DESCRIPTION

The Journal of Applied Developmental Psychology (JADP) publishes scholarly empirical research relating to human development. The Journal focuses on two key concepts: human development and application of knowledge. Human development refers to the transformations and changes that occur during the life cycle and the processes or mechanisms which influence individuals' behavioral, cognitive, emotional, and moral development. Application refers to how the knowledge gained from research can be applied to the improvement of developmental outcomes, such as through policy making or within educational, clinical, and social settings. Consequently, papers published in JADP explicitly articulate how findings can be applied to improving the lives of children, youth and young adults. JADP publishes studies on a broad array of social issues and contexts (e.g., differences in cultural, racial, social and learning contexts) that impact human development.

Please see our Guide for Authors for more information.

Benefits to authors
We also provide many author benefits, such as free PDFs, a liberal copyright policy, special discounts on Elsevier publications and much more. Please click here for more information on our author services. If you require any further information or help, please visit our Support Center

ABSTRACTING AND INDEXING

Scopus
ERIC
ERA (Educational Research Abstracts Online)
Social Sciences Citation Index
PsycINFO
PubMed
EBSCOhost

EDITORIAL BOARD

Editor-in-Chief
Kristin Moilanen, University of Illinois Chicago, Chicago, Illinois, United States of America
Associate Editors
Jamie Aibaed, University of Vermont, Burlington, Vermont, United States of America
Rebecca Bulotsky-Shearer, University of Miami, Coral Gables, Florida, United States of America
Ben Hinnant, Auburn University, Auburn, Alabama, United States of America
Gigliana Melzi, New York University, New York, New York, United States of America

Editorial Board
Pilar Alamos, University of Virginia, Charlottesville, Virginia, United States of America
Mairin E. Augustine, Hamilton College, Clinton, New York, United States of America
Carolyn Barber, University of Missouri Kansas City, Kansas City, Missouri, United States of America
Sarah Beal, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio, United States of America
Megan Bell, The University of Western Australia, Perth, Western Australia, Australia
Rebecca Berndt, Psychological College Berlin, Berlin, Germany
Corinne A. Bower, California State University at Los Angeles, Los Angeles, California, United States of America
Andres Bustamante, University of California Irvine, Irvine, California, United States of America
Jing Chen, Shanghai Jiao Tong University, Shanghai, China
Daniel Choe, University of California Davis, Davis, California, United States of America
Koeun Choi, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, United States of America
Jimena Cosso, The Pennsylvania State University, University Park, Pennsylvania, United States of America
Xuechen Ding, Shanghai Normal University, Shanghai, China
Rebecca Dore, The Ohio State University Crane Center for Early Childhood Research and Policy, Columbus, Ohio, United States of America
Robert Duncan, Purdue University, West Lafayette, Indiana, United States of America
Leanne Elliott, University of Pittsburgh, Pittsburgh, Pennsylvania, United States of America
Matteo Fabris, University of Turin, Torino, Italy
Ainzara Favini, Sapienza University of Rome, Rome, Italy
Sarah L. Friedman, The George Washington University, Washington, District of Columbia, United States of America
Evangelia Galanaki, National and Kapodistrian University of Athens, Athens, Greece
Manuel Gamez-Guadix, Autonomous University of Madrid, Madrid, Spain
Amy Gentzler, West Virginia University, Morgantown, West Virginia, United States of America
Stephanie Godleski, Rochester Institute of Technology, Rochester, New York, United States of America
Wendy Gordon, Auburn University, Auburn, Alabama, United States of America
Jessica Grady, University of the Pacific, Department of Psychology, Stockton, California, United States of America
Annemarie Hindman, Temple University, Philadelphia, Pennsylvania, United States of America
Jason Hustedt, University of Delaware, Newark, Delaware, United States of America
Sarah Kiefer, University of South Florida, Tampa, Florida, United States of America
Karen Kochel, University of Richmond, Richmond, Virginia, United States of America
Dawn Kriebel, Immaculata University, Immaculata, Pennsylvania, United States of America
Alfgeir L. Kristjansson, West Virginia University, Morgantown, West Virginia, United States of America
Becky Ladd, Arizona State University, Tempe, Arizona, United States of America
Robert D. Laird, The University of Alabama, Tuscaloosa, Alabama, United States of America
Lydia Laninga-Wijnen, University of Groningen, Groningen, Netherlands
Kang Lee, University of Toronto, Toronto, Ontario, Canada
Junsheng Liu, East China Normal University, Shanghai, China
Lisa M. Lopez, University of South Florida College of Education, Sarasota, Florida, United States of America
Hayley Love, Southeast Missouri State University, Cape Girardeau, Missouri, United States of America
Angela Mazzone, Dublin City University, Dublin, Ireland
Meredit McGinley, University of Wisconsin-Parkside, Kenosha, Wisconsin, United States of America
Zena Mello, San Francisco State University, San Francisco, California, United States of America
Julia Mendez, UNC Greensboro, Greensboro, North Carolina, United States of America
Wendy Ochoa, San Diego State University, San Diego, California, United States of America
Ryan Omatsu, University of Toronto Metropolitan University, Toronto, Ontario, Canada
Sarah J. Racz, University of Maryland Baltimore, Baltimore, Maryland, United States of America
Andrew Ribner, University of Pittsburgh, Pittsburgh, Pennsylvania, United States of America
Debora Roorda, University of Amsterdam, Amsterdam, Netherlands
Wendy Rote, University of South Florida, Tampa, Florida, United States of America
Shannon Russell, American Institutes for Research, Arlington, Virginia, United States of America
Anne Shaffer, University of Georgia, Athens, Georgia, United States of America
Megan Smith, Boise State University, Boise, Idaho, United States of America
Xin Tang, University of Helsinki, HELSINKI, Finland
Chelsie Temmen, University of Louisville, Louisville, Kentucky, United States of America
Kelly Tu, University of Illinois Urbana-Champaign, Urbana, Illinois, United States of America
Tuomo Virtanen, University of Jyväskylä, JYVASKYLA, Finland
Alexander Wasserman, The Ohio State University, Columbus, Ohio, United States of America
Sharon Wolf, University of Pennsylvania, Philadelphia, Pennsylvania, United States of America
Nan Zhou, University of Macau, Taipa, Macao
GUIDE FOR AUTHORS

INTRODUCTION

Thank you for your interest in The Journal of Applied Developmental Psychology (JADP) as an outlet for your research! The following information is intended to help you determine if JADP is an appropriate outlet for your study prior to preparing your manuscript for submission. A paper is appropriate for consideration (full review) in JADP, if it meets the following criteria: directly addresses an important question in the research literature and clearly discusses how new findings are applicable in improving developmental outcomes, for example through policy or within applied settings. **By itself, addressing a gap in the extant research is not a sufficient rationale for publication.** explicitly examines developmental phenomena, mechanisms or processes, or otherwise has a strong basis in developmental theory, including culturally informed developmental frameworks. reports original empirical findings based on a quantitative statistical approach (mixed method inquiries may be considered, though authors are strongly advised to consult with the Editor in Chief prior to submission). relies on strong developmental methodological designs, such as short- or long-term longitudinal designs or well-designed cross-sectional approaches. does not utilize convenience or small n samples (exceptions may be made, such as when findings are not hypothesized to generalize beyond the sample). is well-written in scholarly English (American and British are both acceptable). is in 7th edition APA format (see below and the applicable APA Style JARS). does not exceed 45 pages all-inclusive of title page, abstract, narrative, references, tables and figures. A typical accepted manuscript is between 30 and 40 pages. Longer manuscripts may be considered if justification is provided in the submission cover letter as to why the extra pages are needed.

In accordance with the APA Publishing EDI framework, JADP is committed to improving diversity, equity, and inclusion (DEI) in research in applied developmental psychology. Thus, JADP welcomes submissions that make novel contributions to the literature and feature Black, Indigenous, and People of Color (BIPOC) and other historically marginalized sample populations, extend beyond Western, educated, industrialized, rich, and democratic (WEIRD) samples (Henrich et al., 2010), extend prior findings documented in WEIRD samples through replication in novel socio-cultural contexts or populations, and/or involve study designs that address heterogeneity within diverse samples.

Authors are advised to highlight such strengths in the Introduction, as part of providing a compelling explanation of the study's potential contribution to the literature.

The following types of papers are not appropriate for JADP and will not be considered for publication: Reviews of existing literature Book reviews Qualitative investigations Measurement-focused papers (e.g., measure development and validation studies)

**Presubmission Checklist for Authors: Stylistic and Substantive Requirements**

Prior to submission, please ensure that the manuscript follows the submission guidelines detailed below. Submissions that do not conform to these guidelines may be returned without review.

**General (Full Manuscript)** Take care to remove any and all tracked changes and/or marginal comments, and to proofread closely for grammar and style prior to submission. Page numbers and headers must be used. The header should be a 3-5-word abbreviation of the title, and should appear on the same line as the page number. Use one font consistently throughout an entire paper. Multiple fonts are acceptable, and options include: 11-point Arial 10-point Lucida Sans Unicode 12-point Times New Roman 11-point Georgia Use separate pages for the title page, abstract, references, appendices, footnotes, tables, and figures. The entire manuscript must be double-spaced (including references, footnotes, and figure and table notes/captions) and all text must be left-aligned (flush with left margin), not justified. The margins of each page should be 1 in. (top, bottom, and sides). New paragraphs must be indented five to seven spaces (1/2 inch; default tab). Headings and subheadings must follow APA style (see below). Headings should be used to convey the article's sequence and to reveal the organization. Define abbreviations at their first occurrence in the article, in the abstract as well as in the main text after it. Ensure consistency of abbreviations throughout the article. Use two spaces after periods ending sentences to aid readability. Use italics for emphasis, but use minimally. No words should be emphasized utilizing bold, underlined, or capital letters. Use a zero before the
decimal point with numbers less than one when the statistic can be greater than one (e.g., 0.56 kg), but do not use a zero before the decimal point when the number cannot be greater than one (e.g., \( r = .015 \); 6.36 Decimal Fractions).

**APA Headings**

There are 5 heading levels in APA (see 2.27 Heading Levels). Regardless of the number of levels, always use the headings in order, beginning with Level 1. The format of each level is illustrated here. Headings and subheadings are not accompanied by letters or numbers. Use as many levels as required in your paper to present the most organized structure. Use at least two subheadings for each section and subsection, or use none. Capitalize each word with four or more letters at all levels.

**In-Text Citations**

All citations must be formatted in accordance with 7th edition APA style conventions.

Both parenthetical and narrative citations are acceptable, and parenthetical citations should generally be placed at the end of the relevant sentence. Unless the sentence contains multiple elements of information from distinct sources, avoid inserting parenthetical citations within sentences as this can interfere with clear communication of ideas.

Please ensure that every reference cited in the text (including the abstract) is also present in the reference list (and vice versa).

**Introduction**

Insert the paper's full title at the start of the first page of the introduction.

Submissions must contain an explicit, evidence-based justification that indicates 1) how the investigation has the potential to make a novel contribution to the developmental literature, and 2) how, if realized, this contribution is relevant for improving developmental outcomes (e.g., through policy or within applied settings). Such statements should be featured early in the introduction (e.g., within the first 1-2 paragraphs), in accordance with the guidance provided in the APA JARS-Quant.

We recommend the following structure, as it is helpful for ensuring that our very broad, interdisciplinary readership can understand the potential value of the research. It is appropriate and necessary to tell the readers precisely what they need to know in order to understand the study, including how it contributes to the literature, and how (if realized) the study's findings have the potential to inform applied efforts. For this reason, the first one to two paragraphs of manuscripts should have the following structure:

(a) The first sentence should succinctly state the general research question the study is asking, or the key problem that the study seeks to address.

(b) Next, include a very brief discussion of the relevant literature and identify notable gaps in that literature. Explain why filling that gap is necessary and valuable.

(c) Then, provide a study purpose statement, which briefly summarizes how your study addresses the informational need you described above (i.e., this is an ideal spot to highlight the unique potential of studies involving marginalized samples and/or novel extensions through replication; see above).

(d) Conclude with a statement about the study's potential novel contributions and applied implications.

**Method**

The methods section involves a detailed description of how the study was conducted. Subsections may include: participants, procedures, measures, design, and analysis plan.
In support of equitable developmental science and inclusive research reporting, the text of the Participants section should include (but is not limited to): Recruitment, eligibility and exclusion criteria. Sample size. Demographic information, including gender, race/ethnicity, age, SES, and any other relevant descriptive statistics that characterize the sample. Attrition and/or bias analyses, as applicable.

Participant section should include: Participant selection procedure (i.e., sampling methodology). How informed consent and/or assent was obtained from the participants (or their parents/guardians). A statement indicating that the study was conducted in compliance with the appropriate IRB or ethical oversight. Data collection process, including when, where, and how the authors obtained the data.

Description of any incentives or payments made to participants.

Measures section should include: Definitions of all measures used to assess the study’s constructs. For independent and dependent variables, provide Cronbach’s for the measure in this sample and other relevant indicators of psychometric properties. Note that labels for response scale anchors must be italicized (6.22 Use of Italics). Design section should include a description of the type of research design (e.g., quasi-experimental or randomized experiment; see the APA JARS-Quant for more information).

Analysis plan section should include: Description of data diagnostics, such as descriptive statistics, outlier analyses, missing data analyses, and other such tests of assumptions as is appropriate for the selected approach. Description of how the research design explicitly tests hypotheses or addresses the research questions.

Results

Report descriptive statistics and details about missing data per the APA JARS-Quant. Reporting of inferential statistics conforms to APA standards, including but not limited to:

1. Reporting the value of the test statistic (including direction of effect), degrees of freedom, and the probability of obtaining a result at least as extreme as the one that was obtained (a p-value).
2. Report decimal fractions per APA conventions (see 6.36): Most of the time, only two decimals of accuracy are necessary (e.g., correlations). Use exact p-values to two or three decimal places (but be consistent). If \( p < .001 \); then use, \( p < .001 \).
3. Italicize non-Greek letters, such as: \( N \) \( M \) \( df \) \( SSE \) \( MSE \) \( t \) \( f \) \( SD \) \( p \)
4. Do not italicize Greek letters, subscripts, and superscripts, such as: \( \alpha \), \( \beta \), \( \gamma \), \( \text{GLM} \), \( \text{WLS} \), \( \log \)
5. Statistics reported will vary depending upon statistical procedures. A few examples: Chi-square: \( X^2(5, N = 75) = 8.60, p = .006 \) T-tests: Girls (\( M = 10.00, SD = 2.00 \)) scored higher than boys (\( M = 8.00, SD = 3.00 \)), \( t(50) = 1.85, p = .04 \) (one-tailed) Analysis of variance: \( F(1, 349) = 8.00, p < .05 \) Regression: \( \beta = .80, p < .01 \)
6. Must report total effect sizes when appropriate. Total effect sizes indicate the strength of the relations between variables, and include (but are not limited to) Cohen's \( d \), \( R^2 \), and \( n^2 \).

Discussion

The Discussion should be prepared in accordance with the structure provided in the APA JARS-Quant.

The opening paragraph of the discussion should consider the broad significance of the research, in parallel with the opening paragraph of the introduction.

The discussion should include explicit consideration about how the findings contribute to efforts to improve developmental outcomes, for example through policy or within applied settings (e.g., intervention contexts).

All authors should consider the diversity of their study sample(s) and the impact of the sample’s composition on the research. If the study involves Western, educated, industrialized, rich, and democratic (WEIRD) or primarily white sample(s), authors should offer a justification for this approach (for additional information, see Roberts et al., 2020).

All authors are required to include a brief Constraints on Generality (COG) statement (for details, see Simons et al., 2017). This statement should describe and justify the targeted populations to which the findings are relevant, discuss the degree to which the findings may generalize beyond the study sample.
study sample, and consider the limits on generality of the research in terms of participants, context, and procedures. Be specific about which elements of the methodology (i.e., sample, measures, and procedures) could likely be varied without impacting the pattern of findings, and which could impact the pattern of findings if varied in replications.

References

Responsibility for the accuracy of the references lies entirely with the authors (e.g., editorial staff will not be able to fill in any missing reference elements, nor are they able to correct any errors in content). All references should be complete and formatted per 7th edition APA style conventions. Include the DOI for all sources for which it is available.

This journal encourages authors to credit underlying or relevant datasets by citing them in the manuscript text and including a data reference in the References list. Format the dataset reference per APA style conventions. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

Tables, Figures, Video, and Data Visualization

In general, be sparing in the use of tables and figures, and ensure that the data presented in them do not duplicate results described elsewhere in the article (i.e., APA style standards also prohibit such redundant reporting). Follow 7th edition APA style conventions in formatting all aspects of tables and figures. Number them consecutively in accordance with their appearance in the text. Organize and label captions and notes per 7th edition APA style conventions.

Tables

Ensure that all tables adhere to 7th edition APA style requirements. Each table should be on its own page, and all tables should be placed after the references.

Please avoid using vertical rules and shading in table cells. Please submit tables as editable text and not as images.

Figures

Ensure that figures adhere to 7th edition APA style requirements. Each figure should be on its own page, and all figures should be placed after the tables.

Elsevier provides additional guidance for electronic artwork as part of publications, detailed below.

General Points. More information is provided in the detailed guide on electronic artwork. Make sure you use uniform lettering and sizing of your original artwork (note that 7th edition APA style rules stipulate the use of the same font throughout the manuscript, including its figures). Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar. Embed the used fonts if the application provides that option. Size the illustrations close to the desired dimensions of the published version. Ensure that any color images are accessible to all, including those with impaired color vision.

Formats. If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply ‘as is’ in the native document format. Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please ‘Save as’ or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below): EPS (or PDF): Vector drawings, embed all used fonts. TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi. TIFF (or JPEG): Bitmapped (pure black and white pixels) line drawings, keep to a minimum of 1000 dpi. TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

Please do not: Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors; Supply files that are too low in resolution; Submit graphics that are disproportionately large for the content.
**Line Drawings.** Supply high-quality printouts on white paper produced with black ink. The lettering and symbols, as well as other details, should have proportionate dimensions, so as not to become illegible or unclear after possible reduction; in general, the figures should be designed for a reduction factor of two to three. The degree of reduction will be determined by the Publisher. Illustrations will not be enlarged. Consider the page format of the journal when designing the illustrations. Photocopies are not suitable for reproduction. Do not use any type of shading on computer-generated illustrations.

**Photographs (Halftones).** Supply original photographs for reproduction, printed on glossy paper, very sharp and with good contrast. Remove non-essential areas of a photograph. Do not mount photographs unless they form part of a composite figure. Where necessary, insert a scale bar in the illustration (not below it), as opposed to giving a magnification factor in the legend. Note that photocopies of photographs are not acceptable.

**Color Artwork.** Please make sure that artwork files are in an acceptable format (TIFF, JPEG, EPS, PDF, or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article. Please indicate your preference for color: in print or online only. **Further information on the preparation of electronic artwork.**

**Video**

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our [video instruction pages](#). Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

**Data Visualization**

Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions [here](#) to find out about available data visualization options and how to include them with your article.

**Other Manuscript Elements**

**Submission Declaration and Verification (Required)**

Please include a cover letter with the submission in accordance with APA style standards (12.11 Writing a Cover Letter). Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check. **JADP** welcomes submissions that proactively challenge racism and other forms of oppression, in pursuit of promoting equity and diversity in applied developmental psychology. For this reason, authors are encouraged to include a brief reflexivity statement in the cover letter, addressing the following: Does the design or framing of the research have the potential to reinforce negative stereotypes of historically excluded, oppressed, or vulnerable
groups? Could any aspect of this research or its findings be misinterpreted or misused, resulting in harm or other negative impacts to historically oppressed, excluded, or vulnerable groups? If so, how may be this be mitigated?

Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication. 

**Highlights**

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 125 characters, including spaces, per bullet point).

**Essential title page information**

Provide the following data on the Title Page only (in the order given, formatted per 7th edition APA style conventions; more information is provided below in the subsection on Double Anonymized Peer Review).

**Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.

**Author names and affiliations.** Where the family name may be ambiguous (e.g., a double name), please indicate this clearly. Present the authors’ affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author’s name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name, and the e-mail address of each author.

**Corresponding author.** Clearly indicate who is willing to handle correspondence at all stages of refereeing and publication, also post-publication. Ensure that telephone and fax numbers (with country and area code) are provided in addition to the e-mail address and the complete postal address.

**Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

**Summary Declaration of Interests Statement.** See below for further details.

**Abstract**

A concise and factual abstract is required (100 - 150 words) in accordance with 7th edition APA style conventions. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separate from the article, so it must be able to stand alone. References should therefore be avoided, but if essential, they must be cited in full, without reference to the reference list.

**Keywords**

Immediately after the abstract on the first page of the manuscript, provide a maximum of 6 keywords. These keywords will be used for indexing purposes.

**GRAPHICAL_ABSTRACT**

Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site.
Acknowledgements

Collate acknowledgements and author notes, including grant and other support for the research, in a separate file. Do not, therefore, include them on the title page, as a footnote to the title or otherwise.

Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only before the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

Compliance With Ethical Standards. If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. The manuscript should be in line with the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals and aim for the inclusion of representative human populations (sex, age and ethnicity) as per those recommendations. The terms sex and gender should be used correctly.

Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

All animal experiments should comply with the ARRIVE guidelines and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, EU Directive 2010/63/EU for animal experiments, or the National Institutes of Health guide for the care and use of Laboratory animals (NIH Publications No. 8023, revised 1978) and the authors should clearly indicate in the manuscript that such guidelines have been followed. The sex of animals must be indicated, and where appropriate, the influence (or association) of sex on the results of the study.

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double anonymized) or the manuscript file (if single anonymized). If there are no interests to declare then please state this: 'Declarations of interest: none'. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal’s official records. It is important for potential interests to be declared in both places and that the information matches. More information.

Declaration of generative AI in scientific writing

The below guidance only refers to the writing process, and not to the use of AI tools to analyse and draw insights from data as part of the research process.

Where authors use generative artificial intelligence (AI) and AI-assisted technologies in the writing process, authors should only use these technologies to improve readability and language. Applying the technology should be done with human oversight and control, and authors should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete or biased. AI and AI-assisted technologies should not be listed as an author or co-author, or be cited as an author. Authorship implies responsibilities and tasks that can only be attributed to and performed by humans, as outlined in Elsevier’s AI policy for authors.

Authors should disclose in their manuscript the use of AI and AI-assisted technologies in the writing process by following the instructions below. A statement will appear in the published work. Please note that authors are ultimately responsible and accountable for the contents of the work.

Disclosure instructions
Authors must disclose the use of generative AI and AI-assisted technologies in the writing process by adding a statement at the end of their manuscript in the core manuscript file, before the References list. The statement should be placed in a new section entitled ‘Declaration of Generative AI and AI-assisted technologies in the writing process’.

Statement: During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

This declaration does not apply to the use of basic tools for checking grammar, spelling, references etc. If there is nothing to disclose, there is no need to add a statement.

Reporting sex- and gender-based analyses

Reporting guidance

For research involving or pertaining to humans, animals or eukaryotic cells, investigators should integrate sex and gender-based analyses (SGBA) into their research design according to funder/sponsor requirements and best practices within a field. Authors should address the sex and/or gender dimensions of their research in their article. In cases where they cannot, they should discuss this as a limitation to their research’s generalizability. Importantly, authors should explicitly state what definitions of sex and/or gender they are applying to enhance the precision, rigor and reproducibility of their research and to avoid ambiguity or conflation of terms and the constructs to which they refer (see Definitions section below). Authors can refer to the Sex and Gender Equity in Research (SAGER) guidelines and the SAGER guidelines checklist. These offer systematic approaches to the use and editorial review of sex and gender information in study design, data analysis, outcome reporting and research interpretation - however, please note there is no single, universally agreed-upon set of guidelines for defining sex and gender.

Definitions

Sex generally refers to a set of biological attributes that are associated with physical and physiological features (e.g., chromosomal genotype, hormonal levels, internal and external anatomy). A binary sex categorization (male/female) is usually designated at birth (“sex assigned at birth”), most often based solely on the visible external anatomy of a newborn. Gender generally refers to socially constructed roles, behaviors, and identities of women, men and gender-diverse people that occur in a historical and cultural context and may vary across societies and over time. Gender influences how people view themselves and each other, how they behave and interact and how power is distributed in society. Sex and gender are often incorrectly portrayed as binary (female/male or woman/man) and unchanging whereas these constructs actually exist along a spectrum and include additional sex categorizations and gender identities such as people who are intersex/have differences of sex development (DSD) or identify as non-binary. Moreover, the terms "sex" and "gender" can be ambiguous—thus it is important for authors to define the manner in which they are used. In addition to this definition guidance and the SAGER guidelines, the resources on this page offer further insight around sex and gender in research studies.

Article transfer service

This journal uses the Elsevier Article Transfer Service to find the best home for your manuscript. This means that if an editor feels your manuscript is more suitable for an alternative journal, you might be asked to consider transferring the manuscript to such a journal. The recommendation might be provided by a Journal Editor, a dedicated Scientific Managing Editor, a tool assisted recommendation, or a combination. If you agree, your manuscript will be transferred, though you will have the opportunity to make changes to the manuscript before the submission is complete. Please note that your manuscript will be independently reviewed by the new journal. More information.

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

List funding sources in this standard way to facilitate compliance to funder's requirements:
**Funding:** This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill and Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa]. It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Queries**
For questions about the editorial process (including the status of manuscripts under review) or for technical support on submissions, please visit our Support Center.

**Abbreviations**
Define abbreviations that are not standard in this field at their first occurrence in the article: in the abstract but also in the main text after it. Ensure consistency of abbreviations throughout the article.

**Line drawings** Supply high-quality printouts on white paper produced with black ink. The lettering and symbols, as well as other details, should have proportionate dimensions, so as not to become illegible or unclear after possible reduction; in general, the figures should be designed for a reduction factor of two to three. The degree of reduction will be determined by the Publisher. Illustrations will not be enlarged. Consider the page format of the journal when designing the illustrations.

Photocopies are not suitable for reproduction. Do not use any type of shading on computer-generated illustrations.

**Photographs (halftones)** Supply original photographs for reproduction, printed on glossy paper, very sharp and with good contrast. Remove non-essential areas of a photograph. Do not mount photographs unless they form part of a composite figure. Where necessary, insert a scale bar in the illustration (not below it), as opposed to giving a magnification factor in the legend.

Note that photocopies of photographs are not acceptable.

**Web references**
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired or can be included in the reference list.

**Preprint references**
Where a preprint has subsequently become available as a peer-reviewed publication, the formal publication should be used as the reference. If there are preprints that are central to your work or that cover crucial developments in the topic, but are not yet formally published, these may be referenced. Preprints should be clearly marked as such, for example by including the word preprint, or the name of the preprint server, as part of the reference. The preprint DOI should also be provided.

**Supplementary material**
Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

**Research data**
This journal requires and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings, which may also include software, code, models, algorithms, protocols, methods and other useful materials related to the project.
Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. When sharing data in one of these ways, you are expected to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

Data linking
If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

Research Elements
This journal enables you to publish research objects related to your original research – such as data, methods, protocols, software and hardware – as an additional paper in a Research Elements journal.

Research Elements is a suite of peer-reviewed, open access journals which make your research objects findable, accessible and reusable. Articles place research objects into context by providing detailed descriptions of objects and their application, and linking to the associated original research articles. Research Elements articles can be prepared by you, or by one of your collaborators.

During submission, you will be alerted to the opportunity to prepare and submit a manuscript to one of the Research Elements journals.

More information can be found on the Research Elements page.

Submission and Review

Submission Procedures

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by email. Authors are responsible for verifying that the email address in the online submission system is correct and current.

Double Anonymized Peer Review All contributions will be initially assessed by the Editor in Chief for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. More information on types of peer review.

This journal uses double anonymized review, which means the identities of the authors are concealed from the reviewers, and vice versa. More information is available on our website. To facilitate this, please include the following separately:

Title page (with author details): This should include the title, authors' names, affiliations, acknowledgements and any Declaration of Interest statement, and a complete address for the corresponding author including an email address.
Anonymized manuscript (no author details): The main body of the paper (including the references, figures, tables and any acknowledgements) should not include any identifying information, such as the authors’ names or affiliations.

All contributions will be initially assessed by the Editor in Chief for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor’s decision is final. More information on types of peer review.

This journal uses double anonymized review, which means the identities of the authors are concealed from the reviewers, and vice versa. More information is available on our website. To facilitate this, please include the following separately:

Title page (with author details): This should include the title, authors’ names, affiliations, acknowledgements and any Declaration of Interest statement, and a complete address for the corresponding author including an email address.

Anonymized manuscript (no author details): The main body of the paper (including the references, figures, tables and any acknowledgements) should not include any identifying information, such as the authors’ names or affiliations.

AFTER ACCEPTANCE

Online proof correction
To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors. If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.

We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

Offprints
The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

AUTHOR INQUIRIES
Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch. You can also check the status of your submitted article or find out when your accepted article will be published.

© Copyright 2018 Elsevier | https://www.elsevier.com