplementary Figure S9, participants reported to perceive a consistent decline in social trust, regardless of whether they believed cooperation itself had declined or increased, although the decline was steeper among those who believed cooperation had decreased. This pattern suggests that individuals conceptually link—but do not fully equate—trust and cooperation. Nevertheless, one might question whether participants clearly differentiated between trust and trustworthiness, since the Communion–Agency scale includes morality-related items such as "trustworthy". It is possible that laypeople conflate these constructs more than researchers do, potentially re-labelling similar judgments (e.g., "this person seems reliable and honest"; trustworthiness) in different terms (e.g., "I feel comfortable relying on this person"; trust). We acknowledge this as a limitation and suggest that future studies assess additional qualitative information (e.g., asking participants to explicitly define "trust in other people" before ranking reasons) or longitudinal designs to better capture the causal relationships among perceived trust, perceived cooperation, and their behavioral correlates." (Pages 9-10, Lines 461-474)

2. "Causes" of perceived decline in trust.

A significant conceptual issue in the manuscript concerns the interpretation of participants' selected explanations (e.g., declining trust, increasing stress) as causal drivers of their beliefs in declining cooperation. These selections were elicited through a ranking task that followed participants' cooperation judgments, and they reflect retrospective self-reports, not real-time cognitive antecedents or experimentally controlled manipulations.

This distinction is crucial: people's folk explanations or lay theories—what they say drove their beliefs—may not align with the actual psychological processes or environmental

exposures that did. The reliance on self-generated attributions opens the door to ex post rationalization, memory distortion, or culturally available narratives, none of which provide causal evidence per se.

As such, describing these factors as “drivers” or “underlying causes” (as the manuscript often does) risks conflating salience with causality, and overstates the evidentiary strength of the data.

To avoid misleading causal inferences, we recommend the following:

- 1. Terminological Adjustment: Re-label the attribution variables as “perceived reasons,” “lay explanations,” or “folk attributions” rather than “drivers” or “causal factors.”*
- 2. Wording Correction: Replace causal phrases (e.g., “X caused belief Y” or “X was a primary driver of decline perceptions”) with descriptive wording (e.g., “X was among the most frequently cited explanations” or “Participants most often attributed decline beliefs to X”).*
- 3. Interpretive Framing: Clarify in the discussion that these results reflect popular narratives about social change, not verified causal relationships. The authors should note that true causal claims would require longitudinal data, natural experiments, or experimental manipulations of candidate mechanisms like trust or stress.*

Authors' response: We very much appreciate this thoughtful comment and constructive suggestions and find ourselves in perfect agreement with the points you raised. Hence, we revised the manuscript in two major ways. First, we have systematically revised potentially suggestive terminology or wording throughout the manuscript (Abstract, Results, Discussion, and Method sections) to avoid references to causality, for example, the word “drivers” in the Abstract was replaced by “perceived reason”; in the results section, the word “reason” was replaced by “attribution” or “perceived reason”. Second, we have strengthened the Limitations section to explicitly address the gap between lay explanations and causality (Page 11, Lines 532-545, or see pasted text below):

“Second, our study explored perceived reasons underlying beliefs about cooperation. However, the reasons for participants to judge were pre-determined based on prior literature rather than spontaneously generated by participants. Future research could directly examine reasons that were generated by participants to complement the present research and to more

directly capture the naturally occurring reasons that participants actively experience (or have experienced) themselves. That is, while the perceived reasons do in fact reflect people's folk explanations or their lay theories, they may be different from the actual psychological processes that determine their beliefs. For example, self-reported attributions may introduce risks of post hoc rationalization (e.g., justifying beliefs after the fact), memory distortion (e.g., misremembering what guided initial judgments), or alignment with culturally salient narratives (e.g., echoing societal discourse about "moral decline"), none of which can ensure causal evidence⁷⁵. We emphasize that complementary evidence for the plausibility of causal claims about the causes of beliefs in cooperation decline can be derived from, for example, longitudinal data or experimental studies in the laboratory or the field." (Page 11, Lines 532-545)

3. Positioning Relative to Prior Work

The manuscript would benefit from a clearer and more explicit articulation of how it builds on and extends prior research, particularly the influential work by Mastroianni and Gilbert (2023) on the "illusion of moral decline" and the two major cross-temporal meta-analyses by Yuan et al. (2022, 2024).

The empirical patterns reported here—such as the perceived linear decline in cooperation from the 1960s to the present—closely mirror those in Mastroianni & Gilbert (2023), where participants similarly rated earlier decades as more moral than the present. These parallels suggest that the present study functions in part as a replication, and this continuity should be acknowledged. At the same time, the current work makes meaningful extensions by:

- Shifting focus from general morality to cooperation, including both trait-based and behavioral proxies (e.g., the Prisoner's Dilemma),*
- Collecting future-oriented estimates (through to 2030), and*
- Examining cross-national comparisons (U.S. and China) in both beliefs and attributions.*

Similarly, the paper's core premise—the gap between objectively increasing cooperation and subjectively perceived decline—is strongly supported by the findings of Yuan et al. (2022, Psychological Bulletin) and Yuan et al. (2024, Acta Psychologica Sinica), which provide meta-analytic evidence of rising cooperation among strangers in both the U.S. (1956–2017) and China (1999–2019).

These studies offer the behavioral foundation for the current investigation. Yet they are not prominently discussed or used to clarify the novelty of the current work.

To better position the contribution, the authors should:

1. Explicitly engage with prior findings in the Introduction. Briefly summarize the key findings of Mastroianni & Gilbert and Yuan et al., and clarify that the present work replicates core belief patterns while offering new insights into lay predictions and folk theories about social decline.

2. Clarify what is new:

o The inclusion of future projections (2030) is genuinely novel, and the finding that beliefs stabilize or even slightly rebound contrasts with the uniform decline seen in backward-looking perceptions.

o The use of game-based cooperation estimates, rather than only trait impressions, adds a behavioral flavor to the measurement of belief.

o The cross-cultural design, with attention to different attribution profiles (e.g., social media vs. education), enriches the field's understanding of how these beliefs are socially situated.

3. Distinguish replication from extension: Help the reader understand which elements of the design and findings reinforce earlier results (e.g., the perceived decline trajectory), and which genuinely extend the literature (e.g., projected stabilization, cross-national attribution differences, behavioral estimation tasks).

Clarifying this would not only strengthen the paper's contribution but also avoid the impression of conceptual redundancy or ambiguous novelty. Properly positioned, this paper offers a useful bridge between actual behavioral change (as tracked in meta-analyses) and public narratives about that change—narratives which may shape everything from public trust to institutional legitimacy.

Authors' response: Thank you for your elaborate and constructive suggestions on how to better position our work in the context of past research. We have followed each suggestion in the revision by adding a more detailed introduction regarding the studies of Mastroianni & Gilbert (see our response to Comment 1) and Yuan et al. in the Introduction section (Pages 2-3, Lines 87-101).

“However, the reality appears to be different from what people believe. Contrary to popular expectations^{13,15}, analyses of experimental research on cooperation indicate that individuals in both the USA and China exhibited increased levels of cooperation towards strangers in the prisoner’s dilemma and other economic games over the past six and two decades, respectively^{29,30}. These studies are part of the Cooperation Databank (CoDa), which includes 2,636 studies on human cooperation that were conducted across six decades (from 1958 to 2017) across 78 societies³¹. Specifically, Yuan and colleagues analyzed 511 studies conducted between 1956 and 2017 with American participants, and 254 studies from 1999 to 2019 with Chinese participants interacting in prisoner’s dilemma, public goods dilemma, and resource dilemma games. Through a cross-temporal meta-analysis, they examine the relationship between data collection year and cooperation levels. Against popular expectations, the results showed that cooperation in games among strangers increased significantly in both countries: the cooperation rate in the USA rose by 21% over 61 years, and that in China also increased by 36% over 20 years. Overall, these meta-analyses indicated that cooperation in the game settings is objectively rising^{29,30}.” (Pages 2-3, Lines 87-101)

Moreover, we have emphasized the goals of replication and extensions of past research both at the beginning (Page 3, Lines 112-125) and the end (Page 4, Lines 179-183) of the Present Study section.

“The present preregistered study was inspired by several goals that complement and extend earlier research on perceived trust and morality^{13,15,26}. Mastroianni and Gilbert (2023) illustrated that there is a gap between perception and reality, and that people may systematically underestimate the moral character of their contemporaries. Our study aimed to replicate this pattern, but shifting the focus from morality to cooperation. This allows us to examine not only perceptions of interpersonal traits (e.g., fairness, honesty, and trustworthiness), but also actual cooperative behaviors in social dilemmas. Moreover, our study extends this research in several ways: First, our research focuses more strongly on human cooperation as studied in the social dilemma literature, a behavior that can be motivated by trust and morality²⁸. Second, rather than focusing on the USA, we investigated whether the belief in declining cooperation exists in both the USA and China. Third, we examined whether this belief in a decline in cooperation extends into the near future. Finally, we explored the role of broader societal trends that participants may perceive as underlying a belief in change in cooperation over time. Each of these aims is elaborated below.” (Page 3, Lines 112-125)

“Thus, in addition to conceptually replicate, the current study extends prior research by focusing on human cooperation as well as judgments, by including participants from two large nations, by examining future projections, and both behavioral and trait-based estimation tasks. Moreover, we examine how laypeople perceive, predict, and explain the changes of cooperation based on perceived social changes in their societies.” (Page 4, Lines 179-183)

4. Theoretical paradox

The paper touches on but does not fully confront a striking paradox at the heart of its findings. If humans are conditional cooperators—adjusting their behavior in response to beliefs about others' cooperation—then widespread belief in declining cooperation should logically lead to lower cooperation. And yet, the behavioral data (from Yuan et al., 2022, 2024) show that cooperation has increased over time. This contradiction is not trivial. It suggests a disconnect between belief and behavior, or at least between retrospective beliefs and present-day expectations. The manuscript would benefit from engaging more directly with this tension. Is it possible that people are pessimistic about the past but relatively optimistic about the present? Or that other mechanisms (e.g., institutions, reputation, sanctions) override belief-based regulation of behavior? Addressing this paradox would not only clarify the theoretical stakes of the paper but also deepen its explanatory power.

Authors' response: Yes, we agree that it raises this logical paradox and that we need to provide greater attention to some additional mechanisms. In the revised manuscript, we have added the discussion about this paradox together with some possible explanations (Page 9, Lines 425-444).

“At the same time, numerous studies have shown that humans are conditional cooperators. People adjust their behavior in response to their beliefs about others' willingness to cooperate⁵¹. From this perspective, the widespread belief in declining cooperation should reduce cooperation behaviors. However, meta-analytic results indicate an opposite trend in that cooperation in economic games seem to have slightly increased over the years^{29,30}. Does this suggest a disconnect between beliefs or expectations and behaviors? The present study revealed that although people were pessimistic about the past, they are less pessimistic about the future⁵². This trend for the future may help sustain or even encourage cooperation. It is also possible that general beliefs about a decline in cooperation do not directly affect our behavior towards one particular person, even though these one-on-one interactions are arguably the contexts where tendencies toward conditional cooperation are strongest⁵³.

Of course, there might be many other potential mechanisms underlying the mismatch between cooperation-related beliefs and behaviors. Cooperation in daily life is shaped by diverse contextual factors such as reputation management, institutional incentives, and social norms^{54,55}. For example, people may choose not to help a stranger on the street, but still cooperate in structured settings such as laboratory games (or vice versa), where

expectations, payoffs, and reputational cues differ. Also, it is possible that beliefs in a decline in cooperation matter the most in our interactions with strangers, the community at large, or with abstract institutions. For example, falling prey to self-interest beliefs may undermine our efforts to mitigate climate change or make donations to causes that seek to reduce poverty⁵⁶.”
(Page 9, Lines 425-444)

Additional remarks:

5. If we understood correctly the method paragraph (if not, ignore); participants likely judged the years in chronological order, which could inadvertently prime a sense of trajectory (e.g., a respondent might sense the “expected” pattern and project a decline). If the year order was fixed (e.g. oldest to newest), some respondents might extrapolate a linear decline across their judgments. It would be helpful if the authors clarified whether year order was randomized or fixed in ascending sequence. Randomizing the order of time-points (or counterbalancing sequences across participants) could ensure that any perceived decline is not an artifact of question order. Nonetheless, the clear linear trend observed suggests a genuine belief rather than just an anchoring effect, especially since Group 2 (with a different set of years) showed a similar linear decline.

Authors' response: We think this is an interesting issue to address. Yes, we confirm that the years participants judged in our study were presented in a fixed chronological order. We have now added this detail to the Procedure section: “Specifically, participants in Group 1 answered questions regarding their beliefs about people living in 1960, 1980, 2000, and 2020, while participants in Group 2 responded to questions about their beliefs about people living in 1970, 1990, 2010, and 2030. Both groups rated these beliefs in a fixed chronological order.”
(Page 5, Lines 213-217)

As you noted, cross-validation across two groups with distinct sets of target years suggests that the perceived decline reflects a genuine belief rather than anchoring or order perceptions (e.g., among USA participants, the sixties may have a stronger association with peace movements than the seventies). We further reinforce this with additional empirical evidence: We treated Year as a categorical variable and conducted ANOVA analyses, which are reported in Supplementary Material Section 8. The results showed significant differences between many year pairs. Importantly, these significant pairs involve consecutive years that were rated by different groups of participants (the same participants did not rate sequential

years), which partially and indirectly rules out the possibility that order-based priming drove the significance.

We have added a footnote to the Methods section to provide context for these points:

“While this fixed order raises potential priming concerns, in the Supplementary Material Section 8, we provide additional evidence that rules out order artifacts by showing that: (1) cross-validation across two groups with distinct year sets showed parallel declining trends; (2) when treating year as categorical variable in ANOVAs, results revealed significant differences across many consecutive pairs of year.” (Page 5, Footnote 1)

6. *We would recommend revising or qualifying the claim that “real-life cooperation has also risen,” (l.76) particularly as it currently relies on the Global Cooperation Barometer 2024 as evidence. The Barometer tracks cooperation at the institutional and international level - e.g., in domains such as trade, capital, innovation, climate, and public health - which reflects macro-level, policy-driven or mediated forms of cooperation. While important, these trends do not directly inform us about individual-level interpersonal cooperation, which is the focus of the rest of the study (e.g., behavior in prisoner’s dilemma games or perceived prosociality of everyday others). Thus, the reference risks conflating structurally coordinated action between states or organizations with spontaneous, trust-based cooperation between individuals. A more appropriate parallel to the belief in declining interpersonal cooperation would require longitudinal data on everyday cooperative behavior (e.g., helping behavior, volunteering from the WVS) at the individual level.*

Authors' response: Indeed, the Global Cooperation Barometer 2024 does indeed reflect macro-level cooperation, rather than the interpersonal cooperation between individuals that our study focuses on. To reduce conflation, we decided to delete this in the revised manuscript. Instead, we elaborated Yuan’s studies as evidence of increasing cooperation (see response to Comment 3 for the revised paragraph). We also checked the WVS data, and it seems that these relevant questions were only asked once or twice, which could not provide a reliable indicator of change.

7. *Both samples come from paid online panels. Such panels skew toward younger, more urban, and more educated internet users. Without weighting or a census comparison, claims*

of a “widespread” belief cannot be generalized to off-line or older populations. Reporting demographic divergences and, if possible, re-estimating key effects with population weights would improve external validity.

Authors' response: Thank you for your suggestions to address generalizability issues. We agree that these issues are important. We followed your suggestion and re-analyzed the data using weighted data. The weights are found based on official databank in the USA and China (also reported in the Supplementary Table S29). The results show similar patterns and are now both reported in full in the Supplementary Material Section 15 and mentioned in the main text as a limitation and direction for future study (Pages 10-11, Lines 522-531).

“Another related issue is the generalizability of the sample to the population of each country. Both samples were recruited from professional online panels, which introduced skew in some demographic characteristics. For instance, urban residents with access to the internet, as well as people with higher incomes and education levels, could be overrepresented in these types of samples. To reduce the influence of these biases, we conducted additional analyses with the sample weighted according to age, education, and income. The results showed similar patterns to those reported here (see Supplementary Material Section 15), confirming the robustness of the beliefs in declining cooperation. However, it remains an open and important empirical question that is whether individuals from rural areas or non-internet users hold similar beliefs.” (Pages 10-11, Lines 522-531)

Comments from Reviewer 2

1. *Prisoner’s Dilemma Game is used to measure the perceived cooperation of individuals in the past (and future). I wonder how to infer that cooperation is declining from assessment of people over the 60 years. This research can only claim that people become more cooperative or less cooperative in their perception.*

Authors' response: We agree that our use of the Prisoner's Dilemma game measures participants' perceptions of changes in cooperation rather than showing actual historical changes in cooperative behavior. The focus of our study is indeed on the subjective perception of cooperation trends, or how individuals believe cooperation has changed.

To minimize any misunderstandings, we clarified this distinction in the revised manuscript. Specifically, we now note that our contribution lies in examining people's beliefs about these trends rather than the objective changes themselves. We revised the end of the introduction to highlight this focus.

“Thus, in addition to replication, the current study extends prior research by focusing on human cooperation as well as judgments, by including participants from two large nations, by examining future projections, and both behavioral and trait-based estimation tasks. Moreover, we examine how laypeople perceive, predict, and explain the changes of cooperation based on perceived social changes in their societies.” (Page 4, Lines 179-183)

2. Although the authors mentioned Cooperation Databank as a benchmark of cooperation rate across years and cited Spadaro, G. et al. (2022), I wonder if they can explain more on how they retrieve the information from the databank or previous publication.

Authors' response: In the revised manuscript, we have expanded Footnote 2 on Page 5 to indicate that the detailed explanation of how these data were obtained and calculated can be found in the Supplementary Material Section 16.

“The cooperation rates for the year 2030 were estimated based on the previous cooperation rate and the relation between time and cooperation 26. The detailed procedures are reported in the Supplementary Material Section 16, the analytic script, dataset, as well as the calculated (or inferred) actual cooperation rates can be found in the OSF (<https://osf.io/at8ks>). Note that we do not use the actual calculated cooperation rate to test hypotheses; we only use it to incentivize the task, as a criterion to decide whether to give participants a bonus.” (Page 5, Footnote 2)

“To provide incentives for participants corresponding to their guesses regarding the cooperation rate in prisoner's dilemma games, we calculated the real cooperation rate based on the data from CoDa. The cooperation rates for the year 2030 were estimated based on the previous cooperation rate and the relation between time and cooperation. Specifically, we retrieved cooperation data from the CoDa on March 15th, 2023, targeting the search by country (China, Hong Kong, USA), type of the game (i.e., one-shot, prisoner's dilemma, interactions with strangers, 2 choice options (i.e., cooperate or defect), resulting in 111 articles (112 studies with U.S. participants and 29 studies with Chinese participants). To analyze trends over time, we grouped the studies into discrete year groups using two interval strategies: ± 5 years and ± 8 years. Then, we used the rma function (metafor package) ⁸ with restricted maximum likelihood (REML) estimation to pool the logit-

transformed cooperation rate by country and year group^{9,10}. Due to insufficient data for the early Chinese year groups, especially those before 1985, we used the U.S. participants' data as the real cooperation rate during debriefing. To estimate the expected cooperation rate in 2030, we used the non-standardized linear regression coefficient from Yuan's study of the U.S. samples ($b = 0.005$). Based on the estimated 53.20% cooperation rate in 2020 ($\log = 0.1283$), the expected rate in 2030 is 54.4% ($\log = 0.1283 + 10 \times 0.005$)." (Supplementary Material Section 16)

3. About the reasons for beliefs in a decline in cooperation, the authors report that Chinese participants listed trust, stress, wealth, and education as more important, while U.S. participants were more likely to select social media, face-to-face contact, technology, and religiosity as important causes. How do the authors come to the conclusion that a decline in trust, as well as an increase in stress, wealth, and individualism are perceived as key reasons for a decline in cooperation?

Authors' response: Thank you for pointing out this gap. We appreciate the opportunity to clarify how we derived conclusions regarding the perceived causes of declining cooperation. Indeed, in our study, participants selected their top three perceived reasons for cooperation change from a pre-tested list of 12 possible factors. This procedure identified which constructs participants regarded as most important, but it did not directly indicate the direction of perceived change (e.g., whether trust was thought to be decreasing or increasing).

To address this, we have clarified in the revised manuscript that the main-text results concern the salience of these causes rather than their directional trends:

"These findings provide descriptive evidence that trust, as well as stress, wealth, and individualism, are perceived as key attributions for a decline in cooperation." (Page 8, Lines 364-366)

In addition, we also included a footnote in the Discussion stating that the trends of these sociocultural factors were analyzed separately and are reported in the Supplementary Material Section 12.

"The directions of the perceived reasons were measured by asking participants to make subjective judgments about the levels of these reasons at different time points (e.g., "To what extent did people trust each other"). The

corresponding trends are shown in Supplementary Material Section 12.”
(Page 9, Footnote 4)

4. The authors find that individuals in both China and the USA exhibited increased levels of cooperation towards strangers in the prisoner's dilemma and other economic games over the past two and six decades. I wonder if this finding verifies any hypothesis.

Authors' response: We acknowledge that the phrasing in our previous version may have caused some confusion. To clarify, the present study did not test whether people's actual cooperation levels have increased or decreased over time. Two meta-analyses by Yuan and colleagues (2022, 2024) have already examined this, analyzing hundreds of economic game studies and finding small but significant increases in cooperation rates (U.S.: $\beta = .11$; China: $\beta = .16$). Instead, our study examines general beliefs about trends of cooperation across past decades and in the near future. Therefore, we have included more details on Yuan et al.'s studies to enhance clarity and provide a stronger contextualization of our research (see Pages 2-3, Lines 87-101). More elaboration is provided in response to Comment 1 shared by Reviewer 1.

5. Moreover, the authors argue that this finding has cross-societal generalizability although these two countries differ in key cultural and social dimensions. I wonder how to generalize this finding to other countries. Does it mean that we can find similar results in every country that is different from either China or the US?

Authors' response: With the current data, we unfortunately cannot provide a definitive answer, and societies differ in many ways. We state this upfront in the limitation section (Page 10, Lines 512-522). However, the fact that we found this in two sizeable countries that differ greatly in numerous cultural descriptors provides some initial evidence for cross-societal generality of the beliefs in a cooperation decline. We also addressed this issue in the Limitations section, where we stated our predictions and the importance for future research to address generality and moderators.

“First, while our research focuses on two major countries—the USA and China—that differ in key cultural and societal dimensions, the cross-societal generalizability of our findings remains a critical avenue for future investigation. In line with the evidence of the generalized beliefs in declining morality across 60 nations¹⁵, future research might examine whether similar

beliefs about cooperation decline are found in different societies undergoing rapid modernization (like China) or those with established individualistic norms (like the USA). However, it still needs careful empirical examination to examine cross-societal generality. For example, the average levels of cooperation observed in economic games in the USA and China are about average or medium across years, it is not yet clear what the beliefs are in countries where general cooperation (or trust) is low (e.g., Turkey and South India) ⁸. ” (Page 10, Lines 512-522)

Comments from Reviewer 3

I co-reviewed this manuscript with one of the reviewers who provided the listed reports. This is part of the Communications Psychology initiative to facilitate training in peer review and to provide appropriate recognition for Early Career Researchers who co-review manuscripts.

Authors' response: We would like to thank you as well for the constructive comments and suggestions and for the time invested in the review process.