

Higher income is associated with greater life satisfaction, and more stress

Corresponding Author: Dr KARTHIK AKKIRAJU

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 Dr AKKIRAJU,

Thank you for your patience during the peer-review process. Your manuscript titled "With income comes greater life satisfaction, and increased stress" has now been seen by 3 reviewers, whose comments are appended below. You will see that they find your work of some potential interest. However, they have raised quite substantial concerns that must be addressed. In light of these comments, we cannot accept the manuscript for publication, but would be interested in considering a revised version that fully addresses these serious concerns.

We hope you will find the Reviewers' comments useful as you decide how to proceed. Should additional work allow you to address these criticisms, we would be happy to look at a substantially revised manuscript. If you choose to take up this option, please highlight all changes in the manuscript text file, and provide a detailed point-by-point reply to the reviewers.

Please bear in mind that we will be reluctant to approach the reviewers again in the absence of substantial revisions.

The Reviewers raise several significant concerns that will require further data analysis, a much-improved presentation of the work, and an updated review of the existing literature.

Reviewers #1 and #2 raise concerns regarding the alignment between data and interpretation, the lack of mechanistic insight, and the potential issue of collinearity. These concerns must be comprehensively addressed through further empirical work.

Reviewers #1 and #2 also highlight that important prior literature is not cited and that this literature compromises the conceptual novelty of the present findings. We ask that the revision gives fair treatment to the relevant literature and carefully delineates how the work confirms, extends, or contradicts previous findings. Please avoid any novelty claims.

The overall presentation needs to be improved. We provide below a link to our formatting checklist and manuscript template, which we ask you to use in revision. To highlight a few issues particularly pertinent to your work: all Methods and Results need to be comprehensively and transparently reported in the main manuscript. The order of presentation runs: Abstract - Introduction - Methods - Results - Discussion. Only ancillary tests that are not further discussed may be in the SI. For example, the turning points analysis and the regression models for those analyses that are discussed in the Introduction and Discussion need to be in the Methods and Results section and only the additional regression analyses should be in the SI.

Finally, please state explicitly whether you use ethnicity/race labels exactly as contained in Gallup. For scientific transparency, we recommend reporting the category labels as derived from the data (which captures self-report) in the Methods and Results. Please confirm whether Hispanic/Latino was used as a category for race, rather than ethnicity in the original data (and revise the text if necessary). Outside the Methods and Results please refer for example to the <https://apastyle.apa.org/style-grammar-guidelines/bias-free-language/racial-ethnic-minorities> for recommended reporting. If the revision process takes significantly longer than five months, we will 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 are committed to providing a fair and constructive peer-review process. Please do not hesitate to contact us if you wish to discuss the revision in more detail.

Please use the following link to submit your revised manuscript, point-by-point response to the Reviewers' comments with a list of your changes to the manuscript text (which should be in a separate document to any cover letter) and any completed checklist:

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Please do not hesitate to contact me if you have any questions or would like to discuss the required revisions further. Thank you for the opportunity to review your work.

Best regards,

Antonia Eisenkoeck

Antonia Eisenkoeck
Senior Editor
Communications Psychology

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*** DATA AVAILABILITY:**

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- Accession codes where appropriate

- If applicable, a statement regarding data available with restrictions
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Please refer to our data policies at <http://www.nature.com/authors/policies/availability.html>.

REVIEWER EXPERTISE:

Reviewer #1: life satisfaction & income; large datasets

Reviewer #2: life satisfaction & income; large datasets; stress & wellbeing

Reviewer #3: life satisfaction & income; large datasets

Reviewer #1 (Remarks to the Author):

Thank you for the opportunity to review the paper “With greater income comes greater life satisfaction and increased stress.” I thought the paper included an interesting and rigorous analysis using data from the US Gallup Daily Poll (2008-2017).

In the paper, the authors argue that the probability of experiencing stress (Y/N) increases after a certain income threshold (~\$63,000), which can partially account for a weaker association between income and life satisfaction at higher income levels. The authors also report detailed subgroup analyses.

I appreciate that the authors used a large-scale dataset and rigorous analytic techniques. Despite these strengths, there were several limitations which made me question the current suitability of the manuscript for publication in Nature Communications. My primary concerns are as follows: 1) alignment between the authors' claims and the reported results, 2) the novelty of the results, and 3) a lack of mechanism data.

#1: Mapping the Data to the Authors' Claims

Throughout the paper, the authors argue that “those with higher incomes are more likely to experience stress.” However, the results do not seem to clearly support this assertion.

If I am interpreting Figure 1B correctly, individuals with higher incomes report—on average—a lower probability of experiencing stress than individuals who make less money. While this trend starts to reverse at higher incomes, it does not reverse completely. Thus, the data does not appear to support the authors' claim that higher (vs. lower) income increases the probability of experiencing stress. Instead, the data seem consistent with an interpretation where people who make more money are less likely to experience stress (on average). At the highest income levels, the probability of experiencing stress starts to rise—but never rises to the level that people experience if they are making low levels of income. This interpretation seems inconsistent with the authors' claim that higher incomes are associated with greater stress.

Relatedly, Figure 2A suggests that making more money closes the “stress gap” between lower and higher-income individuals. For example, poor stressed males report much lower life satisfaction than poor unstressed males. Yet, this gap appears smaller at high income levels. These findings appear to suggest that making more money in general closes the stress gap in life satisfaction. This interpretation is consistent with previous research which shows that higher incomes can protect against negative emotional experiences (e.g., Kushlev et al., 2015; Hudson et al. 2016). However, the authors do not frame the results in this way.

The authors should consider clarifying their claims based on the strength of evidence available, and more clearly describe the main effects between income, life satisfaction, and stress.

#2: Contribution Beyond Previous Research

These findings conceptually overlap with a well-cited paper on time stress and income (Hamermesh & Lee, 2005). This paper shows that as people earn more money, time stress increases. The authors would benefit from citing this paper and explicitly discussing how their analyses contribute novel insights to this area of work. This past work also uses several public datasets and therefore includes more mechanism evidence than the current paper (e.g., exploring patterns by dual-

income households etc.).

#3: Unclear Mechanisms and Boundary Conditions

The current manuscript is unable to test mechanism. The authors should consider finding or collecting other datasets to better understand the moderators and predictors of these findings.

For example, the authors could look at whether these results are driven by dual-income households with young children (Goldin 1995); whether the link between income, stress, and lower life satisfaction is higher during periods of economic uncertainty (Park et al. 2021); whether these results are more likely to emerge in areas of the US with higher income inequality (Park et al. 2021), or higher costs of living. The authors could also look at stress-buffering effects at high income-levels such as by assessing whether high income individuals are less stressed if they have a higher network (e.g., Donnelly et al. 2018).

Without mechanism data, these results seem largely in line with published research, which typically uses more detailed and/or causal datasets to support the core claims (e.g., Hamermesh & Lee, 2005; DeVoe & Pfeffer, 2011; Pfeffer & Carney, 2018; Kaplan & Schulhofer-Wohl, 2018). The authors should therefore consider looking for other large-scale surveys or conducting their own surveys to identify who and why those with higher incomes experience higher stress, and when and why this higher stress does (or does not) translate into lower life satisfaction.

Smaller Point:

I was curious why the authors separately report subgroup analyses for race, health, education, social connection, children, and sex. These factors covary. E.g., those with better health are often more likely to be educated, have children, and be socially connected. Thus, it could be helpful for the authors to justify separating their analyses by inter-related subgroups, present correlation tables between these variables to help readers understand multi-collinearity across models, and run/report interaction analyses between variables to better understand how intersectional identities shape the reported results.

Related References:

DeVoe, S. E., & Pfeffer, J. (2011). Time is tight: how higher economic value of time increases feelings of time pressure. *Journal of Applied Psychology*, 96(4), 665.

Donnelly, G. E., Zheng, T., Haisley, E., & Norton, M. I. (2018). The amount and source of millionaires' wealth (moderately) predict their happiness. *Personality and Social Psychology Bulletin*, 44(5), 684-699.

Kaplan, G., & Schulhofer-Wohl, S. (2018). The changing (dis-) utility of work. *Journal of Economic Perspectives*, 32(3), 239-258.

Kushlev, K., Dunn, E. W., & Lucas, R. E. (2015). Higher income is associated with less daily sadness but not more daily happiness. *Social psychological and personality science*, 6(5), 483-489.

Hudson, N. W., Lucas, R. E., Donnellan, M. B., & Kushlev, K. (2016). Income reliably predicts daily sadness, but not happiness: A replication and extension of Kushlev, Dunn, and Lucas (2015). *Social psychological and personality science*, 7(8), 828-836.

Hamermesh, D. S., & Lee, J. (2007). Stressed out on four continents: Time crunch or yuppie kvetch? *The Review of Economics and Statistics*, 89(2), 374-383.

Park, L. E., Jung, H. Y., Lee, K. S., Ward, D. E., Piff, P. K., Whillans, A. V., & Naragon-Gainey, K. (2021). Psychological pathways linking income inequality in adolescence to well-being in adulthood. *Self and Identity*, 20(8), 982-1014.

Pfeffer, J., & Carney, D. R. (2018). The economic evaluation of time can cause stress. *Academy of Management Discoveries*, 4(1), 74-93.

Reviewer #2 (Remarks to the Author):

This is an excellent study on a topic of great importance and also helps resolve the often-vociferous debate over the relationship between income and life satisfaction. The mediating role that stress plays, demonstrating that higher levels of income affect people differently depending on lifestyle choices, expectations, reference points and more, all of which can be reflected in the concurrent relationship between increased income, life satisfaction, and stress, with satiation points on both income and stress varying by particular demographic cohorts. The methods seem sound and the results are both robust and compelling.

I do recommend some revision and/or additional caveats on the results. A major one is that the exposition needs to be streamlined and simplified - perhaps by creative use of a table or two. Right now, the write up of results on different demographic groups, their diverse satiation points, and their levels of stress is all mixed into one long body of text that is a)

difficult to follow and b) does not offer any discussion of the reason for these differences. And the list is too long. The authors should choose their most important results and discuss those clearly and thoroughly and put the others in an appendix or table. For the article to have a lasting effect on the debate, the results need to be clearer, better explained, and perhaps put in a more structured order of priorities. Are political affiliations really on the same order of importance than race or income categories, for example?

Finally, a central finding of the study is that people who have lower levels of life (and job and other domain) satisfaction are more likely to increase in stress with income and at lower income satiation points. While indeed of interest, the authors should admit that there is likely some multi-collinearity at play here, with those with lower levels of life satisfaction likely to have higher scores on the negative affect dimensions of well-being, such as stress, and are also typically more concerned about income than are those with high levels of well-being. Without a doubt these would both help explain but also "cause" the result. Again more explanation is needed and also a caveat about direction of causality.

With some revision, I think this paper could make a contribution to an important debate in wellbeing economics and also deepen our understanding of the complex intermediating forces that determine human wellbeing.

Reviewer #3 (Remarks to the Author):

funding? conflict of interest? do you work for gallup or who paid for the gwp?

the stress finding totally makes sense! more money more headache

could have a graphical abstract showing relationship of income, stress and swb

totally whites stress more than blacks and latinos!

very cool paper

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Version 1:

Decision Letter:

** Please ensure you delete the link to your author homepage in this e-mail if you wish to forward it to your coauthors **

Dear Dr Akkiraju,

Thank you for your patience during the peer-review process. Your manuscript titled "With income comes greater life satisfaction, and increased stress" has now been seen by 2 of the original 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 important that the revised manuscript provides a sensitivity analysis regarding the power available to test for interactions, greater detail regarding the analytic choices (e.g., control variables included, choice of subgroups, grouping of variables, use of default priors etc.), and robustness checks for analyses (e.g., for demographic variables and alternate subgroups).

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. We are requesting that your manuscript aligns with these requirements as this facilitates the evaluation of your manuscript, reducing delays in re-review and potential future acceptance. 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. Additional information can be found in our style and formatting guide <https://www.nature.com/documents/commpsychol-style-formatting-guide-accept.pdf> Communications Psychology formatting guide.

Please use the following link to submit your

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- cover letter (as a separate document),
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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,

Jennifer Bellingtier

Jennifer Bellingtier, PhD
Senior Editor
Communications Psychology

REVIEWER EXPERTISE:

Reviewer #1: life satisfaction & income; large datasets

Reviewer #2: life satisfaction & income; large datasets; stress & wellbeing

REVIEWER REPORTS:

Reviewer #1 (Remarks to the Author):

Review:

The authors have made efforts to address the concerns raised by reviewers. However, I believe there is still substantial room for improvement in terms of clarity and transparency. My concerns are summarized below, starting with a section-by-section analysis, and then with a summary of my overarching concerns related to this manuscript.

Introduction:

The introduction paragraph on Page 2 is somewhat convoluted and fails to clearly articulate the study's contribution. The authors seem to argue that their research is novel because it explores different well-being outcomes at the same time, but then they state that past research has already done this. The authors then mention that their contribution is that they are looking at a "component of stress," however, they use a broad measure of stress in their analyses.

The authors should carefully review the introduction for consistency and clarity. For example, they state, "Typically, positive affect emotions such as happiness, enjoyment, or smiling and negative affect emotions such as stress, worry, and sadness are aggregated, and seem to satiate at higher incomes." However, they later mention that past studies separately examine these outcomes (Killingsworth). Additionally, they write, "the study found no significant correlation for stress ($p=0.0476$)," and then say, "in this study, we examine the phenomenon of stress more deeply, motivated by the observation that stress seems to be the well-being dimension with the strongest evidence of a turning point." These seeming contradictions may confuse readers and should be addressed to provide a more coherent narrative.

Broadly, to improve the readability and impact of the introduction, the authors should streamline the introduction and focus on the key aspects that directly lead to the current study's objectives - investigating when stress predicts well-being - depending on income. In doing so, the authors should focus on novel aspects of their research compared to past work (which still is not clear from the summary of the research that the authors have provided).

Results Preview (Page 3):

Given that the Gallup Daily Poll uses representative samples from different years (2008-2017), it would be helpful for the authors to clarify how the \$63,000 threshold was determined. Is this an average across the survey years? Does the inflection point hold when controlling for study wave? Have the authors adjusted for purchasing power differences across study years? Addressing these questions upfront would provide valuable context for interpreting the results.

Methods:

The sentence "We investigated the relationship between life satisfaction versus income and stress versus income at the individual level using cubic spline regression models" could be clarified. It would be beneficial to explain the specific relationships being examined (e.g., such as whether the authors are looking at how the relationship between income and life satisfaction changes at different levels of stress) instead of using "versus" language here.

Including the sample sizes for each subgroup (sex, race, political affiliation, health, social factors, work factors, economic factors, education, and life satisfaction quantiles) in the text would help readers assess the statistical power for the complex analyses being conducted. The authors should also discuss statistical power as part of their manuscript (e.g. what effect sizes did the sample size give the authors the power to detect, given their complex interactions and analytic approaches)? How should readers think about statistical power for their subgroup analyses?

The authors mention using a cut-off of <10 for the Variance Inflation Factor (VIF) for all regression models. It would be informative to know if any covariates or variables were dropped due to high VIF and, if so, which ones (Page 4).

Aggregated Model:

The authors' choice of using a default prior (0.707) for their Bayesian analysis could be further justified. Given the existing research on well-being and income using similar data sources and methods (e.g., Jebb et al., 2018), the authors might consider using priors based on effect sizes from the published literature. Providing a rationale for the decision to use default priors would strengthen the methodological robustness of the study.

Data:

The authors should double-check the years mentioned in the data section. The abstract states 2008-2017, but the text mentions 2008-2007, which seems to be a typo.

Table 1:

Including the sample sizes and basic descriptive statistics for each variable and year would enhance the interpretability of the findings.

Stress reduces life satisfaction:

This section could benefit from clearer explanations of the analyses conducted. While the initial analyses demonstrating the association between stress and lower life satisfaction are clear, the subsequent analyses examining job stress and occupation require more detail. Are the authors controlling for income in these analyses, or are they simply looking at occupation itself as a predictor of the relationship between stress and well-being? Is the association between stress and life satisfaction stronger for jobs that make less money, or less strong? Clarifying the specific research questions and how the work/occupation analyses advance the understanding of income's moderating role in the stress-life satisfaction relationship would improve the coherence of this section.

Stress decreases, then increases, with rising income, unlike other emotions:

The authors should consider including basic demographic controls (e.g., employment status, gender, marital status) in their initial models to assess the robustness of the inflection point analyses for stress (in addition to conducting the separate subgroup analyses). This section has the potential to be a key conceptual contribution of the paper. Getting to these findings faster and doing a more thorough job describing these analyses and any robustness checks the authors have done to ensure robustness could help to further increase the impact of these findings.

Turning point in stress changes with demographics:

The interpretation of these results could be strengthened by addressing potential confounding factors. For example, the higher inflection point for women might be because of a (currently unreported) bifurcation in the sample where some women make \$0 (and maybe don't experience as high of stress), but then for working women, they might have to make more to offset

the stress of working, when also taking care of children. The differences between White and Hispanics (\$34,000 vs. \$82,000) could also be driven by confounds. For example, are their fewer Hispanics in the Gallup sample, making these estimates noisier and less reliable than the estimates for White respondents? It is hard to understand what these findings mean without having more information about the underlying data on which these estimates are based (% of employed individuals within each category, Ns for each subsample analysis for each year and across years etc.). Providing more context and discussing the potential limitations of these comparisons would help readers better interpret and understand the implications of the findings.

Additionally, reporting the statistical and practical significance of the differences in turning points across subgroups (e.g., \$88,000 for women vs. \$63,000 for men, \$34,000 for Whites vs. \$82,000 for Hispanics) would enhance the interpretability of the results.

Influence of health, social, basic needs, economic, work and education factors, and life satisfaction on stress: The authors' categorization of individuals as falling into an "unhealthy" category based on diagnoses of one of the following: obesity, depression, cancer, cholesterol, or high blood pressure could be better justified. Providing the empirical basis for grouping these diverse health conditions together would strengthen the validity of the analyses. This seems especially important in light of the fact that these categories differ in their likelihood of affecting well-being and mood. Specifically, some of these categories could directly influence mood (depression) and others might have less of a direct impact on mood (high blood pressure—especially if it is well managed). Similarly, the rationale for focusing on smokers vs. non-smokers as the only separate subgroup comparison should be clarified.

The definitions and justifications for the various subgroups and categories (e.g., socially connected vs. unconnected, worry and insurance as proxies for unmet basic needs, suffering, thriving, and struggling) should be more clearly articulated. For instance, worry seems different from being uninsured—with one being about future concerns and the other about present inability to meet basic needs. Providing the sample sizes for each subgroup and explaining how these categorizations align with past literature would enhance the credibility of the findings.

Overall, the results section could benefit from a more focused and in-depth presentation of the key analyses. Selecting 1-2 central analyses, fully describing the methods, results, and robustness checks, and clearly articulating their contribution to the literature could improve the paper's readability and impact. The current presentation style, with relatively broad-brush descriptions of the analyses and references to various figures at the end of the manuscript, makes it challenging to fully understand and evaluate the significance of the findings.

In conclusion, despite the authors' efforts to address previous concerns, the manuscript still requires work in several key areas. From my perspective, the authors should clarify their conceptual contribution, provide more clarity about the analyses they conducted, provide additional justification for their analytic choices, and enhance the readability and interpretability of the key findings to improve the potential impact and credibility of the paper.

Reviewer #2 (Remarks to the Author):

I am satisfied with the revised version of the article - the authors have done a strong and thorough job with the revisions and, as I noted before, I think this paper has potential to contribute to the debate on the income-wellbeing debate.

I look forward to seeing a published version!

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Decision Letter:

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Dear Dr Akkiraju,

Thank you for your patience during the peer-review process. Your manuscript titled "With income comes greater life satisfaction, and increased stress" has now been seen by 1 reviewer, 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. This will be our final request for revisions, and if possible we intend to review the revisions editorially.

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 important that you address the reviewer's statistical concerns. Please clearly indicate that the study was not preregistered and clearly indicate which analyses were based on a priori hypotheses and which were exploratory or run as sanity checks. Please move all discussion of findings from the Results to the Discussion section. We discourage discussion and over interpretation of ancillary and exploratory analyses, as well as speculation about the causes for differences which have not been tested.

Please follow our guidance in regards to reporting on sex and gender: <https://www.nature.com/commpsychol/editorial-policies/ethics-and-biosecurity#sex-gender-sexual-orientation>. Please report the variable as included in the Gallup poll, as well as note any changes in the collection of this variable over the time period included in the analysis.

Regarding your data availability statement, please remove "reasonable" and clarify if data can also be obtained from Gallup directly. Please also specify where the request for permission is to be sent.

Regarding your code availability statement, the code for your study should be publicly deposited and the statement should directly link to the code.

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. We are requesting that your manuscript aligns with these requirements as this facilitates the evaluation of your manuscript, reducing delays in re-review and potential future acceptance. 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. Additional information can be found in our style and formatting guide <https://www.nature.com/documents/commpsychol-style-formatting-guide-accept.pdf> Communications Psychology formatting guide.

Please use the following link to submit your

- revised manuscript,
- point-by-point response to the referees' comments,
- cover letter (as a separate document),
- the Editorial Policy Checklist (see below),
- the Reporting Summary (see below), and
- the completed Editorial Request Table (attached):

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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,

Jennifer Bellintier

Jennifer Bellintier, PhD
Senior Editor
Communications Psychology

REVIEWER EXPERTISE:
Reviewer #1 life satisfaction & income

REVIEWER REPORTS:

Reviewer #1 (Remarks to the Author):

This manuscript continues to present an interesting analysis of the relationship between income, stress, and life satisfaction using a large dataset from Gallup. The authors examine how stress prevalence changes with rising income levels and explore potential mediating factors. While the study offers some intriguing findings, there are several areas where the manuscript could be strengthened:

Introduction:

The introduction needs more detail to properly set up the hypothesis regarding a U-shaped relationship between income and stress. Given that the authors now acknowledge mixed findings in past research on the relationships between stress, income and life satisfaction, it is unclear why they have such a strong directional prediction about observing turning points. If this was not an a priori hypothesis before data analysis, the authors should be transparent about that rather than claiming a directional prediction post-hoc. The rationale for expecting turning points or U-shaped relationships should be more clearly articulated based on existing theory and evidence.

Methods:

The authors need to provide more justification for their analytical choices. Why were spline regressions chosen over other methods like OLS? What are the advantages of this approach for addressing the research questions? The assumption of normality in the data distribution should be explicitly tested rather than assumed. More detail is needed on why particular subgroup analyses were conducted and how they relate to the core research questions.

The use of a dichotomous measure of stress is an important limitation that should be acknowledged upfront. The authors should discuss how this binary operationalization may impact the results, particularly in comparison to the continuous measures used for other emotions. Could this account for why an inflection point is observed for stress but not other variables?

Results:

The results section is difficult to follow and would benefit from restructuring. For each analysis, the authors could:

Explain the rationale for conducting that particular analysis

Clearly state the analytical approach

Present the results

Interpret the findings

This structure would improve readability and help readers understand how each analysis builds on previous ones to address the key research questions.

The presentation of results feels unpolished, with unformatted tables and inconsistent spacing. Greater attention to formatting would enhance the overall quality of the manuscript.

Discussion:

The discussion could be strengthened by more explicitly connecting the findings back to existing theory and research on income, stress and wellbeing. How do these results advance understanding in the field? What are the implications for future research? The limitations section should be expanded, including discussion of the dichotomous stress measure and potential confounds in the subgroup analyses.

Additional points:

More detail is needed on how missing data was handled across analyses. Were there differences in missingness across key variables or subgroups?

The authors state that they didn't check if the variables were normally distributed. Why? Seems easy enough to test and typically income and other variables are not, which necessitates log transformation.

EDITORIAL POLICIES

We ask that you ensure your manuscript complies with our editorial policies and reporting requirements.

To that end, we require revised manuscripts to be accompanied by two completed items: a reporting summary that collects information on study design and procedure, and an editorial policy checklist that verifies compliance with all required editorial policies.

- <https://www.nature.com/documents/nr-reporting-summary.zip>>Nature Research Reporting Summary
- <https://www.nature.com/documents/nr-editorial-policy-checklist.pdf>>Editorial Policy Checklist

All points on the policy checklist must be addressed. Your revised manuscript can only be sent back to the referees if these checklists are completed and uploaded with the revision.

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Version 3:

Decision Letter:

**** Please ensure you delete the link to your author homepage in this e-mail if you wish to forward it to your coauthors ****

Dear Dr Akkiraju,

Thank you for submitting your manuscript titled "With income comes greater life satisfaction, and increased stress" to Communications Psychology. We have given the paper our careful consideration. However, we did not find that the revisions resulted in a manuscript of appropriate quality to warrant re-review or publication. Therefore, we invite you to revise the work one last time. However, please be aware that we will not be able to proceed further with a re-submission that does not fully address our editorial concerns.

In particular,

1. All statements or interpretations of your results must be supported by appropriate, fully reported statistics, for example, "Female respondents 270 (N = 993908) report higher life satisfaction for all income levels compared to male respondents 271 (N = 1044259) in agreement with previous studies." All references to frequentist inferential statistics must be reported as statistic (degrees of freedom) = value, p = value, effect size statistic = value, % Confidence Intervals = values. Please report confidence intervals around all turning and satiation points. Narrative reporting of the findings is not sufficient. Please be explicit about the evidence for your findings and how it was derived (e.g., what tests were used).
2. Please ensure that descriptions of your methods and findings are accurate. There are numerous references to mediation and moderation, yet many do not seem to relate to any statistical mediation or moderation analysis.
3. Please ensure your interpretation of the findings stays close to the data. Your measurement of stress asks only about experiencing stress on the prior day. This is not a measurement of average daily stress nor chronic stress. Therefore, it is not appropriate to speak of stressed individuals. Likewise, unless participants reported on the type of stress, it is not warranted to describe it as affluence-related or associated with time scarcity. Please ensure your interpretation corresponds to your measurements. In this case, it would be appropriate to refer to individuals who experienced prior-day stress.
4. The cross-sectional data does not warrant any claims on the direction of the effects or what would occur with increasing or decreasing income. You can speak about those with higher and lower income, but longitudinal data is needed to discuss changes in income or the direction of the effects.
5. We allow unlimited space for Methods. The Methods must contain sufficient detail such that the work could be repeated by an independent researcher. It is preferable that all key methods be included in the Methods section in the main manuscript, rather than in the Supplementary Information. Looking at Table 1 and the supplement, it remains unclear how variables are measured and coded. For example, education is described in the supplement as measured by, "What is the highest level of school you have completed or the highest degree you have received?" and in Table 1 as Education yes/no. Adding a third column to Table 1 that gives a brief description of the variables would be helpful (e.g., at least college or university degree).

We shall hope to receive your revised version as soon as you are able to complete the suggested revisions. If something similar is published in the interim we will have to consider the impact it has on the novelty of a revised manuscript.

If you anticipate a delay of more than four weeks, please let us know. Should your manuscript be substantially delayed without notifying us in advance and your article is eventually published, the received date may be that of the revised, not the original, version.

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- <https://www.nature.com/documents/nr-editorial-policy-checklist.pdf>>Editorial Policy Checklist

All points on the policy checklist must be addressed. Your revised manuscript can only be sent to referees if these checklists are completed and uploaded with the revision.

If you are not interested in submitting a suitably revised manuscript in the future please let me know immediately so we can close your file. If you have any questions, please contact me.

Please use the link below when you are prepared to resubmit.

Link Redacted

Thank you for your interest in Communications Psychology.

Best regards,
Jennifer Bellingtier

Jennifer Bellingtier, PhD
Senior Editor
Communications Psychology

Version 4:

Decision Letter:

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Dear Dr Akkiraju,

Your manuscript titled "Higher income is associated with greater life satisfaction, and increased stress" has now been editorially evaluated, and 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 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:

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.

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end of the methods section. We require that the custom analysis code supporting your conclusions is made available in a publicly accessible repository at this stage; please choose a repository that generates a digital object identifier (DOI) for the code; the link to the repository and the DOI must be included in the Code Availability statement. Publication as Supplementary Information will not suffice.

*** DATA AVAILABILITY:**

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

Best regards,

Jennifer Bellingtier

Jennifer Bellingtier, PhD
Senior Editor
Communications Psychology

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Response to Reviewers

Summary of Changes:

Figure change summary:

1. We have added Fig.4d-f, Fig. 5b, Fig. S9f-i, Fig. S10f-I, Figs. S11f-I, Fig. S14, Fig. S17, and Fig. S18 in the current version of the manuscript.
2. We have modified Fig. 2, Fig. 3, Fig. S3b, Fig. S4, Fig. S5, and Fig. S7.
3. We have removed Figs. 4c-d, Fig. S9, Fig. S10, Fig. S11, Fig. S12, Fig. S13, Fig.S14, and Fig. S19 from the original submission.

Table change summary:

1. We have added Table 1 and Table S7 to the current version of the manuscript.
2. We have modified Table S1- S6 to adhere to formatting and reporting policies.

Reviewer #1 (Remarks to the Author):

Thank you for the opportunity to review the paper “With greater income comes greater life satisfaction and increased stress.” I thought the paper included an interesting and rigorous analysis using data from the US Gallup Daily Poll (2008-2017).

In the paper, the authors argue that the probability of experiencing stress (Y/N) increases after a certain income threshold (~\$63,000), which can partially account for a weaker association between income and life satisfaction at higher income levels. The authors also report detailed subgroup analyses.

I appreciate that the authors used a large-scale dataset and rigorous analytic techniques. Despite these strengths, there were several limitations which made me question the current suitability of the manuscript for publication in Nature Communications. My primary concerns are as follows: 1) alignment between the authors' claims and the reported results, 2) the novelty of the results, and 3) a lack of mechanism data.

Response: We thank Reviewer #1 for the fair assessment of our manuscript. In response, (1) we have re-organized the writing for better alignment of our key results and central claims, (2) included references pointed out by Reviewer #1 (and others) while discussing the novelty of the results, and (3) have added several new moderating factors, additional analysis, and discussion to suggest a possible hypothesis for experiencing stress across the income and life satisfaction distributions.

Below we present a detailed comment-by-comment response to these issues.

#1: Mapping the Data to the Authors' Claims

“Throughout the paper, the authors argue that “those with higher incomes are more likely to experience stress.” However, the results do not seem to clearly support this assertion.

If I am interpreting Figure 1B correctly, individuals with higher incomes report—on average—a lower probability of experiencing stress than individuals who make less money. While this trend starts to reverse at higher incomes, it does not reverse completely. Thus, the data does not appear to support the authors' claim that higher (vs. lower) income increases the probability of experiencing stress. Instead, the data seem consistent with an interpretation where people who make more money are less likely to experience stress (on average). At the highest income levels, the probability of experiencing stress starts to rise—but never rises to the level that people experience if they are making low levels of income. This interpretation seems inconsistent with the authors' claim that higher incomes are associated with greater stress.”

Response: We agree with Reviewer #1’s interpretation of Fig. 1b that the increased probability of experiencing stress for the higher-income population never rises to the stress levels of the lower-income respondents for the population considered overall. However, we now show that there are several instances where drivers of life satisfaction such as being healthy (Fig. 4a), basic needs being met (Fig. 4d), having a positive view of the economy (Fig. 4e), working more than 30 h a week (Fig. 4e), having a higher life satisfaction (Fig. 5a), and thriving in life (Fig. S17a) wherein higher income leads to comparable or even higher stress compared to the lower income after the turning point. To better organize these observations, we now add trends of life satisfaction with the turning point in Fig. S14a and the increase in stress after the turning point in Fig. S14b. We observe that the turning point income is negatively associated with life satisfaction and an increase in stress after the turning point is positively correlated to life satisfaction for various sub-groups investigated in this study. These results support our main claim that *‘With increased income, comes increased life satisfaction, and increased stress’*. However, we also add a cautionary note on the causality between income, life satisfaction, and increased stress due to the possible bidirectionalities and multi-collinearities.

We have made the following changes to the main text and added the following Figures to the Supplementary Information.

(page 11) “We find that access to basic needs shifts the turning point to lower income and lower stress. Individuals who don’t worry about having money for basic needs are less stressed than those who don’t for all income levels. (Fig. 4d) However, with increasing income, the Needs-met sub-group shows a turning point at ~\$19,000 (Fig. S10f) while for the Needs-unmet sub-group, there is no satiation or turning point (Fig. S9f for aggregate-model). In a similar vein, we find a turning point in stress for those having health insurance (~\$59,000 for the Insured in Fig. S16c and Fig. S9g for the aggregate-model) while the Uninsured do not show a turning point in stress with income at all. The increase in stress with income for individuals with basic needs met after the turning point suggests that there could be other affluent life circumstances associated with this stress. Relatedly, individuals who have a positive view of the economy (Fig. 4e) have a lower turning point at ~\$32,000 compared to ~\$72,000 for the ones with a moderate view. Individuals who reported a positive view of the economy also reported higher life satisfaction than those who did not (Fig. S11h and Fig. S12h for aggregate-model).”

(page 12) “Finally, analyzing work and education conditions, individuals who work for more than 30 h weekly experience increasing stress with increasing income compared to individuals who work for 15-30 h, 0-15 h, or are unemployed for whom stress decreases with income (Fig. 4f, Fig. S10i, and Fig. S9i for aggregate-model) suggesting that longer work time could be associated with the job stress. Further, divided by education, we observe that individuals with a college degree are more likely to be stressed than individuals without a college degree (Graduate vs. Non-Graduate in Fig. S13d) for all household income values but both sub-groups have a similar turning point. (~\$88,000 vs ~\$82,000 in Fig. S10j and refer to Fig. S9j for aggregate-model). “

Relevant Figures:

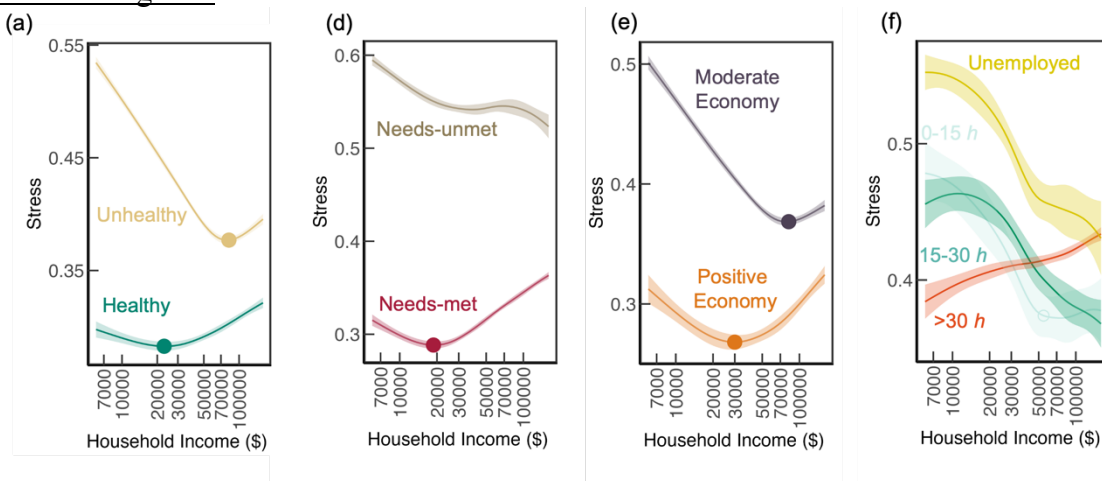


Figure 4: Turning/Satiation of stress with household income. Trends of stress, as the probability of experiencing stress the previous day, with household income (\$) when controlled for (a) health, (c) basic needs met, (e) view of economy, and (f) working hours along with fitted cubic spline showing the 95% confidence interval and the satiation (empty)/turning (full) point indicated.

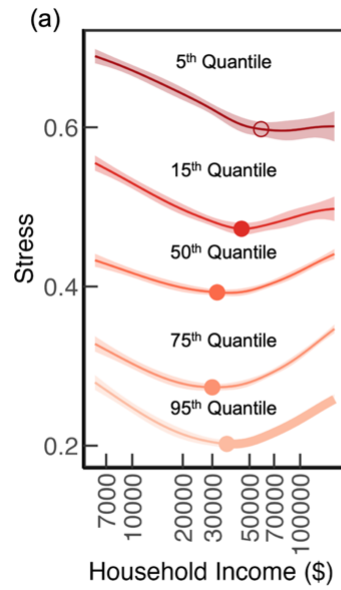


Figure 5: Turning/Satiation of stress with household income for life satisfaction quantiles. (a) Trends of stress, as the predicted probability of experiencing stress the previous day, with household income for 5th, 15th, 50th, 75th, and 95th quantile sub-groups of the life satisfaction distribution along with fitted cubic spline showing the 95% confidence interval and the satiation (empty)/turning (full) point indicated.

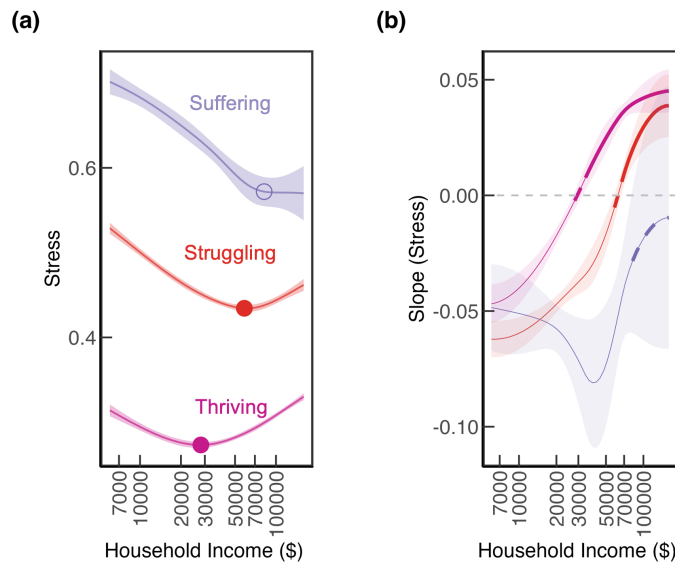


Figure S18: Turning/Satiation of stress with household income for thriving conditions. (a) Trends of the predicted probability of experiencing thriving, struggling, and suffering life conditions along with fitted cubic spline with the satiation(empty)/turning(full) point indicated, and (b) Slope of the predicted stress with household income for the suffering, struggling, and thriving population. The shaded area denotes a 95% Bayesian confidence interval for the estimated slope. The thick line point corresponds to the statistically significant region where the slope is greater than zero while the dotted line indicates the region where the slope is equal to zero.

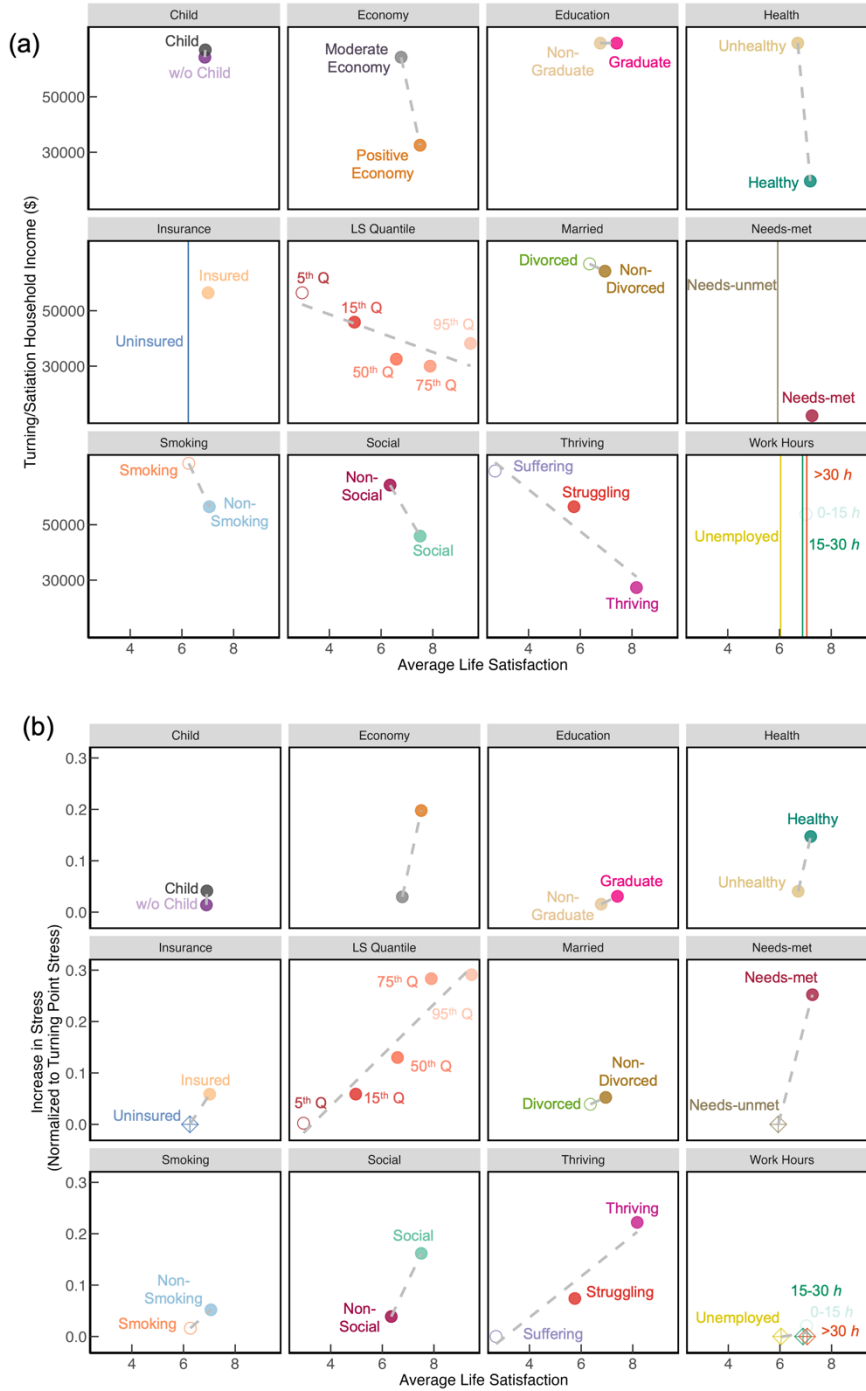


Figure S14: Turning/Satiation household income with average life satisfaction. Trends of (a) satiation(empty)/turning(full)/no-turning(diamond) household income and (b) increase in stress normalized to stress at the turning point as a function of the average life satisfaction of sub-groups divided by mediating factors of having children, education, being healthy, insurance, life satisfaction quantile, marital status, basic needs-met, smoking, social, view of economy, status of thriving, and work hours. The vertical line corresponds to the average life satisfaction of the sub-group that did not exhibit a turning/satiation point.

“Relatedly, Figure 2A suggests that making more money closes the “stress gap” between lower and higher-income individuals. For example, poor stressed males report much lower life satisfaction than poor unstressed males. Yet, this gap appears smaller at high income levels. These findings appear to suggest that making more money in general closes the stress gap in life satisfaction. This interpretation is consistent with previous research which shows that higher incomes can protect against negative emotional experiences (e.g., Kushlev et al., 2015; Hudson et al. 2016). However, the authors do not frame the results in this way.

The authors should consider clarifying their claims based on the strength of evidence available, and more clearly describe the main effects between income, life satisfaction, and stress.”

Response: We thank Reviewer #1 for this observation. We do agree that increasing household income closes the stress gap in life satisfaction between stressed and unstressed individuals while noting that significant differences persist at higher income levels between the stressed and unstressed individuals. We have added the references of Kushlev *et al.*¹, Hudson *et al.*², and Roxburgh³ to the Discussion section, clarifying the buffering role of income in moderating the difference in life satisfaction due to being stressed. We have also added these details to the Methods section.

(page 4) “For the life satisfaction-income relationship, we also use separate spline terms for the stressed and un-stressed individuals to model the buffering effect of stress on life satisfaction with income.”¹⁻³

(page 15) “Nevertheless, our results show that experiencing any kind of stress (whether time stress, distress, or eustress) lowers life satisfaction at all income levels. While the decreasing difference in life satisfaction between stressed and unstressed individuals with increasing income could be attributed to the buffering nature of income against negative emotions,¹⁻³ significant differences in life satisfaction scores persist even at the highest income levels. It may be that the negative stress associated with affluence dominates the stress-income relationship at higher income levels once stress related to poor health and social conditions is overcome.”

Relevant Figure:

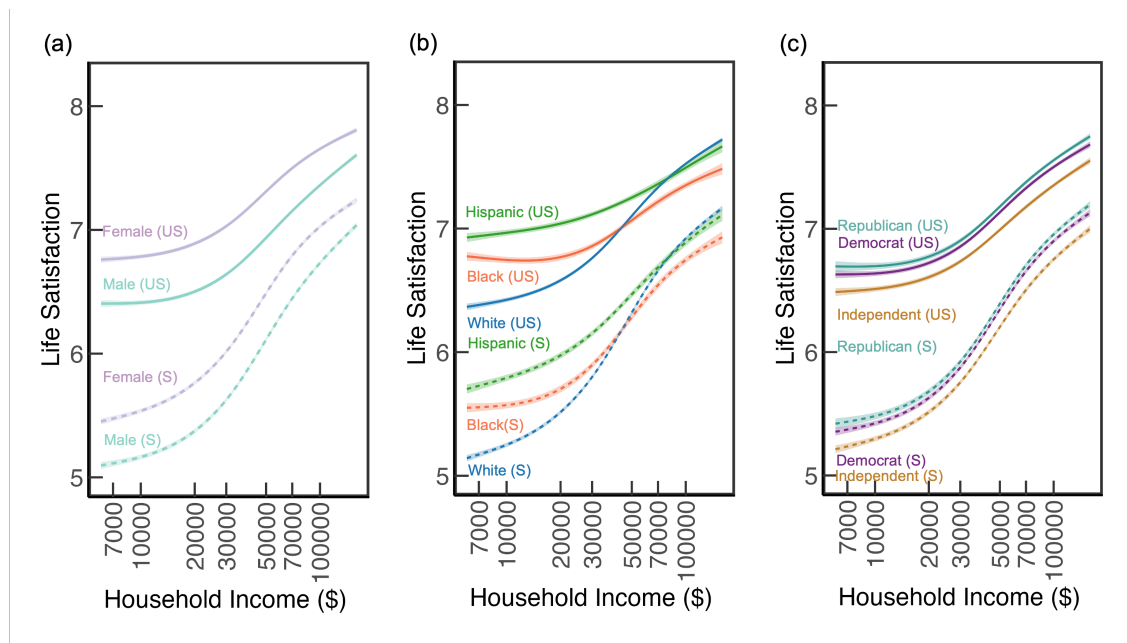


Figure 2: Trends of predicted life satisfaction with household income. Trends of predicted life satisfaction scores with household income (\$) for the Stressed (S, full) and Unstressed (US, dashed) individuals when divided by (a) sex (Male, Female), (b) race (White, Black, Hispanic), and (c) political affiliation (Republican, Democrat, Independent) subgroups, for the years 2008-2017.

#2: Contribution Beyond Previous Research

“These findings conceptually overlap with a well-cited paper on time stress and income (Hamermesh & Lee, 2005). This paper shows that as people earn more money, time stress increases. The authors would benefit from citing this paper and explicitly discussing how their analyses contribute novel insights to this area of work. This past work also uses several public datasets and therefore includes more mechanism evidence than the current paper (e.g., exploring patterns by dual-income households etc.).”

Response: We partly agree with Reviewer #1 that the findings of Hamermesh and Lee⁴ overlap with the findings in our study. Hamermesh and Lee⁴ focus on quantifying time stress correlates, based on the question, ‘How often do you feel rushed or pressed for time? Almost always; often; sometimes; rarely; never.’ In contrast, we study stress in a broader context based on the question ‘Did you experience the following feelings during A LOT OF THE DAY yesterday? How about stress?’ and analyze stress as a function of income and other correlates. Our broader stress variable equips us to observe a turning point in stress with income (rather than the only increase in time stress with income reported by Hamermesh and Lee⁴) which we hypothesize to be a combination of decreasing stress with income due to improved health/basic needs being met and an increase in stress at higher income due to other affluent life circumstances which could include time pressure. We also show that there are factors associated with stress for high-income-high satisfied individuals that are not necessarily time-related. To address this specifically, we have developed a logistic regression model for stress for high-income and highly satisfied individuals (Fig. 5b). We observe that experiencing stress is correlated with longer

working hours, using strength at work to do the best job, not enough time for vacations, as well as poorer social relationships, and not being satisfied with the standard of living among other factors. We have added the following text in the Introduction and the Discussion sections referring to Hamermesh and Lee.⁴ We have re-organized the Results section to move the previous Fig. 4a to Fig. 5a and included a new Fig. 5b showing stress correlates for the high income-high satisfaction individuals.

(page 2) "Interestingly, it has been reported that stress due to time scarcity increases with increasing income,⁴ especially when the value of time is perceived to be monetary at workplaces.^{5,6} The decrease in stress with increasing income at lower income levels followed by the studies of time stress at higher incomes suggests that stress is a complex multidimensional construct.⁷ Further, except for Jebb et al.⁸ who find turning points for different population sub-groups for aggregated positive and negative-affect emotions, studies either examine these relationships for the entire population or a component of stress thus ignoring potential heterogeneity in the lived experiences across sub-groups."

(page 14) "The consistency across various demographics (sex, race, and political affiliation) and lifestyles (health, socialization, education, basic needs, and work conditions) of a turning point in the income-stress relationship, differences in income level at which the turning points occur, and the extent of stress at different income levels point to the likely heterogeneity in the perception of stress with life circumstances for different groups including access to basic needs,⁷ time pressure,⁴ income equality,⁹ and yet the possible universality of the impact of affluent lifestyles on stress that seems to dominate at incomes after the turning point."^{33,34}

Relevant Figures:

#3: Unclear Mechanisms and Boundary Conditions

"The current manuscript is unable to test mechanism. The authors should consider finding or collecting other datasets to better understand the moderators and predictors of these findings."

Response: We agree with Reviewer #1 that we don't have the means to test a causal relationship due to the cross-sectional nature of the Gallup dataset. We have added this to the limitations of the paper in the Discussion section.

(page 16) "In any case, our findings suggest that the life satisfaction of higher-income households would be even higher without the experience of stress. What remains to be answered is whether the stress associated with affluent lifestyles is desirable? Or if there are ways to avoid the feeling of being stressed. The exploratory nature of this work is aimed at establishing moderating factors that could influence the stress-income relationship. As the data is cross-sectional, we are unable to make causal inferences or test hypotheses between the stress and the moderating factors. Instead, we lay down possible hypotheses about the possible causal mechanisms and suggest that more causal data be collected on the nature and causes of stress to understand how they contribute to overall well-being."

However, in this study, we have identified several moderators of the turning point in stress. Below, we contrast the studies shared by Reviewer #1 by identifying the key differences relative to our study. We then add additional analysis and discussion that allow us to frame the findings obtained from several moderating factors into a hypothesis for the stress-income relationship mediated by life satisfaction.

“For example, the authors could look at whether these results are driven by dual-income households with young children (Goldin 1995);”

Response: We thank Reviewer #1 for sharing this reference. We unfortunately do not have access to the dual-income variable in this dataset. We have added a discussion of the possible factors that we have not been able to consider in this study and could influence the stress-income relationship.

(page 17) “While we have considered several moderating factors, the list of moderating factors and the interactions between them is not exhaustive. For example, we have not evaluated factors such as having a high net worth,¹⁰ dual-income families with young children¹¹ that could influence the stress-income relationship due to the non-availability of such variables in the current dataset.”

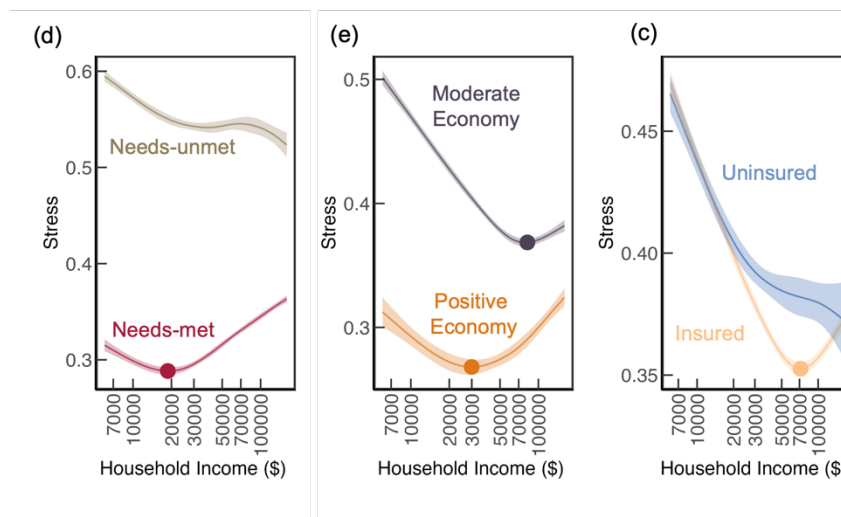
“whether the link between income, stress, and lower life satisfaction is higher during periods of economic uncertainty (Park et al. 2021);”

Response: We thank Reviewer #1 for sharing this reference. To address economic uncertainty, we investigated self-reported economic conditions of the individuals based having health insurance (Fig. S13c), worrying about having money to meet basic needs of food, shelter, and health care (Fig. 4d), and their view on economic condition of the nation (Fig. 4e). We find that individuals whose basic needs are unmet due to lack of money show higher levels of stress for all the income levels consistent with the results of Park *et al.*¹² Moreover, for the Needs-met individuals, we see a turning point in stress at ~\$19,000, after which stress increases to levels higher compared to the low-income levels. These results are consistent with our hypothesis that stress increases only after basic life needs, health, socialization factors are met due to affluent life circumstances. Divided by having health insurance, we do not observe large differences in stress for lower-income individuals, while we find that for the uninsured individuals only a satiation is observed while for the insured individuals, a turning point is observed at ~\$59,000. Finally, individuals with a positive view of the economy also have a lower turning point than those with moderate views. Life satisfaction is also lower for individuals who are uninsured, whose needs are unmet, and those with a moderate view of the economy. We have added the following text and figures in this regard.

(page 11) “We find that access to basic needs shifts the turning point to lower income and lower stress. Individuals who don’t worry about having money for basic needs are less stressed than those who don’t for all income levels. (Fig. 4d) However, with increasing income, the Needs-met sub-group shows a turning point at ~\$19,000 (Fig. S10f) while for the Needs-unmet sub-group,

there is no satiation or turning point (Fig. S9f for aggregate-model). In a similar vein, we find a turning point in stress for those having health insurance (~\$59,000 for the Insured in Fig. S16c and Fig. S9g for the aggregate-model) while the Uninsured do not show a turning point in stress with income at all. The increase in stress with income for individuals with basic needs met after the turning point suggests that there could be other affluent life circumstances associated with this stress. Relatedly, individuals who have a positive view of the economy (Fig. 4e) have a lower turning point at ~\$32,000 compared to the ~\$72,000 for the ones with a moderate view. Individuals who reported a positive view of the economy also reported higher life satisfaction than those who did not (Fig. S11h and Fig. S12h for aggregate-model).”

Relevant Figures:



Figures 4 and S13: Turning/Satiation of stress with household income with social and health factors. Trends of stress, as the probability of experiencing stress the previous day, with household income (\$) when controlled for basic needs met, having health insurance, and view on economy along with fitted cubic spline showing the 95% Bayesian confidence interval and the satiation(filled)/turning(empty) point indicated.

“whether these results are more likely to emerge in areas of the US with higher income inequality (Park et al. 2021), or higher costs of living.”

Response: We would like to thank Reviewer #1 for the suggestion to investigate the role of income inequality and well-being. To address this, we have investigated the correlation between income inequality measured at the state and MSA level to the well-being measures of life satisfaction and stress. First, we find that average life satisfaction is correlated negatively with income inequality both at the MSA and state levels consistent with Park *et al.*¹² and other previous reports at the country level.^{13,14} However, we do not find a significant correlation between the fraction of respondents experiencing stress with income inequality at either the MSA or state level contrary to previous findings at the country level.¹⁵

Table R1: Correlation coefficients between life satisfaction, stress with income Gini Index, Mean log deviation (MLD), Palma Ratio, Prop20, and Theil Index calculated for the top 35 metropolitan areas in the US.

MSA	Life Satisfaction	Stress
Gini Index	-0.33***	-0.02
MLD	-0.16*	-0.01
Palma Ratio	-0.16*	-0.07
Prop20	0.02	-0.06
Theil Index	-0.32***	-0.02

Table R2: Correlation coefficients between life satisfaction, stress with income Gini Index, Mean log deviation (MLD), Palma Ratio, Prop20, and Theil Index calculated for all the states in the US.

State	Life Satisfaction	Stress
Gini Index	-0.44**	0.01
MLD	-0.27	0
Palma Ratio	-0.27	-0.08
Prop20	0.02	-0.12
Theil Index	-0.41**	0.01

We also investigated metrics of the income at the turning point, stress at the turning point, slope of increase in stress, and maximum increase in stress in Tables R3 and R4.

Table R3: Correlation coefficients between the slope of increase in stress, income at the turning point, stress at the turning point, stress Gini Index, Mean log deviation (MLD), Palma Ratio, Prop20, and Theil Index calculated for the top 35 MSA in the US.

MSA	Normalized Stress Increase	Maximum Stress	Slope	Turning Stress	Turning Income
Gini Index	0.41*	0.4*	0.42*	-0.59***	-0.31
MLD	0.51**	0.51**	0.43*	-0.4*	-0.51**
Palma Ratio	0.31	0.29	0.32	-0.57**	-0.34
Prop20	0.45*	0.44*	0.31	-0.37*	-0.59**
Theil Index	0.43*	0.41*	0.42*	-0.57**	-0.35

Table R4: Correlation coefficients between the slope of increase in stress, income at turning point, stress at turning point, stress with income Gini Index, Mean log deviation (MLD), Palma Ratio, Prop20, and Theil Index calculated for all the states in the US.

State	Normalized Stress Increase	Maximum Stress	Slope	Turning Stress	Turning Income
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Gini Index	-0.09	-0.11	-0.08	-0.45**	0.06
MLD	0	-0.01	-0.02	-0.36*	-0.11
Palma Ratio	-0.03	-0.05	-0.03	-0.49**	0
Prop20	0.12	0.11	0.08	-0.35*	-0.22
Theil Index	-0.08	-0.1	-0.08	-0.45**	0.05

We find significant correlations between turning stress and objective inequality measures both at the MSA and state levels (Table R3 and R4). However, previous studies have remarked that the subjective perception of inequality^{9,16} based on reference groups also needs to be considered when evaluating the role of income inequality and well-being along with the objective measures. We believe the role of inequality in dictating the turning point in stress is beyond the scope of the current study as we it raises questions such as ‘*What is the reference group*’ which merits a separate study. We therefore err on the side of caution by not including these findings in this manuscript but making a note in the discussion section on the factors that we have not considered in this study as noted below.

(page 17) “The consistency across various demographics (sex, race, and political affiliation) and lifestyles (health, socialization, education, economic, and work conditions) of a turning point in the income-stress relationship, differences in income level at which the turning points occur and the extent of stress at different income levels point to the likely heterogeneity in the perception of stress with life circumstances for different groups including time pressure, income equality,⁹ and yet the possible universality of the impact of affluent lifestyles on stress that seem to dominate at higher incomes after the turning point.”

“The authors could also look at stress-buffering effects at high income-levels such as by assessing whether high income individuals are less stressed if they have a higher networth (e.g., Donnelly et al. 2018.)”

Response: We do agree with Reviewer #1 that higher net-worth could be a stress-buffering reason. We do not have access to wealth data in this dataset and have added this reference to the text.

(page 18) “While we have considered several moderating factors based on insights from existing literature, the list of moderating factors and the interactions between them is not exhaustive. For example, we have not considered factors such as having a high net worth,¹⁰ dual-income families with young children¹¹ that could influence the stress-income relationship due to the non-availability of such variables in the current dataset.”

“Without mechanism data, these results seem largely in line with published research, which typically uses more detailed and/or causal datasets to support the core claims (e.g., Hamermesh & Lee, 2005; DeVoe & Pfeffer, 2011; Pfeffer & Carney, 2018; Kaplan & Schulhofer-Wohl, 2018). The authors should therefore consider looking for other large-scale surveys or conducting their own surveys to identify who and why those with higher incomes experience higher stress,

and when and why this higher stress does (or does not) translate into lower life satisfaction.”

Response: We thank Reviewer #1 for sharing these references. We agree that the overall findings of these existing studies conceptually overlap with some of the key findings in our manuscript. We therefore specifically address the main findings from these references and discuss how our findings are in contrast to the existing literature and add to it.

*Hamermesh & Lee (2005)*⁴: This study investigates the role of time stress with increasing income in 4 different countries. Across the 4 countries, with varying degrees of confidence, they conclude that time stress comes from not only longer working hours but also having less time to spend the higher money that people make. Our results agree with their main findings that high-income stressed individuals use strength at work, spend more time at work, and have less time for friends and family (Fig. 5b). Controlling for health, *Hamermesh & Lee* also find that time stress decreases with better self-assessed health. However, our finding using health as a mediating factor for the stress-income relationship adds more context to these results. While we find that Healthy individuals are less stressed overall compared to Unhealthy individuals for all income levels (Fig. 4a), we also find that Healthy individuals are more susceptible to experiencing stress at higher income levels. These results suggest that stress is a multi-dimensional complex construct of which both unmet basic needs and time stress are components, amongst other factors.

*DeVoe & Pfeffer (2011)*⁶ and *Pfeffer & Carney (2018)*⁵: Both these papers investigate the role of stress at work due to the economic evaluation of time and the results are conceptually built and expanded from Hamermesh and Lee.⁴ These works conclude that income is positively correlated to job stress (time pressure) as the perceived economic value of time increases with increasing income. To explore this phenomenon in our work, we have now studied stress as a function of income for working hour categories of being unemployed, 0-15 h, 15-30 h, and >30 h. in Fig. 5j. We observe that stress increases with income only for individuals working more than 30 hours in a week.

*Kaplan & Schulhofer-Wohl (2018)*¹⁷: This paper reports time-wise trends in well-being measures at work, including stress, for mediating factors of job type, gender, race, and education. Our results are consistent with the findings that higher education, women, and Whites experience higher stress than the corresponding lower education, men, and Blacks. We have now added averaged life satisfaction and stress for the various sub-groups used in our study in Table S2 for easier comparison. However, *Kaplan & Schulhofer-Wohl*¹⁷ don't have a measure of wage (income) which is one of the key variables in our discussion. Moreover, *Kaplan & Schulhofer-Wohl*¹⁷ also comment on the lack of additional personal attributes in their study apart from the job type that could contribute to the subjective well-being that we have included in our study. Like the previous works discussed in this comment, this work also focuses on the nature of stress at the workplace. We offer a multi-dimensional perspective on stress by studying stress as a function of income mediated by other drivers of life satisfaction.

In summary, *Hamermesh & Lee*⁴, *DeVoe & Pfeffer*⁶, *Pfeffer & Carney*⁵, and *Kaplan & Schulhofer-Wohl*¹⁷ focus on the stress experienced at work (job stress) due to time scarcity. To address the results of these works in the context of our study, we investigated moderating factors of overall

working hours (Fig. 4f). We find that the individuals who use their strength to perform their job in the best way are less stressed than those who don't for all income levels. However, for the individuals using their strengths at work, we see an increase in stress after a turning point of \$28,000. Divided by working hours, we find that stress decreases for all individuals with income except for those working for more than 30 h weekly. This result for the >30 h working individuals is consistent with the existing reports that show a positive correlation between time stress and income.⁴ Here, we argue that there are life circumstances that dictate the interplay between the different types of stress. We show that stress due to unmet basic needs of health, social, and education conditions decreases with income while stress arising due to working longer hours (and affluent lifestyles) increases with time. While we acknowledge these existing theories of job stress, we add to the existing discussion on stress by laying out stress as a multidimensional concept that captures both stressful conditions due to unmet basic needs as well as the feeling of stress due to time and other life conditions. We have added the following text and figures in this regard.

(page 12) “Finally, analyzing work and education conditions, individuals who work for more than 30 h weekly experience increasing stress with increasing income compared to individuals who work for 15-30 h, 0-15 h, or are unemployed for whom stress decreases with income (Fig. 4f, Fig. S10i, and Fig. S9i for aggregate-model) suggesting that longer work time could be associated with the job stress. Further, divided by education, we observe that individuals with a college degree are more likely to be stressed than individuals without a college degree (Graduate vs. Non-Graduate in Fig. S13d) for all household income values but both sub-groups have a similar turning point. (~\$88,000 vs ~\$82,000 in Fig. S10j and refer to Fig. S9j for aggregate-model).”

(page 15) “Our findings build on the existing literature on time scarcity and basic needs by demonstrating conditions when stress associated with time scarcity starts to dominate stress associated with stressful life conditions of basic needs deprivations. We first show that an increase in stress with income is likely to occur when basic needs and stressors associated with those needs are compensated or are buffered by income. We then investigate whether stress experienced by highly satisfied high-income individuals are mere complaints by the affluent¹¹ or if other life domains are affected by such lifestyles.¹⁴ First, our results are consistent with these findings that individuals who use their strengths at work (O.R = 1.33, $P < 0.001$) and work for > 30 h (O.R = 1.25, $P < 0.026$) are more likely to experience stress (Fig. 5b).

Here, we also find that affluent lifestyles can harbor different stress-inducing factors. For example, the lack of pro-social behavior⁴⁷, as evidenced by the decreasing social connections in the form of not having time for friends and family for the highly satisfied high-income individuals (Odds Ratio = 0.82, $P < 0.001$ in Fig. 5b). Additionally, the feeling of liking what you do every day and achieving your goals are correlated with being unstressed (O.R. = 0.86, $P < 0.001$ and 0.88, $P < 0.001$ respectively in Fig. 5b). Despite these factors, stress might reflect a combination of distress and eustress stress components,¹⁶ which manifest differently across income levels. Eustress can challenge individuals to achieve goals and improve productivity at their workplace.”⁴⁸

Relevant Figures:

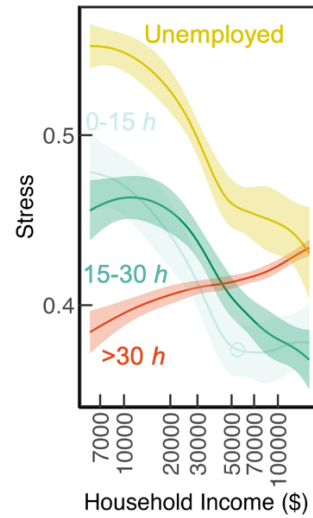


Figure 4: Turning/Satiation of stress with household income with social and health factors. Trends of stress, as the probability of experiencing stress the previous day, with household income (\$) when controlled for using strength at work, and working hours along with fitted cubic spline showing the 95% Bayesian confidence interval and the satiation(empty)/turning(full) point indicated.

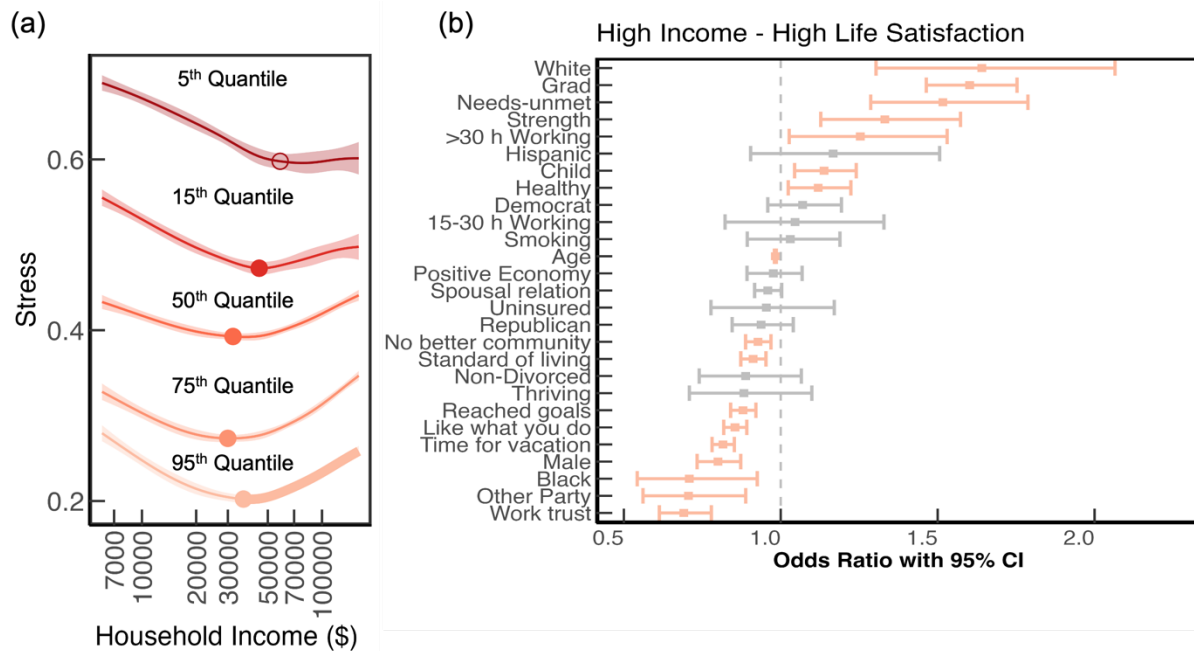


Figure 5: Turning/Satiation of stress with household income for life satisfaction quantiles. Trends of stress, as the predicted probability of experiencing stress the previous day, with household income for 5th, 15th, 50th, 75th, and 95th quantile sub-groups of the life satisfaction distribution along with fitted cubic spline showing the 95% confidence interval and the satiation (empty)/turning (full) point indicated, (b) correlation coefficients with 95% CI for the experiencing stress for the highly satisfied high-income individuals (thick line in (a)).

Smaller Point:

I was curious why the authors separately report subgroup analyses for race, health, education, social connection, children, and sex. These factors covary. E.g., those with better health are often more likely to be educated, have children, and be socially connected. Thus, it could be helpful for the authors to justify separating their analyses by inter-related subgroups, present correlation tables between these variables to help readers understand multi-collinearity across models, and run/report interaction analyses between variables to better understand how intersectional identities shape the reported results.

Response: We would like to thank Reviewer #1 for their comment, and we agree that the sub-group factors might be correlated. We have added a correlation heatmap in Fig. S18a to address correlations between sub-group variables. We note the importance of analyzing these sub-groups separately due to the complex nature of the stress-income relationship for each sub-group which requires the fitting of cubic spline models with varying number of knots rather than running one large model which could fail to capture the complexities of the location of the turning point as well as run into multi-collinearity issues. While the usage of cubic splines allows us the flexibility to include several moderating factors, comprehensively exploring interactions is beyond the scope of this study. Nevertheless, we conduct additional analysis of the intersectional variable of being both Healthy and Basic needs-met in Fig. S18b. The resulting stress-income behavior is complex compared to the individual sub-groups of Healthy and Needs-met sub-groups which warrants additional studies beyond the scope of the current study. We have added the following text and figures in this regard. For all the regression models used in this study, to avoid potential collinearity issues, we have implemented a Variance Inflation factor (VIF) of 10 as the cutoff for all the model reported in this study and have updated all the models to reflect these changes. We have now included these details in the Methods section.

(page 7) “We investigated the relationship between life satisfaction versus income and stress versus income at the individual level using cubic spline regression models for each of the sub-groups separately (sex, race, political affiliation, health, social factors, work factor, economic factors, education, and life satisfaction quantile). We analyze these sub-groups separately due to the complex nature of the stress-income relationship for each sub-group which requires the fitting of cubic spline models with the varied location of knots individually rather than running one large logistic regression model which could fail to capture the complexities of the location of the turning point.”

(page 7) “A cutoff of <10 was implemented for the Variance Inflation Factor (VIF).”

(page 13) “The investigated moderating factors are also correlated with each other (Fig. S21a) and these need to be considered in the context of intersectional identities. For example, considering those who are Healthy with Needs-met ($r = 0.12$, $P < 0.001$), we observe vastly different behaviors for these compounded identities compared to the respective individual sub-groups (Fig. S21b). For Healthy individuals with Needs-met, stress is much lower for low-income

individuals (compared to the Healthy and Needs-met groups) and increases with income after the turning point. These results suggest the compounding effects of these sub-groups in both decreasing stresses associated with low-income deprivations and increasing stress associated with affluence. We next discuss possible hypotheses for the origin of stress across the income and life satisfaction distributions.”

(page 17) “We have also not considered all possible interactions between moderating factors which could influence the turning point.”

Relevant Figures:

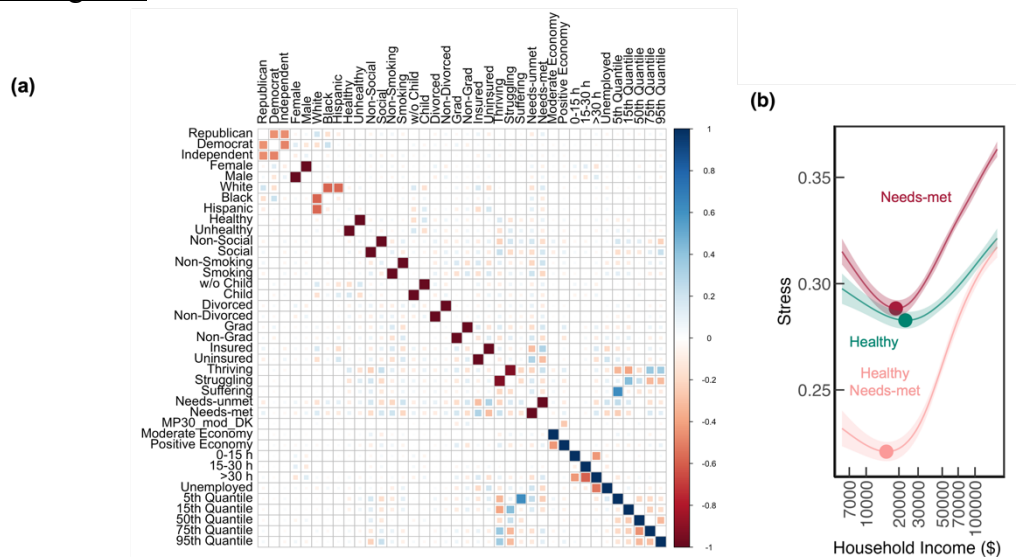


Figure S18: (a) Pair-wise weighted correlations for the various sub-groups discussed in this study, and trends of stress, as the probability of experiencing stress the previous day, with household income (\$) when controlled for being (b) Healthy and Needs-met compared to only Healthy and only Needs-met compared with the fitted cubic spline showing the 95% confidence interval and the satiation (empty)/ turning(full) point indicated.

Related References:

DeVoe, S. E., & Pfeffer, J. (2011). Time is tight: how higher economic value of time increases feelings of time pressure. *Journal of Applied Psychology*, 96(4), 665.

Comment: Similar to Hamermesh.

Donnelly, G. E., Zheng, T., Haisley, E., & Norton, M. I. (2018). The amount and source of millionaires' wealth (moderately) predict their happiness. *Personality and Social Psychology Bulletin*, 44(5), 684-699.

Kaplan, G., & Schulhofer-Wohl, S. (2018). The changing (dis-) utility of work. *Journal of Economic Perspectives*, 32(3), 239-258.

Kushlev, K., Dunn, E. W., & Lucas, R. E. (2015). Higher income is associated with less daily sadness but not more daily happiness. *Social psychological and personality science*, 6(5), 483-489.

Hudson, N. W., Lucas, R. E., Donnellan, M. B., & Kushlev, K. (2016). Income reliably predicts daily sadness, but not happiness: A replication and extension of Kushlev, Dunn, and Lucas (2015). *Social psychological and personality science*, 7(8), 828-836.

Hamermesh, D. S., & Lee, J. (2007). Stressed out on four continents: Time crunch or yuppie kvetch? *The Review of Economics and Statistics*, 89(2), 374-383.

Park, L. E., Jung, H. Y., Lee, K. S., Ward, D. E., Piff, P. K., Whillans, A. V., & Naragon-Gainey, K. (2021). Psychological pathways linking income inequality in adolescence to well-being in adulthood. *Self and Identity*, 20(8), 982-1014.

Pfeffer, J., & Carney, D. R. (2018). The economic evaluation of time can cause stress. *Academy of Management Discoveries*, 4(1), 74-93.

Reviewer #2 (Remarks to the Author):

“I do recommend some revision and/or additional caveats on the results. A major one is that the exposition needs to be streamlined and simplified - perhaps by creative use of a table or two. Right now, the write up of results on different demographic groups, their diverse satiation points, and their levels of stress is all mixed into one long body of text that is a) difficult to follow and b) does not offer any discussion of the reason for these differences. And the list is too long. The authors should choose their most important results and discuss those clearly and thoroughly and put the others in an appendix or table. For the article to have a lasting effect on the debate, the results need to be clearer, better explained, and perhaps put in a more structured order of priorities. Are political affiliations really on the same order of importance than race or income categories, for example?”

Response: We agree with Reviewer #2 that the discussion amongst the various sub-groups warrants more streamlining. For this, we have created a new section ‘*Turning point in stress changes with demographics*’. We have added a clarifying note below on the relative importance of the sex, race, and political affiliation factors in mediating the turning point in stress. We have also removed the results on the trends with time and state of residence (previously in Figs. S10 and S11 respectively) and the quantile of other well-being metrics (previously in Figs. 5b-d) to aid with readability and better focus on the discussion of the turning points in stress. We have

also moved the results from the sub-group analysis of education, children, and being divorced to the Supplementary Information as we observed relatively smaller changes in the turning point compared to the other sub-groups. We have also added a new analysis of sub-group of access to basic needs and view of the economy.

(page 11) Interestingly, Republicans tend to have relatively higher life satisfaction scores and lower stress levels regardless of the political leaning of the state they live in (Figs. S9a-c and Figs. S9d-f respectively). Overall and subgroup level year-averaged stress levels have remained constant for 2008-2017 and the relative trends of the various subgroups (Male vs. Female, White vs. Black vs. Latino, Republican vs. Democrat vs. Independent) have largely remained consistent (Figs. S10a-h).

(page 17) The increase in stress (Fig. S13a) for the highly satisfied individuals in the 95th quantile is also unique when compared to other negative emotions of anger, worry, or sadness that either show a weak turning point (worry in Figs. S19a and Fig. S13c) or only satiation (anger and sadness in Figs. S19b, c and Figs. S13b, d respectively) with increasing household income. Positive emotions such as enjoyment, smiling, and happiness satiate for the most satisfied individuals in the 95th quantile while there is a small decrease for the individuals in the 5th quantile with increasing household income (Figs. S11a-c and Figs. S12a-c).

(page 8) “Thus, the observation that higher life satisfaction is associated with increased stress seems to hold even if stress were work-driven. Furthermore, stressed individuals across all job categories report lower life satisfaction than the corresponding unstressed individuals (Fig. S3b) suggesting that even for those who are satisfied with life despite job stress, their lives could be better.”

(page 9) “The larger differences in the turning/satiation point when divided by race and sex compared to political affiliation suggest that daily stress circumstances are less influenced by political affiliation.”

For each of the sub-groups chosen, we have now added possible reasons for the differences in stress levels. The added sentences for the moderating factors discussed in the study are mentioned below.

(page 12) “The higher income and higher stress at the satiation point for the Smoking sub-group suggest that higher income is needed to compensate for the stressors associated with Smoking.”

(page 12) “The lower income and lower stress at the satiation point for the Social sub-group suggest that relatively lower income is needed to compensate for the low-income stressors associated with being social.”

Further, to develop an overarching narrative of the turning point results from various moderating factors, we added a figure (Fig. S14) showing the relationship between with average life satisfaction of the moderating factors and the turning point income and increase in stress. We find a negative slope between the turning point and the average life satisfaction of the sub-group supporting our claim that more satisfied individuals are more likely to experience an increase in stress. We also note that for sub-groups where the turning/satiation point was not observed, the life satisfaction of those sub-groups is always lower than the corresponding paired subgroup.

We have added the following text and table in this context.

(page 13) “ Notably, the healthier, non-smoking, non-divorced, socially connected, basic needs-met, and working individuals report higher life satisfaction than the other corresponding subgroup individuals while the presence of children does not change life satisfaction (Table S2). Moreover, stressed individuals from all the health, social, education, basic needs, and work subgroups report lower life satisfaction than the corresponding un-stressed individuals. (Figs. S11a-j and Figs. S12a-j for aggregate-model). Of significance is that sub-groups with higher life satisfaction also show an earlier turning point in income (Fig. S14a) except for the education subgroup and larger increases in stress (Fig. S14b). For sub-groups, with no turning/satiation point, we observe comparatively lower life satisfaction. We therefore investigate the mediating role of life satisfaction in the stress versus income relationship.”

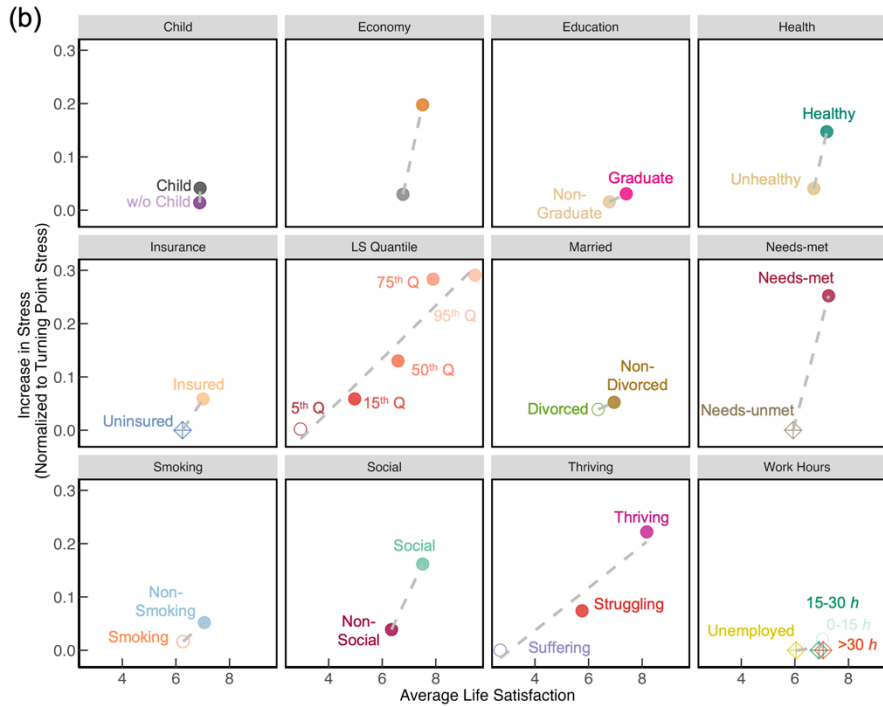
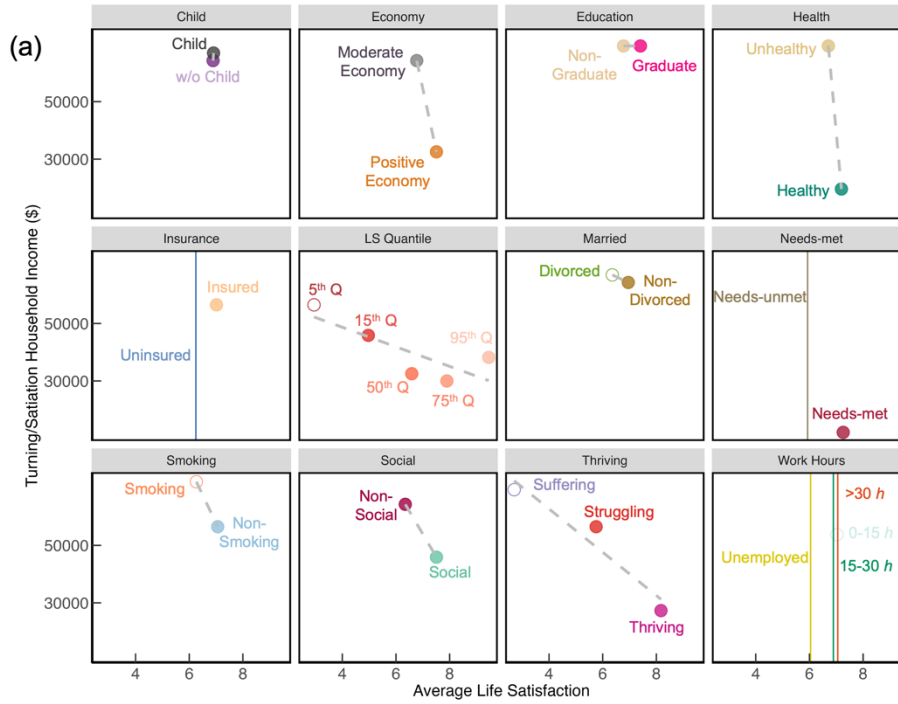


Figure S14: Turning/Satiation household income with average life satisfaction. Trends of (a) satiation(empty)/turning(full)/no-turning(diamond) household income and (b) increase in stress normalized to stress at the turning point as a function of the average life satisfaction of sub-groups divided by mediating factors of having children, education, being healthy, insurance, life satisfaction quantile, marital status, basic needs-met, smoking, social, strength, status of thriving, and work hours. The vertical line corresponds to the average life satisfaction of the sub-group that did not exhibit a turning/satiation point.

“Finally, a central finding of the study is that people who have lower levels of life (and job and other domain) satisfaction are more likely to increase in stress with income and at lower income satiation points. While indeed of interest, the authors should admit that there is likely some multi-collinearity at play here, with those with lower levels of life satisfaction likely to have higher scores on the negative affect dimensions of well-being, such as stress, and are also typically more concerned about income than are those with high levels of well-being. Without a doubt these would both held explain but also "cause" the result. Again more explanation is needed and also a caveat about direction of causality.”

Response: We thank Reviewer #2 for this cautionary comment. We would like to point out that the central finding of this study is that individuals who have high satisfaction are more likely to increase in stress with income and at lower income satiation points (Fig. S14a). We agree that multicollinearity could be at play with the less satisfied individuals being more likely to experience stress due to concern about not having enough money and vice-versa of highly satisfied individuals being more likely to have higher incomes and more worried about spending their money under time constraints⁴. However, we do not have mechanisms to test out the directionality of the effects. We have added several notes in the Discussion section proposing a hypothesis and mentioning caveats about the direction of causality.

(page 16) “The exploratory nature of this work is aimed at establishing moderating factors that could influence the stress-income relationship. As the data is cross-sectional, we are unable to make causal inferences or test hypotheses between the stress and the moderating factors. Instead, we lay down possible hypotheses about the possible causal mechanisms and recommend that more causal data needs to be collected on the nature and causes of stress to understand how they contribute to wellbeing.”

(page 16) “We also note that the reverse causality is possible due to the possible bi-directionality of the association between income, stress, and life satisfaction.”^{21–23}

With some revision, I think this paper could make a contribution to an important debate in wellbeing economics and also deepen our understanding of the complex intermediating forces that determine human wellbeing.

Response: We thank Reviewer #2 for their positive view of our work.

Reviewer #3 (Remarks to the Author)

#1 “funding? conflict of interest? do you work for gallup or who paid for the gwp?”

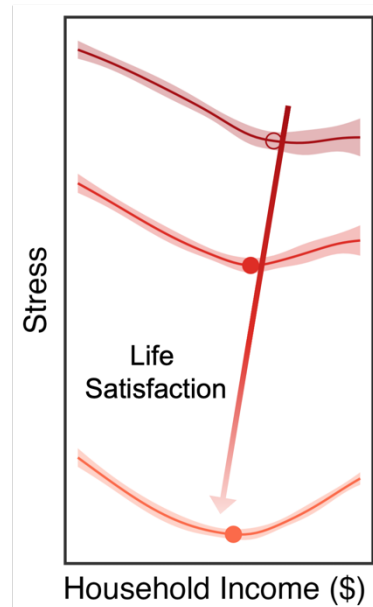
Response: We thank Reviewer #3 for the comments on the nature of funding. We have access to the Gallup datasets through an agreement between Gallup Inc. and Yale University. We are not employed by Gallup or have paid for the study. We have included this in the Conflict-of-Interest Statement as noted below.

(page 19). **“Competing interest**

All the authors declare no competing interests.”

#2“could have a graphical abstract showing relationship of income, stress and swb”

Response: We thank Reviewer #3 for the thoughtful comment. We have added a schematic below that captures the thematic message of the relationship between income, stress, and life satisfaction. However, as the journal does not allow for a Graphical Abstract, we are unable to include this in the manuscript.



Relevant References

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Response to Reviewers

Summary of Changes:

Figure change summary:

1. We have added Fig. S2, Fig. S3, Fig. S8, and Fig. S21c in the current version of the manuscript.
2. We have removed Fig. S3a. We now use the previous Fig. S3a to merge similar job types based on average life satisfaction/stress and replace it with Fig. S3b. The current figure number is Fig. S5.
3. We have modified all the figures to include the corrected 95% C.I. due to bugs in the underlying R packages and moved them to the corresponding locations in the text for better readability. We have also modified the axes to adhere to journal guidelines.

Table change summary:

1. We have added Table S1 and Table S2 to include key descriptive statistics (including effect sizes and statistical power) of the sample and sub-groups in the current version of the manuscript.
2. We have modified Tables S3-S9 to adhere to formatting and reporting policies by including P-values and 95% Confidence Intervals.
3. We have updated the Summary Tables to include AIC, BIC, and additional models used to check for robustness.

We have also updated the language to refer to survey respondents as ‘*respondents*’ rather than ‘*individuals*’ for inclusive language when referring to various sub-groups.

Reviewer #1 (Remarks to the Author):

The authors have made efforts to address the concerns raised by reviewers. However, I believe there is still substantial room for improvement in terms of clarity and transparency. My concerns are summarized below, starting with a section-by-section analysis, and then with a summary of my overarching concerns related to this manuscript.

Response: We thank the Reviewer for their constructive feedback. Below we have addressed each of their concerns. We have indicated other minor changes to the Main text in the Highlighted document.

Introduction:

The introduction paragraph on Page 2 is somewhat convoluted and fails to clearly articulate the study's contribution. The authors seem to argue that their research is novel because it explores different well-being outcomes at the same time, but then they state that past research has already done this. The authors then mention that their contribution is that they are looking at a "component of stress," however, they use a broad measure of stress in their analyses.

The authors should carefully review the introduction for consistency and clarity. For example, they state, "Typically, positive affect emotions such as happiness, enjoyment, or smiling and negative affect emotions such as stress, worry, and sadness are aggregated, and seem to satiate at higher incomes." However, they later mention that past studies separately examine these outcomes (Killingsworth). Additionally, they write, "the study found no significant correlation for stress ($p=0.0476$)," and then say, "in this study, we examine the phenomenon of stress more deeply, motivated by the observation that stress seems to be the well-being dimension with the strongest evidence of a turning point." These seeming contradictions may confuse readers and should be addressed to provide a more coherent narrative.

Broadly, to improve the readability and impact of the introduction, the authors should streamline the introduction and focus on the key aspects that directly lead to the current study's objectives - investigating when stress predicts well-being - depending on income. In doing so, the authors should focus on novel aspects of their research compared to past work (which still is not clear from the summary of the research that the authors have provided).

Response: We would like to thank the Reviewer for pointing out the lack of interpretability in the Introduction. We have made several changes to the Introduction by re-organizing the text to indicate the missing gaps from existing literature on the mediating factors of turning points in stress with income. We now clarify how our study aims to address these gaps. We have also modified the last paragraph of the Introduction to describe our hypothesis in accordance with the journal guidelines. The changes are as follows:

(Page 3) “Contradictions have also been reported for the relationship between emotional (or experienced) well-being and high income. Typically, positive affect emotions such as happiness, enjoyment, or smiling and negative affect emotions such as stress, worry, and sadness are aggregated before analysis.¹⁻³ Kahneman and Deaton report plateauing (satiation) of negative emotional well-being at an annual household income of ~\$75,000⁴ while others report a monotonic increase for different elements of experienced well-being (less sadness and anger, more feeling good) with increasing household income up to \$625,000.⁵ This difference has been attributed to the different extents of satiation experienced by people at different levels of well-being among the high-income earners.⁶”

(Page 3) “Stress stands out among experienced well-being dimensions for potentially having a unique relationship with income: stress has been found to decrease with income up to \$60,000-90,000^{4,7} but then slightly increase at higher incomes. Such a turn-around with income has also been found for aggregated negative-affect emotions (including stress), but it is unclear what specific elements may be driving this trend.⁸ However, Killingworth found no significant correlation for stress ($P = 0.0476$) with household income.⁵ Given that stress is a complex multidimensional construct¹², it may be interpreted differently across sub-groups with different lived experiences leading to seemingly contradictory conclusions. For example, for one component of stress related to time scarcity, it has been reported that stress increases with income,⁹ especially when the value of time is perceived to be monetary at workplaces.^{10,11} Motivated by the heterogeneity in this potential turn-around, in this study we examine the phenomenon of stress more deeply. Who experiences stress, how does its prevalence vary at different income levels, and how does it influence life satisfaction? How do these relationships vary across the population sub-groups? We then examine the population characteristics that influence the turning point from lower stress prevalence with rising income to growing prevalence, particularly at what income level the turning point occurs and how fast the prevalence increases.”

(Page 3) “Why is it important to examine stress? Increased stress has been linked to increased cortisol levels that are associated with heart-ailments, anxiety, depression, and/or a strain on personal relationships.¹³”

(Page 3) “We hypothesize that the relationship between life satisfaction and stress differs for different ranges of household incomes, leading to a turning point.⁸ We test whether this turn-around is observed whether the population is divided by sex, race, and political affiliation. Additionally, we predict that the turning point⁹ (increase or U-shaped trend) for stress versus household income is mediated by factors such

as life satisfaction, health, basic needs, social, economic, and work factors which are previously reported correlates of stress overall. Lastly, we investigate the lifestyle correlates of stress for the high-income and high-life satisfaction respondents to infer whether an earlier turning point is desirable.”

(Page 4): “We confirm that the relationship between life satisfaction and stress differs for different ranges of household incomes.”

Results Preview (Page 3): Given that the Gallup Daily Poll uses representative samples from different years (2008-2017), it would be helpful for the authors to clarify how the \$63,000 threshold was determined. Is this an average across the survey years? Does the inflection point hold when controlling for study wave? Have the authors adjusted for purchasing power differences across study years? Addressing these questions upfront would provide valuable context for interpreting the results.

Response: We thank the Reviewer for this comment. We have not adjusted for purchasing power across different years similar to the works of Jebb *et al.*⁸ and Teeselink *et al.*⁷. We have noted this in the Methods section. We have controlled for survey year and age in all the results presented for the respondent-model. We have now added these details to the summary paragraph of the Results section for context.

(Page 4) “To identify the turning/satiation point for the predicted stress versus household income relationships, we fit penalized cubic splines using the mgcv package in R²³ with 3-7 knots for the subgroups and identified the turning/satiation point by calculating the first derivative of the conditional prediction.”⁹

(Page 8) “At the respondent-level, we report predicted life satisfaction scores and predicted probability of experiencing stress after controlling for survey year and age unadjusted for income inflation.”

Methods:

The sentence "We investigated the relationship between life satisfaction versus income and stress versus income at the individual level using cubic spline regression models" could be clarified. It would be beneficial to explain the specific relationships being examined (e.g., such as whether the authors are looking at how the relationship between income and life satisfaction changes at different levels of stress) instead of using “versus” language here.

Response: We thank the Reviewer for these comments. We have modified these sentences to explicitly specify the goal for investigating each of these relationships.

(Page 4) “We investigated the non-linear association between stress and income at the respondent level using cubic spline regression models for each of the sub-groups separately (sex, race, political affiliation, health, social factors, work factor, economic factors, education, and life satisfaction quantile) to probe the mediating role of these sub-group factors in altering the location of the turning point. We also investigated the relationship between life satisfaction versus income at different stress levels to probe the moderating role of stress.”

(Page 4) “We also investigated the association between life satisfaction and income and stress and income at an aggregated level for each income category as an auxiliary model to the respondent-model.”

Including the sample sizes for each subgroup (sex, race, political affiliation, health, social factors, work factors, economic factors, education, and life satisfaction quantiles) in the text would help readers assess the statistical power for the complex analyses being conducted. The authors should also discuss statistical

power as part of their manuscript (e.g. what effect sizes did the sample size give the authors the power to detect, given their complex interactions and analytic approaches)? How should readers think about statistical power for their subgroup analyses?

Response: We thank the Reviewer for these comments. We have included Table S1 which reports year-wise weighted average life satisfaction, proportion of stressed respondents, and sample sizes for each sub-group. We have also included sample sizes in the relevant sections of the text. We have also included size effects (d, h) and statistical power for each sub-group life satisfaction and stress proportions to provide the practical significance of the differences between sub-groups in Table S1. Due to the relatively large sample sizes, we have enough statistical power to predict effect sizes as low as 0.01 with $> 97\%$ statistical power (95% C.I.), except for the stress proportion for the education sub-group where we found no difference in the average stress proportions. Furthermore, for the sub-group turning point analysis, we have included the exact P-values obtained from and the Bayes Factor obtained from the aggregated model when discussing the statistical significance. Previously, these results were reported in the Supplementary Information figures (using $P < 0.05$ from visual inspection), and the Bayes Factor was only reported for the aggregate-level model in the Supplementary Tables. We have also added a note on the Statistical interpretation of the results in the Methods section.

Table S1: Descriptive statistics of the dataset showing variable, sub-group, effect size (Cohen d , power, Cohen h , power), sub-group sample size (N), year-wise distribution of sub-group averaged life satisfaction, and the proportion of stressed respondents. The number and percentage of observations are shown in the brackets.

Variable	Sub-group	Effect Size	Sub-group Size (N)	Year:2008	Year:2009	Year:2010	Year:2011
	Needs-unmet	LS:0.8(1),Stress:0.53(1)	422678	5.94,0.6(47449,19.55%)	5.82,0.6(49764,21.8%)	5.87,0.59(59457,22.42%)	5.88,0.59(66029,22.8%)
Basic Needs	Needs-met	LS:0.8(1),Stress:0.53(1)	1534711	7.07,0.34(103871,42.8%)	7.29,0.34(176266,77.22%)	7.32,0.34(205682,77.57%)	7.3,0.35(223553,77.18%)
Children	w/child	LS:0.02(1),Stress:0.27(1)	601124	6.82,0.47(74198,30.57%)	6.92,0.48(68893,30.18%)	6.96,0.47(78380,29.56%)	6.95,0.47(84501,29.18%)
	w/o child	LS:0.02(1),Stress:0.27(1)	1448239	6.83,0.37(168351,69.37%)	6.99,0.38(159224,69.75%)	7.01,0.38(186609,70.38%)	6.98,0.38(204887,70.74%)
	Moderate	LS:0.38(1),Stress:0.19(1)	1127532	6.7,0.43(101746,41.93%)	6.88,0.43(116700,51.13%)	6.9,0.44(115335,43.5%)	6.89,0.44(128240,44.28%)
Economy	Positive	LS:0.38(1),Stress:0.19(1)	273484	7.41,0.28(21851,9%)	7.68,0.29(12907,5.65%)	7.68,0.29(14695,5.54%)	7.68,0.31(14832,5.12%)
	Graduate	LS:0.26(1),Stress:0(0.05)	526775	7.25,0.41(51367,21.17%)	7.43,0.41(47508,20.81%)	7.46,0.42(54614,20.6%)	7.43,0.43(58305,20.13%)
Education	Non-Graduate	LS:0.26(1),Stress:0(0.05)	1475156	6.71,0.41(191313,78.83%)	6.85,0.42(180755,79.19%)	6.87,0.41(210549,79.4%)	6.86,0.42(231329,79.87%)
	Healthy	LS:0.21(1),Stress:0.04(1)	689659	6.97,0.38(83030,34.21%)	7.23,0.39(73748,32.31%)	7.27,0.39(84393,31.83%)	7.26,0.39(96664,33.37%)
Health	Unhealthy	LS:0.21(1),Stress:0.04(1)	1336768	6.75,0.43(157396,64.86%)	6.84,0.44(152264,66.71%)	6.86,0.43(177916,67.1%)	6.82,0.44(189443,65.41%)
	Insured	LS:0.51(1),Stress:0.22(1)	1831238	6.9,0.39(218656,90.1%)	7.09,0.4(202748,88.82%)	7.11,0.4(234678,88.5%)	7.09,0.41(254119,87.74%)
Insurance	Uninsured	LS:0.51(1),Stress:0.22(1)	217795	6.13,0.5(23851,9.83%)	6.02,0.5(25334,11.1%)	6.09,0.49(30241,11.4%)	6.13,0.48(35160,12.14%)
	15th Quantile	LS:10.3(1),Stress:0.59(1)	242965	4.67,0.68(19278,7.94%)	5.0,52(29141,12.77%)	5.0,52(33298,12.56%)	5.0,52(36612,12.64%)
	50th Quantile	LS:5.28(1),Stress:0.45(1)	671150	6.17,0.47(87053,35.87%)	6.67,0.44(74497,32.64%)	6.66,0.45(86037,32.45%)	6.66,0.45(95686,33.04%)
	5th Quantile	LS:7.79(1),Stress:0.88(1)	165722	3.88,0.8(306,0.13%)	2.96,0.68(21600,9.46%)	2.97,0.67(24717,9.32%)	3.0,67(27530,9.51%)
Life Satisfaction Quantile	75th Quantile	LS:3.94(1),Stress:0.18(1)	608365	7.5,0.31(122912,50.65%)	8.0,33(61754,27.05%)	8.0,33(71501,26.96%)	8.0,33(76114,26.28%)
	95th Quantile	Ref	363292	8.13,0.29(13131,5.41%)	9.44,0.25(41271,18.08%)	9.45,0.25(49610,18.71%)	9.45,0.25(53692,18.54%)
	Divorced	LS:0.3(1),Stress:0.1(1)	240385	6.28,0.46(30610,12.61%)	6.47,0.46(28584,12.52%)	6.52,0.46(33065,12.47%)	6.47,0.47(33030,11.4%)
Marital Status	Non-Divorced	LS:0.3(1),Stress:0.1(1)	1808491	6.9,0.4(211917,87.32%)	7.04,0.41(199482,87.39%)	7.06,0.41(231824,87.43%)	7.04,0.41(256239,88.47%)

Political Affiliation	Overall	Ref	2051494	6.82,0.41(242680,100%)	6.97,0.42(228263,100%)	6.99,0.42(265163,100%)	6.97,0.42(289634,100%)
	Democrat	LS:0.09(1),Stress:0.06(1)	547505	6.61,0.43(85226,35.12%)	6.94,0.42(80360,35.21%)	7.07,0.41(87210,32.89%)	7.05,0.41(89553,30.92%)
	Independent	LS:0.18(1),Stress:0.1(1)	555906	6.71,0.43(79102,32.6%)	6.84,0.43(70377,30.83%)	6.84,0.44(85797,32.36%)	6.83,0.44(102704,35.46%)
	Republican	Ref	498879	7.23,0.36(70494,29.05%)	7.16,0.39(69401,30.4%)	7.12,0.4(81553,30.76%)	7.1,0.4(84150,29.05%)
	Black	LS:0.06(1),Stress:0.08(1)	164262	6.59,0.37(16425,6.77%)	6.88,0.37(14024,6.14%)	7.04,0.34(17950,6.77%)	6.93,0.36(22946,7.92%)
	Hispanic	LS:0.01(0.97),Stress:-0.04(1)	158782	6.93,0.41(15198,6.26%)	6.88,0.42(15511,6.8%)	6.93,0.39(18621,7.02%)	6.95,0.4(17450,6.02%)
Race	White	Ref	1611799	6.85,0.41(199855,82.35%)	6.99,0.42(187636,82.2%)	7.01,0.43(214668,80.96%)	7.01,0.42(218959,75.6%)
	Female	LS:0.08(1),Stress:0.08(1)	1001453	6.84,0.45(116025,47.81%)	7.02,0.45(110079,48.22%)	7.07,0.45(129618,48.88%)	7.07,0.45(143862,49.67%)
Sex	Male	LS:0.08(1),Stress:0.08(1)	1050038	6.81,0.37(126655,52.19%)	6.92,0.39(118184,51.78%)	6.92,0.38(135545,51.12%)	6.87,0.39(145771,50.33%)
	Non-Smoking	LS:0.44(1),Stress:0.24(1)	1702254	6.93,0.38(198846,81.94%)	7.11,0.39(187375,82.09%)	7.14,0.39(218374,82.35%)	7.11,0.39(238947,82.5%)
Smoke	Smoking	LS:0.44(1),Stress:0.24(1)	348305	6.35,0.5(43754,18.03%)	6.3,0.51(40819,17.88%)	6.33,0.51(46699,17.61%)	6.31,0.52(50550,17.45%)
	Non-Social	LS:0.64(1),Stress:0.45(1)	249563	NA	NA	NA	NA
Social	Social	LS:0.64(1),Stress:0.45(1)	332679	NA	NA	NA	NA
	Struggling	LS:1.72(1),Stress:0.25(1)	759202	NA	5.97,0.49(100089,43.85%)	5.97,0.49(114276,43.1%)	5.96,0.49(124309,42.92%)
	Suffering	LS:5.39(1),Stress:0.57(1)	64949	NA	2.8,0.64(8038,3.52%)	2.79,0.65(9425,3.55%)	2.83,0.64(10765,3.72%)
Thriving	Thriving	Ref	923955	NA	8.18,0.34(112269,49.18%)	8.21,0.35(131811,49.71%)	8.2,0.35(142705,49.27%)
	0-15 <i>h</i>	LS:0.55(1),Stress:-0.3(1)	44262	NA	NA	7.13,0.42(7196,2.71%)	7.11,0.42(8183,2.83%)
	15-30 <i>h</i>	LS:0.5(1),Stress:-0.24(1)	78781	NA	NA	7.02,0.43(12943,4.88%)	7,0.44(14655,5.06%)
Work Type	30 <i>h</i>	LS:0.67(1),Stress:-0.18(1)	664253	NA	NA	7.12,0.42(111662,42.11%)	7.08,0.43(120805,41.71%)
	Unemployed	Ref	63469	NA	NA	5.82,0.54(13494,5.09%)	5.93,0.53(13882,4.79%)

Year:2012	Year:2013	Year:2014	Year:2015	Year:2016	Year:2017
5.91,0.59(65057,22.05%)	5.93,0.58(35694,24.14%)	5.85,0.61(28817,19.86%)	5.89,0.61(26901,18.14%)	5.89,0.61(26047,17.24%)	5.69,0.67(17463,12.62%)
7.29,0.35(229884,77.93%)	7.35,0.34(112163,75.85%)	7.34,0.35(116191,80.09%)	7.37,0.36(121383,81.83%)	7.38,0.36(125017,82.74%)	7.36,0.38(120701,87.22%)
6.94,0.47(84600,28.68%)	6.98,0.46(44124,29.84%)	7.03,0.46(41855,28.85%)	7.07,0.46(41387,27.9%)	7.11,0.46(42505,28.13%)	7.16,0.47(40681,29.4%)
7.01,0.39(210094,71.22%)	7.02,0.38(103519,70%)	7.05,0.39(102995,71%)	7.11,0.39(106692,71.93%)	7.13,0.39(108389,71.73%)	7.14,0.4(97479,70.44%)
6.85,0.45(124171,42.09%)	6.88,0.43(119962,81.12%)	6.9,0.43(114449,78.89%)	6.94,0.43(110286,74.35%)	6.95,0.44(109078,72.19%)	6.88,0.46(87565,63.28%)
7.63,0.33(21767,7.38%)	7.58,0.33(27486,18.59%)	7.59,0.35(30228,20.84%)	7.56,0.36(37683,25.4%)	7.59,0.35(41670,27.58%)	7.61,0.35(50365,36.4%)
7.45,0.42(61618,20.89%)	7.48,0.41(30405,20.56%)	7.42,0.42(38908,26.82%)	7.46,0.42(60651,40.89%)	7.48,0.42(63880,42.28%)	7.48,0.43(59519,43.01%)
6.87,0.42(233363,79.11%)	6.89,0.41(117476,79.44%)	6.81,0.42(57973,39.96%)	6.85,0.41(87138,58.74%)	6.86,0.41(86792,57.44%)	6.89,0.42(78468,56.71%)
7.24,0.39(99351,33.68%)	7.29,0.38(51378,34.74%)	7.32,0.38(49357,34.02%)	7.37,0.38(50001,33.71%)	7.38,0.38(52508,34.75%)	7.42,0.38(49229,35.58%)
6.85,0.44(192087,65.12%)	6.85,0.43(94377,63.82%)	6.89,0.44(93543,64.48%)	6.95,0.44(96232,64.87%)	6.98,0.44(96495,63.86%)	6.99,0.45(87015,62.88%)
7.1,0.41(259467,87.96%)	7.13,0.4(128726,87.05%)	7.13,0.41(130630,90.04%)	7.17,0.41(136240,91.85%)	7.19,0.41(139820,92.53%)	7.22,0.42(126154,91.17%)
6.18,0.48(35124,11.91%)	6.2,0.48(18919,12.79%)	6.24,0.47(14175,9.77%)	6.36,0.46(11846,7.99%)	6.35,0.44(11125,7.36%)	6.41,0.47(12020,8.69%)
5,0.51(37103,12.58%)	5,0.5(18226,12.32%)	5,0.5(18199,12.54%)	5,0.51(18073,12.18%)	5,0.5(17592,11.64%)	5,0.54(15443,11.16%)
6.66,0.46(97571,33.08%)	6.67,0.45(47164,31.89%)	6.66,0.46(44975,31%)	6.67,0.46(45991,31%)	6.67,0.46(47769,31.61%)	6.68,0.47(44407,32.09%)
3.02,0.65(27520,9.33%)	2.98,0.65(14142,9.56%)	2.95,0.64(13505,9.31%)	2.96,0.64(12808,8.63%)	2.97,0.65(12531,8.29%)	2.95,0.68(11063,7.99%)
8,0.34(77452,26.26%)	8,0.34(39312,26.58%)	8,0.35(38846,26.78%)	8,0.35(40262,27.14%)	8,0.35(41656,27.57%)	8,0.35(38556,27.86%)
9.45,0.25(55335,18.76%)	9.46,0.25(29038,19.64%)	9.48,0.26(29547,20.37%)	9.48,0.25(31202,21.03%)	9.48,0.25(31556,20.88%)	9.48,0.25(28910,20.89%)
6.52,0.47(33000,11.19%)	6.51,0.46(17101,11.56%)	6.56,0.46(16467,11.35%)	6.64,0.45(16998,11.46%)	6.66,0.44(16412,10.86%)	6.66,0.46(15118,10.93%)

7.05,0.41(261624,88.69%)	7.08,0.41(130531,88.27%)	7.1,0.41(128303,88.44%)	7.16,0.41(131069,88.36%)	7.18,0.41(134464,88.99%)	7.21,0.42(123038,88.91%)
6.99,0.42(294981,100%)	7.01,0.41(147882,100%)	7.04,0.42(145072,100%)	7.1,0.41(148336,100%)	7.12,0.41(151104,100%)	7.15,0.42(138379,100%)
7.17,0.4(92055,31.21%)	7.05,0.41(9606,6.5%)	7.09,0.41(13819,9.53%)	7.12,0.41(13673,9.22%)	7.19,0.42(33071,21.89%)	7.11,0.44(42932,31.02%)
6.82,0.44(92330,31.3%)	6.85,0.43(10680,7.22%)	6.89,0.43(15827,10.91%)	6.93,0.44(15568,10.5%)	6.96,0.44(34182,22.62%)	6.98,0.44(49339,35.65%)
7.01,0.41(85947,29.14%)	7.18,0.38(8447,5.71%)	7.2,0.39(12788,8.81%)	7.32,0.39(13236,8.92%)	7.29,0.38(32679,21.63%)	7.42,0.38(40184,29.04%)
7.04,0.35(25402,8.61%)	6.83,0.36(12874,8.71%)	6.88,0.37(13259,9.14%)	6.93,0.37(13694,9.23%)	6.94,0.36(13882,9.19%)	6.88,0.38(13806,9.98%)
7.04,0.39(20001,6.78%)	7.01,0.4(13130,8.88%)	7.07,0.4(13902,9.58%)	7.08,0.39(14406,9.71%)	7.09,0.39(15187,10.05%)	7.08,0.41(15376,11.11%)
6.98,0.43(236148,80.06%)	7.04,0.42(115069,77.81%)	7.07,0.43(110758,76.35%)	7.13,0.43(112979,76.16%)	7.16,0.43(114386,75.7%)	7.2,0.44(101341,73.23%)
7.1,0.44(147927,50.15%)	7.1,0.44(72838,49.25%)	7.12,0.44(71135,49.03%)	7.17,0.44(72964,49.19%)	7.21,0.44(72615,48.06%)	7.18,0.46(64390,46.53%)
6.87,0.39(147053,49.85%)	6.93,0.39(75044,50.75%)	6.96,0.39(73937,50.97%)	7.03,0.39(75371,50.81%)	7.05,0.39(78489,51.94%)	7.11,0.39(73989,53.47%)
7.12,0.39(245510,83.23%)	7.16,0.39(122625,82.92%)	7.18,0.39(120822,83.28%)	7.23,0.39(124905,84.2%)	7.26,0.39(127915,84.65%)	7.28,0.4(116935,84.5%)
6.33,0.51(49301,16.71%)	6.28,0.52(25155,17.01%)	6.35,0.51(24162,16.66%)	6.39,0.51(23369,15.75%)	6.4,0.51(23135,15.31%)	6.4,0.54(21361,15.44%)
NA	NA	6.36,0.54(62055,42.78%)	6.41,0.54(62682,42.26%)	6.45,0.54(62613,41.44%)	6.51,0.54(62213,44.96%)
NA	NA	7.55,0.32(82796,57.07%)	7.6,0.32(85465,57.62%)	7.6,0.32(88346,58.47%)	7.67,0.32(76072,54.97%)
5.94,0.49(124206,42.11%)	5.98,0.48(62797,42.46%)	5.94,0.48(59851,41.26%)	5.98,0.48(59861,40.36%)	5.98,0.48(60184,39.83%)	5.95,0.51(53629,38.76%)
2.84,0.63(10312,3.5%)	2.83,0.62(5955,4.03%)	2.78,0.6(5727,3.95%)	2.75,0.61(5386,3.63%)	2.77,0.62(5041,3.34%)	2.73,0.65(4300,3.11%)
8.2,0.35(147130,49.88%)	8.23,0.34(74890,50.64%)	8.26,0.35(75585,52.1%)	8.26,0.35(79391,53.52%)	8.25,0.36(82329,54.48%)	8.23,0.35(77845,56.25%)
7.09,0.43(8333,2.82%)	7.14,0.41(4243,2.87%)	7.11,0.46(4173,2.88%)	7.18,0.44(4100,2.76%)	7.22,0.44(4109,2.72%)	7.19,0.46(3925,2.84%)
6.98,0.44(14936,5.06%)	6.97,0.44(7854,5.31%)	6.92,0.45(7245,4.99%)	7.01,0.45(7219,4.87%)	7.03,0.46(7261,4.81%)	7.03,0.47(6668,4.82%)
7.06,0.44(123059,41.72%)	7.11,0.43(63427,42.89%)	7.13,0.43(59403,40.95%)	7.18,0.43(60736,40.94%)	7.19,0.43(64167,42.47%)	7.22,0.44(60994,44.08%)
5.95,0.54(12376,4.2%)	6.02,0.52(6052,4.09%)	6.07,0.53(4923,3.39%)	6.18,0.52(4479,3.02%)	6.12,0.53(4232,2.8%)	6.17,0.55(4031,2.91%)

(Page 4) “We report estimated *P*-values for both satiation (two-tailed) and turning (one-tailed) cases.”

(Page 4) “We also investigated the association between life satisfaction and income and stress and income at an aggregated level for each income category as an auxiliary model to the respondent-model. For cases, where the respondent and aggregate-models do not agree, we rely on the Bayes Factor to judge the strength of the evidence.”

(Page 4) “Bayes factor provides not only the strength of the evidence of the turning point (1-3: Weak, 3-10: Moderate, and 1-30: Strong, >30: Very Strong),^{14,15} but also gives us insights into the strength of the alternate hypothesis by comparing the Bayes Factor for both the alternate and null hypotheses (whether subjective well-being metric increases, remains same, or decreases after the predicted turning point).¹⁴ We report Bayes Factors as auxiliary for the satiation/turning point along with the *P*-values from the respondent-model.”

(Page 6) “We also report sub-group sample size, effect sizes (Cohen *d*, Cohen *h*), and statistical power noting that we have enough statistical power to predict effect sizes as low as 0.01 with > 97% statistical power (95% C.I.), except for the education sub-group where we found no difference in the average stress proportions (Table S1).”

The authors mention using a cut-off of <10 for the Variance Inflation Factor (VIF) for all regression models. It would be informative to know if any covariates or variables were dropped due to high VIF and, if so, which ones (Page 4).

Response: We thank the Reviewer for these comments. We have not dropped any variables due to high VIF. We have additionally checked for concurvity of the splines as well and found no significant correlation issues using 0.8 as the cutoff. We translate concurvity to VIF for easier interpretation. We have included these details in the Methods section.

(Page 5) "A cutoff of <10 was implemented for the Variance Inflation Factor (VIF, for the splines terms concurvity was converted to VIF for easier interpretation) for all the regression models, although no variables were dropped in any analysis."

Aggregated Model:

The authors' choice of using a default prior (0.707) for their Bayesian analysis could be further justified. Given the existing research on well-being and income using similar data sources and methods (e.g., Jebb et al., 2018), the authors might consider using priors based on effect sizes from the published literature. Providing a rationale for the decision to use default priors would strengthen the methodological robustness of the study.

Response: We thank the Reviewer for pointing this out. We have added the reference from Jebb *et al.*⁸ when discussing our choice of default prior. We have also tested 2 alternate prior values (wide, ultrawide) while evaluating Bayes Factor along with the default medium case reported across the study. We find no significant change in the Bayes Factor when changing the prior (B.F. = 2878 and 2625 for the wide and ultrawide cases respectively compared to the B.F. = 2884 for the default case) for the population overall. These results demonstrate strong evidence for the turning point and the robustness of the results with regard to the choice of the prior. We have added this detail to the Methods sections.

(Page 5) "We find that the choice of prior does not affect the strength of evidence of the turning point for the population overall with strong evidence observed for wide and ultrawide priors as well."

Data:

The authors should double-check the years mentioned in the data section. The abstract states 2008-2017, but the text mentions 2008-2007, which seems to be a typo.

Response: We thank the Reviewer for pointing this out. This has been corrected in the text

(Page 5) "Data from 2008-2017 was analyzed together to estimate the turning/satiation point."

Table 1:

Including the sample sizes and basic descriptive statistics for each variable and year would enhance the interpretability of the findings.

Response: We thank Reviewer #1 for this comment. We have included Table S1 for this purpose. (Shown on Page 3 of this document)

Stress reduces life satisfaction:

This section could benefit from clearer explanations of the analyses conducted. While the initial analyses demonstrating the association between stress and lower life satisfaction are clear, the subsequent analyses

examining job stress and occupation require more detail. Are the authors controlling for income in these analyses, or are they simply looking at occupation itself as a predictor of the relationship between stress and well-being? Is the association between stress and life satisfaction stronger for jobs that make less money, or less strong? Clarifying the specific research questions and how the work/occupation analyses advance the understanding of income's moderating role in the stress-life satisfaction relationship would improve the coherence of this section.

Response: We thank the Reviewer for their comment. As the Reviewer points out there are several interesting questions that can be posed within the analysis of stress by income and job type. Our goal with this analysis is to specifically probe the difference in life satisfaction between the stressed and unstressed with increasing income to answer the question if high income associated life satisfaction compensates for the increased stress for certain job types. We have therefore modified Figure S3 by not discussing the overall life satisfaction and stress trends (previously in Figure S3a) but solely focusing on the difference in the life satisfaction for the stressed and unstressed respondents with increasing income across job types and moving it to Figure S5. For this, we now explicitly model the interaction between stress and job types by studying different interaction methods (no interaction, linear interactions, spline interactions) and select the model with the lowest AIC. We have documented the model selection criteria for all interaction models in the Methods section and modified the discussion to reflect this.

(Page 4) “To study the life satisfaction-income relationship, we fit separate spline terms for the Stressed (S) and Un-Stressed (US) respondents to model the buffering effect of income on the life satisfaction-stress relationship.^{16,17} We further investigate interaction effects to model different buffering effects with income for each mediating factor. Among the investigated interaction models, we report all models in the Supplementary Information Summary Tables and only discuss the model with the lowest Akaike information criterion (AIC).”

(Page 8) “To probe whether there are certain job types where experiencing stress is associated with higher life satisfaction, we investigated trends of life satisfaction with income for stressed and unstressed respondents across different job categories. We observe that stressed respondents across all job categories report lower life satisfaction than the corresponding unstressed respondents (Fig. S5) suggesting that even for those who are satisfied with life despite job stress, their lives could be better.”

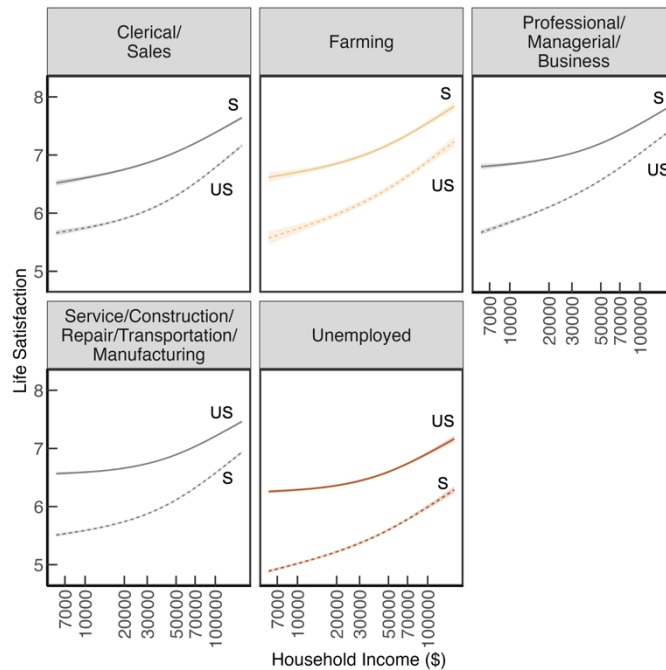


Figure S5: Trend of predicted life satisfaction scores for the Stressed (dashed, S) and Unstressed (full, US) for Clerical (in business, government agency, or other type of organization) and Sales, Farming (or Fishing or Forestry worker), Professional (lawyer, doctor, scientist, teacher, engineer, nurse, accountant, computer programmer, architect, investment banker, stock brokerage, marketing, musician, artist), Manager (or Executive or Official—in a business, government agency, or other organization), Business (self-employed), Construction, Manufacturing, Transportation, Repair, Service, and Construction (or Mining worker) job categories along with the Unemployed, averaged for 2008-2017 (only 2010-2017 for the Unemployed). The shaded area denotes the 95% confidence interval for the predicted life satisfaction.

Stress decreases, then increases, with rising income, unlike other emotions:

The authors should consider including basic demographic controls (e.g., employment status, gender, marital status) in their initial models to assess the robustness of the inflection point analyses for stress (in addition to conducting the separate subgroup analyses). This section has the potential to be a key conceptual contribution of the paper. Getting to these findings faster and doing a more thorough job describing these analyses and any robustness checks the authors have done to ensure robustness could help to further increase the impact of these findings.

Response: We thank the Reviewer for this comment. We agree that adding the above-mentioned controls would improve the interpretation of the results. We have now included additional controls as linear terms only in this section as in the subsequent sections we analyze the sub-groups separately using cubic spline terms. We have added a note on robustness checks by evaluating three separate models with the current version of controls of age and survey year being used for all subsequent models (including those for the mediating factors in the next section), and two other models including gender, marital status, similar to the controls used by Jebb *et al.*⁸ (Model B) and further including the presence of children and employment (Model C) as suggested by Reviewer #1 as linear terms. We observe that the turning point in the stress versus income relationship remains statistically significant ($P < 0.001$ (turning), $P < 0.001$ (turning), and $P = 0.017$ (turning) for Model A, Model B, and Model C respectively) and within a range of ~\$4000 after

controlling for additional demographic variables. We have added a new figure showing the relationship between stress and income for each of these models in Fig. S8.

(Page 8) “For robustness, we considered additional controls of gender, presence of children, marital status, and employment in modeling the association between stress and income and found a statistically significant turning point in all cases within ~\$4000 (Fig. S8).”

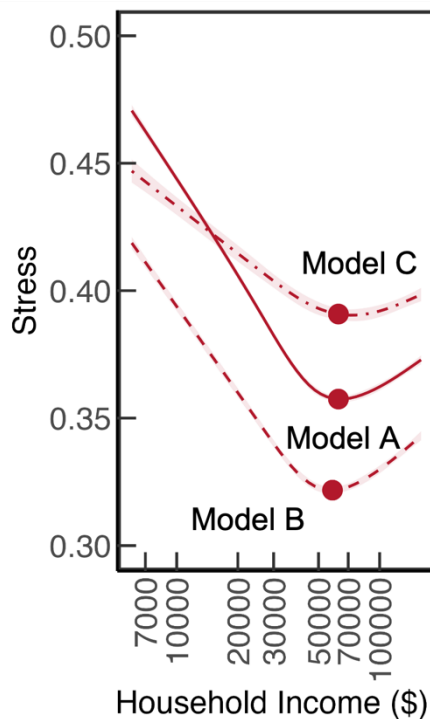


Figure S8: Turning/Satiation of stress with household income. Trends of stress, as the probability of experiencing stress the previous day, with household income (\$) when controlled for age, survey year (Model A, Turning Point = \$63,000), survey year, gender, age, and marital status (Model B, Turning Point = \$59,000), and survey year, gender, age, marital status, children, and job-type (Model C, Turning Point = \$63,000) with fitted cubic spline groups for the years 2008-2017 plotted on a logarithmic x-axis showing the 95% confidence interval and the satiation(empty)/turning(full) point indicated.

For robustness, we have dropped non-responses to the Stress question, instead of relying on the ‘Yes’ responses. None of the conclusions change although we lose a small fraction of the sample (0.11%). We have amended the Abstract to change from 2.1 to 2.05 million respondents to reflect this.

(Page 1) “Is there a cost to our well-being from increased affluence? Drawing upon responses from 2.05 million U.S. adults from the Gallup Daily Poll from 2008 to 2017 we find that with increasing household income above ~\$63,000 more respondents are likely to experience stress.”

Turning point in stress changes with demographics:

The interpretation of these results could be strengthened by addressing potential confounding factors. For example, the higher inflection point for women might be because of a (currently unreported) bifurcation in the sample where some women make \$0 (and maybe don't experience as high of stress), but then for working women, they might have to make more to offset the stress of working, when also taking care of children. The differences between White and Hispanics (\$34,000 vs. \$82,000) could also be driven by confounds. For example, are their fewer Hispanics in the Gallup sample, making these estimates noisier and less reliable than the estimates for White respondents? It is hard to understand what these findings mean without having more information about the underlying data on which these estimates are based (% of employed individuals within each category, Ns for each subsample analysis for each year and across years etc.).

Providing more context and discussing the potential limitations of these comparisons would help readers better interpret and understand the implications of the findings.

Response: We thank the Reviewer for this insightful comment. We agree that additional details of the explanatory variables will enhance the interpretation of the results. We have therefore added Table S2 (in addition to the year-wise distribution reported in Table S1) reporting the distribution and sample size of demographic variables (sex, race, and political affiliation) across the investigated mediating factors (health, social factors, working hours, economic factors, education, and life satisfaction). To specifically address the comment about the lower turning point for Latinos compared to White and Black respondents perhaps being linked to lower sample size of Latino respondents, we find that Latino and Black respondents represent 6-7% of the overall unweighted sample suggesting that there could be other factors leading to the lower turning point.

Next, to explain possible reasons for why we observe a satiation for females as opposed to a turning point for males, we identify the case for Females and Smoking, who are 4% less likely to smoke compared to the Males and Smoking sub-group (Table S2), for further analysis using interaction effects. We observe a turning point for Females who don't smoke ($P = 0.309$ (satiation), $P = 0.007$ (turning) in Fig. S19c) compared to satiation for Females who smoke ($P = 0.296$ (satiation), Fig. S19c). These results suggest the compounding effects of sub-group identities in affecting both stresses associated with low-income deprivations and affluence. We have also added a note in the limitations section on other possible interactions (such as the one that Reviewer #1 suggests) not investigated in this study.

Table S2: Distribution of mediating factors across the socio-demographic variables divided by sex for Males, Females, by race for Whites, Blacks, and Latinos, and by political affiliation for Democrats, Republicans, and Independents. In some cases, the percentage for each mediating factor might not add to 100% due to 'other' variable labels not investigated in this study.

Variable	Sub-group	Male	Female	White	Black	Hispanic	Democrat	Republican	Independent
Basic Needs	Basic Needs-unmet	18%(188909)	23%(233768)	17%(281816)	34%(56018)	35%(54789)	22%(121325)	15%(74378)	23%(126648)
Basic Needs	Basic Needs-met	77%(810238)	72%(724471)	78%(1250309)	63%(102940)	62%(99007)	72%(394432)	79%(395056)	72%(399216)
Children	w/child	30%(315733)	28%(285389)	26%(415201)	38%(62865)	51%(81030)	27%(146396)	30%(148238)	31%(171568)

Children	w/o child	70%(733029)	71%(715209)	74%(1195434)	62%(101185)	49%(77263)	73%(400739)	70%(350226)	69%(383810)
Divorced	Divorced	9%(98123)	14%(142262)	12%(192151)	14%(22759)	9%(13878)	13%(72626)	10%(48601)	12%(67473)
Divorced	Non-Divorced	91%(950581)	86%(857907)	88%(1418024)	86%(141219)	91%(144590)	87%(474317)	90%(449883)	88%(487734)
Economy	Moderate	54%(567235)	56%(560295)	55%(886821)	55%(90107)	57%(90330)	48%(265499)	50%(250441)	52%(289500)
Economy	Fair	14%(151235)	12%(122249)	13%(205875)	16%(25942)	16%(25148)	13%(69445)	12%(57877)	10%(58025)
Education	Graduate	27%(282213)	24%(244560)	27%(433938)	21%(34413)	15%(24122)	29%(157088)	22%(111762)	24%(131893)
Education	Non-Graduate	71%(742424)	73%(732731)	71%(1140193)	76%(125386)	82%(129763)	70%(385393)	77%(382718)	75%(418171)
Work Type	0-15 h	4%(18411)	7%(25850)	5%(34008)	5%(3790)	4%(3475)	5%(10988)	5%(9742)	5%(11332)
Work Type	15-30 h	6%(30725)	13%(48055)	9%(59326)	9%(6997)	9%(7620)	10%(19485)	9%(16311)	9%(21166)
Work Type	>30 h	83%(396434)	72%(267819)	79%(501346)	74%(58190)	76%(61992)	76%(153040)	80%(151703)	77%(178763)
Work Type	Unemployed	7%(32065)	8%(31403)	6%(41041)	12%(9026)	10%(8528)	8%(16513)	6%(10927)	8%(19632)
Insurance	Insured	88%(924973)	90%(906262)	92%(1480021)	85%(139182)	71%(112530)	90%(493592)	93%(462505)	86%(480371)
Insurance	Uninsured	12%(123673)	9%(94122)	8%(130214)	15%(24853)	29%(45826)	10%(53402)	7%(35964)	13%(74855)
Life Satisfaction Quantile	15th Quantile	11%(120568)	12%(122396)	11%(183702)	14%(23739)	13%(20454)	12%(64307)	10%(50121)	13%(71236)
Life Satisfaction Quantile	50th Quantile	35%(368441)	30%(302709)	33%(526553)	34%(55633)	31%(49290)	34%(187476)	30%(152131)	35%(191894)
Life Satisfaction Quantile	5th Quantile	9%(90125)	8%(75597)	8%(126091)	9%(14153)	9%(13705)	7%(37890)	7%(34043)	9%(50532)
Life Satisfaction Quantile	75th Quantile	29%(306810)	30%(301554)	31%(495532)	24%(39138)	27%(42968)	30%(165994)	33%(164322)	29%(159264)
Life Satisfaction Quantile	95th Quantile	16%(164094)	20%(199197)	17%(279921)	19%(31599)	20%(32365)	17%(91838)	20%(98262)	15%(82980)
Smoking	Non-Smoking	81%(854647)	85%(847605)	84%(1346119)	78%(128371)	84%(133515)	83%(453448)	86%(430511)	80%(447043)
Smoking	Smoking	19%(194754)	15%(153550)	16%(265046)	22%(35823)	16%(25169)	17%(93859)	14%(68202)	20%(108573)
Social	Non-Social	45%(134750)	41%(114812)	42%(186031)	46%(25015)	43%(25406)	42%(43698)	39%(38689)	47%(53754)
Social	Social	55%(166746)	59%(165933)	58%(252985)	54%(29567)	57%(33382)	58%(59689)	61%(60117)	53%(61064)
Thriving	Struggling	44%(392954)	43%(366247)	44%(599606)	42%(60346)	42%(55971)	42%(186148)	43%(180056)	46%(210404)
Thriving	Suffering	4%(35395)	3%(29554)	4%(52685)	3%(3711)	3%(4023)	3%(13929)	3%(13291)	4%(19772)
Thriving	Thriving	52%(466670)	54%(457283)	52%(716897)	55%(79736)	55%(73628)	55%(246972)	53%(221216)	50%(230765)

(Page 14) “The demographic and moderating factors are also correlated with each other and these need to be considered in the context of intersectional identities and their influence on the turning point. For example, considering those who are Healthy with basic needs-met ($r = 0.12$, $P < 0.001$, Fig. S21a), we observe vastly different behaviors for the stress-income relationships for the compounded identities (Fig. S21b). For Healthy respondents with Needs-met, stress is much lower for low-income respondents (compared to the Unhealthy and Needs-unmet respondents) and increases with income in contrast to the Unhealthy and Needs-unmet respondents for whom stress decreases with increasing income. Further, to understand the lack of a turning point for Female respondents (Fig. 3a), we hypothesized the stress associated with smoking to moderate the presence of a turning point as smoking was observed to have a large difference in stress levels and turning points (Fig. 4c). Therefore, we investigated turning points for female respondents with and without smoking habit reported (Table S2). We observe a turning point for

female respondents who don't smoke ($P = 0.309$ (satiation), $P = 0.001$ (turning) in Fig. S21c) compared to satiation for female respondents who smoke ($P = 0.296$ (satiation), Fig. S21c). These results suggest the compounding effects of sub-group identities in affecting both stresses associated with low-income deprivations and high-income affluence factors. We next discuss possible hypotheses for the origin of stress across the income and life satisfaction distributions.”

(Page 21) “Although we have not considered all possible interactions between demographic and moderating factors that could influence the turning point, the framework offers future studies the flexibility to conduct such investigations.”

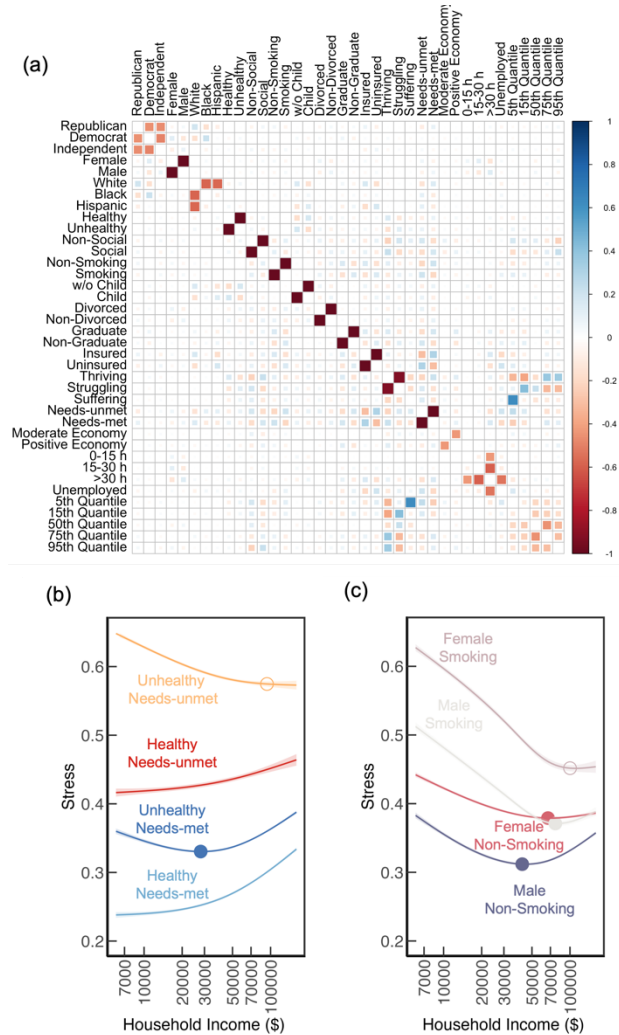


Figure S21: (a) Pair-wise weighted correlations for the various sub-groups discussed in this study, and trends of stress, as the probability of experiencing stress the previous day, with household income (\$) (b) when controlled for Healthy and basic needs-met, (c) when controlled for sex and smoking with the satiation(empty)/turning(full) point indicated along with the shaded area denoting the 95% confidence interval.

Additionally, reporting the statistical and practical significance of the differences in turning points across subgroups (e.g., \$88,000 for women vs. \$63,000 for men, \$34,000 for Whites vs. \$82,000 for Hispanics) would enhance the interpretability of the results.

Response: In all our results, we ascertain the presence of a satiation/turning point using a significance level of $P < 0.05$ for the slope of the predicted spline being different from zero. To address these comments, we now report the exact P-value and Bayes factor for the aggregate-model in all our results and discussion to aid with the statistical interpretability of the turning point for the readers. Due to the non-linear relationship between stress and income and the continued debate the calculation of standard deviations for non-parametric models,¹⁸ we are unable to provide standardized effect sizes. We therefore discuss the practical differences in the turning points using the average income of the dataset as a reference in the Discussion section. The average national income from this dataset is \$67,000 suggesting that Latino respondents (\$32,000) require much less money before experiencing an increase in stress compared to White (\$82,000) and Black (\$77,000) respondents who must make more than the average national income to experience increasing stress. A higher turning point could also imply that White and Black respondents have access to other factors that come with increasing income that may not be accessible to those with lower turning points. As the study is not designed to probe whether an earlier turning point is desirable directly, we offer insights into the lifestyle correlates of respondents beyond the turning point. Whether this is desirable or not remains an open question since it is unclear whether respondents choose affluent lifestyles and the stress that comes with it.

“(page 17) For example, Latinos (\$34,000) require much less money before experiencing an increase in stress compared to Whites (\$82,000) and Blacks (\$77,000) who will have to make more than the average national income (\$67,00) to experience increasing stress. A higher turning point could also imply that Whites and Blacks have access to other factors that come with increasing income that may not be accessible to those with lower turning points.”

Influence of health, social, basic needs, economic, work and education factors, and life satisfaction on stress:

The authors' categorization of individuals as falling into an "unhealthy" category based on diagnoses of one of the following: obesity, depression, cancer, cholesterol, or high blood pressure could be better justified. Providing the empirical basis for grouping these diverse health conditions together would strengthen the validity of the analyses. This seems especially important in light of the fact that these categories differ in their likelihood of affecting well-being and mood. Specifically, some of these categories could directly influence mood (depression) and others might have less of a direct impact on mood (high blood pressure—especially if it is well managed). Similarly, the rationale for focusing on smokers vs. non-smokers as the only separate subgroup comparison should be clarified.

The definitions and justifications for the various subgroups and categories (e.g., socially connected vs. unconnected, worry and insurance as proxies for unmet basic needs, suffering, thriving, and struggling) should be more clearly articulated. For instance, worry seems different from being uninsured—with one being about future concerns and the other about present inability to meet basic needs. Providing the sample sizes for each subgroup and explaining how these categorizations align with past literature would enhance the credibility of the findings.

Response: We thank the reviewers for their comments. We have included references to previous studies that have shown an association between the chosen mediating factors of health components, smoking, having health insurance, basic needs, education, marital status, having children, and experiencing stress. We have also chosen mediating factors (life satisfaction quantiles) based on previous results that have shown that emotional well-being metrics show different behaviors with income at various levels of life satisfaction. We have now documented all these choices and the justifications to provide better context to the readers. We also provided sample sizes for all the sub-groups in Table S1.

(Page 10) “First, we grouped respondents as healthy by modifying an existing grouping methodology⁴ based on whether they were diagnosed with cancer, cholesterol, or high blood pressure along with factors such as obesity¹⁹ and depression²⁰ which have also been associated with increased stress. (“Unhealthy” for those with any of these conditions).”

(Page 10) “We next compared Smoking and Non-smoking sub-groups as smoking has been previously linked with poor health²¹ while the relationship between smoking and stress is exceedingly complex.²²”

(Page 11) “Next, we investigate the role of social factors that are known to moderate the effect of stress by providing coping resources.²³”

(Page 11) “Other social factors such as having children (Figs. S16a and S12d) and being divorced (Figs. S16b and S12e) that are known correlates of increased stress⁴ do not influence the turning point.”

(Page 12) “Regarding economic status, we first compare the stress-income relationship for groups divided by whether basic needs are being met, inferred for those worrying about having enough money for shelter, food, and healthcare²⁴ (Fig. 4h), and having health insurance^{25,26} (Fig. S16c) as these factors were previously associated with stress.”

(Page 12) “Finally, analyzing work conditions and education,²⁷ respondents who work for more than 30 h (N = 664253) weekly experience increasing stress with increasing income compared to respondents who work for 15-30 h (N = 78781), 0-15 h (N = 44262), or are unemployed (N = 63469) for whom stress decreases with income (Fig. 4f, Fig. S13i, and Fig. S12i for aggregate-model) suggesting that longer work time could be associated with the job stress.”

To specifically address the comment about the difference in the contribution of mood-dependent and physiological health variables, we evaluated the stress-income relationship by reclassifying the health variables without the mood-dependent ‘*depression*’ variable. We find that the main conclusion for the stress-income relationship, that the healthier respondents are less stressed for all income values and have an earlier turning point, remains (Figure below).

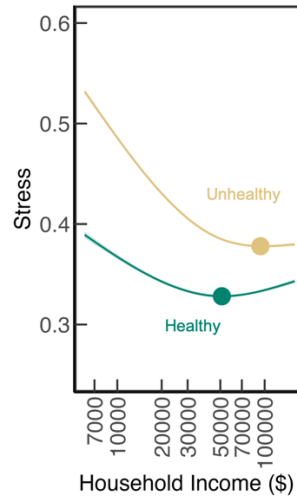


Figure: Trends of stress, as the probability of experiencing stress the previous day, with household income (\$) when controlled for the reclassified health sub-group without the depression variable for the years 2008-2017 plotted on a logarithmic x-axis along with fitted cubic spline showing the 95% confidence interval and the satiation(empty)/turning(full) point indicated.

Overall, the results section could benefit from a more focused and in-depth presentation of the key analyses. Selecting 1-2 central analyses, fully describing the methods, results, and robustness checks, and clearly articulating their contribution to the literature could improve the paper's readability and impact. The current presentation style, with relatively broad-brush descriptions of the analyses and references to various figures at the end of the manuscript, makes it challenging to fully understand and evaluate the significance of the findings.

In conclusion, despite the authors' efforts to address previous concerns, the manuscript still requires work in several key areas. From my perspective, the authors should clarify their conceptual contribution, provide more clarity about the analyses they conducted, provide additional justification for their analytic choices, and enhance the readability and interpretability of the key findings to improve the potential impact and credibility of the paper.

Response: We thank the Reviewer for summarizing their recommendations. In response, we have conducted additional analysis to improve the Robustness of the results, added more details on the analytical choices in the Methods section, and modified the Introduction to identify gaps in the literature and place our findings in the broader context. We have also added a note in the discussion explicitly stating our contribution beyond existing studies. We have also moved the figures to the corresponding positions in the text for better readability.

Reviewer #2 (Remarks to the Author):

I am satisfied with the revised version of the article - the authors have done a strong and thorough job with the revisions and, as I noted before, I think this paper has potential to contribute to the debate on the income-wellbeing debate.

I look forward to seeing a published version!

Response: We thank Reviewer #2 for their positive evaluation of our manuscript.

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Response to Reviewer

Reviewer

#1 (Remarks to the Author):

“This manuscript continues to present an interesting analysis of the relationship between income, stress, and life satisfaction using a large dataset from Gallup. The authors examine how stress prevalence changes with rising income levels and explore potential mediating factors. While the study offers some intriguing findings, there are several areas where the manuscript could be strengthened.”

Response: We thank the Reviewer for their comments. We have addressed each of their concerns below. In summary, we have provided additional details to motivate the analyses reported in this study, performed additional robustness checks, and added several details to the Limitaiton section. All the figure numbers have been updated to reflect this.

“Introduction:

The introduction needs more detail to properly set up the hypothesis regarding a U-shaped relationship between income and stress. Given that the authors now acknowledge mixed findings in past research on the relationships between stress, income and life satisfaction, it is unclear why they have such a strong directional prediction about observing turning points. If this was not an a priori hypothesis before data analysis, the authors should be transparent about that rather than claiming a directional prediction post-hoc. The rationale for expecting turning points or U-shaped relationships should be more clearly articulated based on existing theory and evidence.”

“More detail is needed on why particular subgroup analyses were conducted and how they relate to the core research questions.”

Response: We thank Reviewer #1 for this comment. First, there is some mixed evidence in the literature that merits further exploration of the phenomenon of turning point. We have now rephrased the Introduction to include an additional reference. We now refer to studies that report opposite trends for the association of stress with income to motivate the hypothesis for the presence of a turning point for the population overall.

(page 2) “For example, for one component of stress related to time scarcity, it has been reported that stress increases with income,¹ especially when the value of time is perceived to be monetary at workplaces.^{2,3} For another component of stress associated with financial worries, it has been reported that higher income is associated with lower distress.⁴ Motivated by this potential turn-around due to different underlying lived experiences, in this study we examine the phenomenon of turning point in stress more deeply.”

Next, we hypothesize that different demographic sub-groups will have different turning points based on the results of Jebb *et al.*⁵ Jebb *et al.* showed that the turning points in aggregated negative affect emotions including stress, worry, and sadness vary by sub-groups. However, the underlying drivers of the variation in the turning point are not extensively discussed. We therefore perform an

exploratory analysis to probe how previously reported correlates of stress such as physical health, smoking habits, social habits, having children, being married, level of education, having insurance, and working hours, and life satisfaction influence the turning point of stress with income. We also include the rationale for the choice for each of the sub-group type at the beginning of the sub-group analysis.

(page 3) *“We hypothesize that the relationship between income and stress differs for different ranges of household incomes, leading to a turning point (increase or U-shaped trend).⁵ Previous studies have shown that the turning point in aggregated negative-affect emotions including stress varies by demographics such as gender, education, and geography.⁵ We test whether this turn-around is observed in the stress income relationship when the population is divided by gender, race, and political affiliation. As the underlying factors that govern the turning point in stress remain unclear across these population demographics, we performed an exploratory analysis to probe how the turning point for stress versus household income is mediated by previously reported correlates of stress such as health, smoking habits, basic needs, social, educational, marital, economic, and work factors, and life satisfaction.”*

“Methods:

The authors need to provide more justification for their analytical choices. Why were spline regressions chosen over other methods like OLS? What are the advantages of this approach for addressing the research questions?

Response: We thank Reviewer #1 for this thoughtful comment. We have now included additional discussion in the Methods section for the analytical choice of cubic regression splines over OLS regression. In this study, as the turning point is hypothesized to be mediated by different underlying components of stress, we expect different extents of flattening and reversal of the stress income curve for different sub-groups. Fitting linear models for such relationships can result in abrupt shift in the fitted curves which does not capture realistic behavior.⁶ Spline regression models offer flexibility in modeling such complex relationships between income, stress, and life satisfaction without assuming the presence of a turning point for all the sub-group as previously noted by Jebb *et al.*⁵ We have added the following to the Methods section justifying this analytical choice.

(page 4) *“As we hypothesize the relationship between stress and income to be non-linear, we use cubic spline regression models instead of linear regression models. Linear models have been previously used to model well-being-income relationships, but linear models require identification of the break point in the income stress relationship⁷ and can also result in abrupt shift in slopes that may not be reflective of the underlying relationship.⁵”*

“The use of a dichotomous measure of stress is an important limitation that should be acknowledged upfront. The authors should discuss how this binary operationalization may impact the results, particularly in comparison to the continuous measures used for other emotions. Could this account for why an inflection point is observed for stress but not other variables?”

“The limitations section should be expanded, including discussion of the dichotomous stress measure and potential confounds in the subgroup analyses.”

Response: We thank Reviewer #1 for this comment. We would like to clarify that among the investigated well-being metrics only life satisfaction is a continuous measure on a scale of 0-10 while other emotional well-being metrics of anger, sadness, worry, enjoyment, smiling, and happiness are all dichotomous/binary measures. Among these emotional well-being indicators only stress shows a strong inflection point while other emotional well-being metrics show weaker trends. This result is consistent with Kahneman and Deaton who report plateauing trends for the negative-affect emotional well-being metrics compared to the increase in stress at higher income levels. We partially agree with the Reviewer that the absence of a turning point in life satisfaction both in our study as well as the Kahneman and Deaton could be due to the continuous nature of the life satisfaction variable. However, Jebb et al⁵ use a similar continuous measure and find a turning point in life satisfaction with income. However, the income measure in that case was an equalized personal income measure rather than the household income used in this study. We now note the binary nature of all the emotional well-being metrics upfront in the Results sections and rearrange the Limitations section to note this upfront.

We have expanded the Limitation section to also include the discussion of the potential confounds in the sub-group analysis. We have already included the results of the trends for confounded variables. We have now added how the results might be affected due to the choice of the sub-group and how future studies could address this issue. We have also included the limitation of the categorical nature of the income variable could also have an influence on the presence of the turning point.

(page 7) “In all the Gallup surveys we examine from 2008-2017, stress, anger, sadness, worry, happiness, smiling, and enjoyment are binary responses (Yes/No), indicative of respondents’ experiences the previous day, while life satisfaction is a score (0-10) reported on a Cantril ladder (Table 1 for variable name and range).⁸

(page 18) “The demographic and moderating factors are also correlated with each other and these need to be considered in the context of compounded identities and their influence on the turning point.”

(page 22) “Some limitations must be considered in the interpretation of the results discussed in this study. The binary nature of the stress variable reported here does not allow us to infer whether self-reported stress is beneficial or not, the intensity of the experienced stress, and whether other avenues of well-being are correlated with stress. Therefore, we recommend that future data collection probe stress prevalence with higher time resolution and a richer set of well-being measures while testing the mechanisms proposed in this study.”

(page 22) “Household income is reported crudely, in bins, which could further bring uncertainty in the turning point estimation. For example, Kudrna and Kushlev have shown that moderate to null effects were observed for the relationship between happiness and income depending on whether income was treated as a continuous or a binned variable respectively.⁹

(page 22) “Mediating factors are correlated with each other to varying degree (Fig. S21a) which could also influence the interpretation of the turning points, and these correlations were not exhaustively considered in this study.”

Results:

The results section is difficult to follow and would benefit from restructuring. For each analysis, the authors could:

Explain the rationale for conducting that particular analysis

Clearly state the analytical approach

Present the results

Interpret the findings

This structure would improve readability and help readers understand how each analysis builds on previous ones to address the key research questions.

Response: We thank the Reviewer for this comment. Further adhering to the journal guidelines of not including interpretation within the Results section, we have now modified the Results section to include the rationale for the analysis, the analytical approach, and the results. Below we report the specific changes:

1. We have included additional details about the analytical method in Figure 5b in the Methods section.

(page 7) “High Income-High Life Satisfaction Model

To investigate the lifestyle correlates of stress for those with high life satisfaction and high income, we modeled the relationship using a logistic regression model controlling for survey year and age.”

2. *(page 7) “We start by showing how the life satisfaction trends with rising income vary across population groups using cubic spline regression models.”*
3. *(page 8) “Next, we assess the mediating role of stress in the trends of life satisfaction with income for different population subgroups using cubic spline regressions.”*
4. *(page 11) “We next evaluate the stress versus household income relationship for various population demographics through an exploratory analysis of the turning point.”*
5. *(page 12) “We next investigate whether the differences in the turning point income/stress are significant through a turning point analysis of the underlying moderating factors and more importantly to infer if an earlier turning point is desirable.”*
6. *(page 12) “We find that both the levels of stress and turning points are influenced by previously reported drivers of stress such as health, social conditions, basic needs*

satisfiers, economic, work, and education conditions, and overall life satisfaction using cubic spline regression models.”

7. *(page 17) “We then investigate whether stress experienced by highly satisfied high-income respondents are mere complaints by the affluent¹ or if other life domains are affected by such lifestyles¹⁰ using logistic regression models.”*

The presentation of results feels unpolished, with unformatted tables and inconsistent spacing. Greater attention to formatting would enhance the overall quality of the manuscript.

Response: We have now modified all the table formatting for better consistency in the Supplementary Information file. The newly formatted Table S2 is shown below as an example.

Table S2: *Distribution of mediating factors across the socio-demographic variables divided by Gender for Male and Female respondents, by race for White, Black, and Hispanic respondents, and by political affiliation for Democrat, Republican, and Independent respondents. In some cases, the percentage for each mediating factor might not add to 100% due to ‘Other’ variable labels not being reported.*

Variable	Sub-group	Male	Female	White	Black	Hispanic	Democrat	Republican	Independent
Basic Needs	Basic Needs-unmet	18% (187718)	23% (232090)	17% (280298)	34% (55622)	34% (54249)	22% (120617)	15% (73975)	23% (125819)
	Basic Needs-met	77% (806035)	72% (718884)	78% (1243310)	63% (102003)	62% (98281)	72% (392375)	79% (393039)	72% (396479)
Children	w/child	30% (314319)	29% (283912)	26% (413658)	38% (62503)	51% (80487)	27% (145802)	30% (147704)	31% (170681)
	w/o child	70% (728751)	71% (709201)	74% (1188054)	62% (100177)	49% (76485)	73% (398397)	70% (348192)	69% (380917)
Divorced	Divorced	9% (97511)	14% (141078)	12% (190927)	14% (22509)	9% (13749)	13% (72146)	10% (48299)	12% (66984)
	Non-Divorced	91% (945516)	86% (851700)	88% (1410377)	86% (140105)	91% (143410)	87% (471875)	90% (447630)	88% (484466)
Economy	Moderate	54% (564129)	56% (556051)	55% (881747)	55% (89400)	57% (89617)	48% (264097)	50% (249145)	52% (287568)
	Fair	14% (150342)	12% (121197)	13% (204646)	16% (25673)	16% (24955)	13% (69055)	12% (57527)	10% (57595)
Education	Graduate	27% (280329)	24% (242205)	27% (431040)	21% (33965)	15% (23890)	29% (156127)	22% (111065)	24% (130667)
	Non-Graduate	71% (738708)	73% (727778)	71% (1134375)	76% (124480)	82% (128701)	70% (383431)	77% (380857)	75% (415630)
Working Hours	0-15 h	4% (18310)	7% (25668)	5% (33809)	5% (3761)	4% (3454)	5% (10935)	5% (9688)	5% (11259)
	15-30 h	6% (30575)	13% (47767)	9% (59022)	9% (6953)	9% (7575)	10% (19399)	9% (16213)	9% (21062)
	>30 h	83% (394431)	72% (265708)	79% (498725)	74% (57692)	76% (61563)	76% (152222)	80% (150995)	77% (177644)
	Unemployed	7% (31878)	8% (31134)	6% (40768)	12% (8962)	10% (8466)	8% (16412)	6% (10855)	8% (19507)
Insurance	Insured	88% (920040)	90% (899439)	92% (1471777)	85% (137957)	71% (111637)	90% (490948)	93% (460137)	86% (477106)

	Uninsured	12% (122856)	9% (93437)	8% (129490)	15% (24701)	29% (45400)	10% (53107)	7% (35756)	13% (74321)
Life Satisfaction Quantile	15th Quantile	11% (119831)	12% (121468)	11% (182594)	14% (23545)	13% (20291)	12% (63945)	10% (49829)	13% (70777)
	50th Quantile	35% (366760)	30% (300760)	33% (524078)	34% (55261)	31% (48954)	34% (186605)	31% (151487)	35% (190732)
	5th Quantile	9% (89518)	8% (74931)	8% (125256)	9% (14043)	9% (13565)	7% (37683)	7% (33823)	9% (50169)
	75th Quantile	29% (305128)	30% (299429)	31% (492872)	24% (38794)	27% (42576)	30% (165139)	33% (163523)	29% (158113)
	95th Quantile	16% (163022)	20% (197320)	17% (277999)	19% (31234)	20% (32060)	17% (91180)	20% (97627)	15% (82298)
Smoking	Non-Smoking	81% (849795)	85% (840973)	84% (1338362)	78% (127175)	84% (132345)	83% (450901)	86% (428232)	80% (443800)
	Smoking	19% (193854)	15% (152658)	16% (263831)	22% (35639)	16% (25008)	17% (93462)	14% (67897)	20% (108011)
Social	Non-Social	45% (133885)	41% (113676)	42% (184714)	46% (24813)	43% (25189)	42% (43402)	39% (38436)	47% (53345)
	Social	55% (165693)	59% (164415)	58% (251205)	54% (29278)	57% (33164)	58% (59305)	61% (59691)	53% (60534)
Thriving	Struggling	44% (391054)	43% (363713)	44% (596512)	42% (59910)	42% (55601)	42% (185274)	43% (179197)	46% (209148)
	Suffering	4% (35100)	3% (29288)	4% (52302)	3% (3672)	3% (3966)	3% (13843)	3% (13193)	4% (19610)
	Thriving	52% (464500)	54% (453979)	52% (713234)	55% (79074)	55% (73146)	55% (245767)	53% (220184)	50% (229365)

Discussion:

“The discussion could be strengthened by more explicitly connecting the findings back to existing theory and research on income, stress and wellbeing. How do these results advance understanding in the field? What are the implications for future research?”

Response: We thank Reviewer #1 for this comment. We now add that our findings build on the existing works by clarifying the presence of a turning point and conditions under which turning point is observed based on the sub-group analysis. We have also included new discussion about the future implications for research in this area, especially with that of the consequences of the increased stress as revealed by the respondents.

(page 18) “First, we confirm that there is a clear turn-around in the relationship between stress prevalence and income across the U.S. population, for all subgroups that we consider and suggest possible reasons for cases where a turning point does not exist. This result is in agreement with previous results that showed an increase in stress at high income^{11,12} and can potentially explain why this phenomenon was not observed in other studies.¹³”

(page 21) “Instead, we lay down hypotheses about the possible causal mechanisms through an exploratory analysis of the moderating factors and suggest that more causal data be collected on the nature and causes of stress to understand how they contribute to overall well-being, especially at high incomes and factors that showed a larger influence on the turning point such as health, social and basic needs fulfillment.”

Additional points: More detail is needed on how missing data was handled across analyses. Were there differences in missingness across key variables or subgroups?

Response: Respondents with missing values of income, life satisfaction, stress were previously dropped from the analysis of the population overall. We have updated the analysis to further drop non-respondents for the age variable as well as this variable is a key variable across analyses. All the figures and key metrics associated have been updated to reflect this. We note that the household income variable has the highest number of missing values followed by life satisfaction (Table below). This is consistent across key sub-groups of gender, basic needs and smoking as well. For the sub-group analysis, respondents were dropped if any of the responses for mediating factors were missing. As a sanity check, we tested the presence of a turning point for the sub-groups overall as well. All the sub-groups subsets showed a turning point. This has been now included in Figure S9b. The details about the missing values are included in the Methods section as well as the Reporting Summary file. The table is included only here.

Table: Distribution of missing values of age, stress, household income, and life satisfaction for key sub-groups.

Variable	Age	Stress	Household Income	Life Satisfaction
Overall	41989	10	516501	102230
Basic Needs met	32623	56993	402036	56993
Basic Needs unmet	6785	22200	77783	22200
Female	25297	4	290917	53158
Male	16691	4	225583	49069
Non-Smoking	37099	5	450187	85403
Smoking	4624	1	65406	16639

(page 4) "All data analysis was conducted after filtering out entries with no household income, age, stress, and life satisfaction, and other well-being metrics reported. Household income variable has the highest number of missing values (516501) followed by life satisfaction (102230)."

The authors state that they didn't check if the variables were normally distributed. Why? Seems easy enough to test and typically income and other variables are not, which necessitates log transformation."

The assumption of normality in the data distribution should be explicitly tested rather than assumed

Response: We thank the Reviewer #1 for this comment. Since the regression splines method used is non-parametric, the data normality assumption is not strictly applicable here. However, we test the normality for the life satisfaction, income, and age distributions which are the common variables across models. We have amended the statement to reflect this. These distributions have been added to the Supplementary Information File as Figure S1a-c.

(page 4) “The non-parametric methods used for the parametric analysis do not rely on any distributional assumptions about the data. The distributions for the key variables of age, life satisfaction, and household income are shown in Figures S1a-c respectively.”

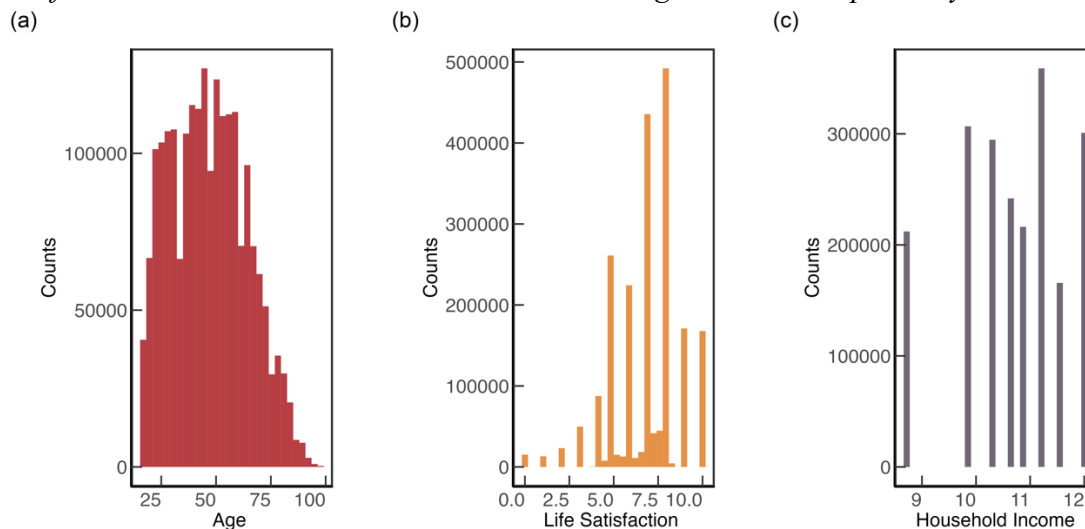


Figure S1: Weighted histograms showing the distributions for (a) age, (b) life satisfaction, and (c) household income distribution for 2008-2017. Household income has been log transformed and non-ordinal values of the life satisfaction variable are due to predicted values for life satisfaction (computed by Gallup) for certain respondents in 2008.

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