

File No.: 2025-717

April 20, 2026

s.22(1)

Dear s.22(1)

Re: **Request for Access to Records under the Freedom of Information and Protection of Privacy Act (the "Act")**

I am writing regarding your request of October 1, 2025 under the *Freedom of Information and Protection of Privacy Act* for:

Records related to the procurement and development of the Energy Modelling Guidelines Version 3.0 (EMG v3.0):

1. Procurement records including:
 - a) Requests for Proposals (RFPs);
 - b) Invitations to Tender, or other procurement notices;
 - c) Bid submissions received;
 - d) Evaluation criteria and scoring sheets; and
 - e) Selection rationale or decision memos;
2. Contracts or agreements between the City of Vancouver and Focal Engineering Inc. or any other consultant retained for the EMG v3.0 update;
3. Invoices and payment records related to work performed on EMG v3.0;
4. Internal communications (emails, memos, meeting minutes) discussing:
 - a) The scope of work for EMG v3.0;
 - b) Consultant selection and oversight; and
 - c) Any conflict-of-interest declarations or disclosures;
5. Records of payment made to Focal Engineering Inc. or other parties for work related to EMG v3.0;
6. Internal communications (emails, memos, meeting minutes) discussing the scope, selection, and oversight of the EMG v3.0 update process; and
7. Conflict of interest declarations or disclosures related to the procurement or development of EMG v3.0.

Date range: January 1, 2022 to September 30, 2025

All responsive records are attached*. Some of the information in the records has been severed (blacked out) under s.13(1), s.15(1), s.15(1)(l), s.21(1), s.22(1), and s.22(3)(d) of the Act. You can read or download these sections here:

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96165_00.

*Please note, due to the file size of the responsive records package it has been uploaded to a City of Vancouver secured SharePoint site. Access details can be located in the email received alongside this letter.

Under Part 5 of the Act, you may ask the Information & Privacy Commissioner to review any matter related to the City's response to your FOI request by writing to: Office of the Information & Privacy Commissioner, info@oipc.bc.ca or by phoning 250-387-5629.

If you request a review, please provide the Commissioner's office with: 1) the request number (2025-717); 2) a copy of this letter; 3) a copy of your original request; and 4) detailed reasons why you are seeking the review.

Yours truly,

Kevin Tuerlings, FOI Case Manager, for

[Signed by Kevin Tuerlings]

Siân Madsen, MA, MAS
Acting Director, Access to Information & Privacy

If you have any questions, please email us at foi@vancouver.ca and we will respond to you as soon as possible. You may also contact 3-1-1 (604-873-7000) if you require accommodation or do not have access to email.

:Encl. via SharePoint (Response Package)

:ma

From: ["Goundouvas, Dino" <dino.goundouvas@vancouver.ca>](mailto:dino.goundouvas@vancouver.ca)
To: ["Goundouvas, Dino" <dino.goundouvas@vancouver.ca>](mailto:dino.goundouvas@vancouver.ca)
Date: 1/17/2023 7:10:46 AM
Subject: City of Vancouver RFP No. PS20230002
Attachments: City of Vancouver RFP No. PS20230002.pdf

The City of Vancouver has issued Request for Proposal (RFP) PS20230002 - CONSULTANT SERVICES – 2023 ENERGY MODELLING GUIDELINES UPDATE

Please find the attached RFP document containing the submission instructions and detailed requirements.

Please note some key dates listed below:

Deadline for Enquiries - 12:00pm (Noon), Wednesday, February 1, 2023

Closing Time- 3:00pm, Monday, February 6, 2023

Please be advised this is not a public call for proposal however, any questions or clarifications that are submitted for response will be issued to all short listed proponents.

Dino Goundouvas
Contracting Specialist
City of Vancouver
Supply Chain Management
604.871.6812



REQUEST FOR PROPOSALS

CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE

RFP No. PS20230002

Issue Date: January 17, 2023

Issued by: City of Vancouver (the "City")

SUMMARY

The intent of this RFP is to update the City of Vancouver's Energy Modelling Guidelines to version 3, for new changes to take into effect in alignment with VBBL Sections 6.6.2 and 10.2 changes in July 2023 and January 2025

PART A INSTRUCTIONS AND INFORMATION

1.0 INSTRUCTIONS

1.1 The City is interested in selecting an entity (each, a “**Proponent**”) that submits a proposal (each, a “**Proposal**”) with the capability and experience to efficiently and cost-effectively meet the requirements described in this RFP. The City expects to select a Proponent to enter into contract negotiations. The term of any agreement is expected to be approximately Six months with possible extensions to complete the work.

However, the City may: (i) decline to select any Proponent; (ii) decline to enter into any agreement; (iii) select multiple Proponents for negotiation; or (iv) enter into one or more agreements respecting the subject matter of the RFP with one or more Proponents or other entities at any time. The City may also terminate the RFP at any time.

1.2 Proponents should submit their proposals on or before 3:00pm on the 6th day of February, 2023 (the “**Closing Time**”) by email in accordance with the following:

- Subject of the file to be: PS# - Title - Vendor name.
- Document format for submissions:
 - RFP Appendix 1 in PDF format - 1 combined PDF file,
 - Any other attachments if necessary
- Zip the files to reduce the size or email separately if needed.
- Send your submissions to dino.goundouvas@vancouver.ca; do not deliver a physical copy to the City of Vancouver.
- Submitting the files via Drop box, FTP, or similar programs, is not acceptable.
- Inquiries related to this RFP must be sent to dino.goundouvas@vancouver.ca by 12pm, February 1, 2023
- Due to cybersecurity concerns, the City of Vancouver will quarantine any inbound email with attachments not in PDF or Microsoft Office formats which will result in non-delivery to Supply Chain Management and will be deemed not submitted. Non-compliant file formats will be detected and quarantined even if they are compressed, zipped, renamed, and include password protected zipped files.
- The maximum number of attachments allowed in an email message is 10 attachments.
- The maximum size limit for an email message, including all attachments, is 10MB per message.

- 1.3 To be considered by the City, a Proposal must be submitted in the form set out in Appendix 1 (the "Proposal Form"), completed and duly executed by the relevant Proponent.
- 1.4 Amendments to a Proposal may be submitted via the same methods, at any time prior to the Closing Time. Proposals are revocable and may be withdrawn at any time before or after the Closing Time.
- 1.5 Proposals that are submitted after the Closing Time or that otherwise do not comply in full with the terms hereof may or may not be considered by the City and may or may not be returned to the Proponent, in the City's sole discretion.
- 1.6 All enquiries must be made in writing and are to be directed only to the above contact person. In-person or telephone enquiries are not permitted. Any communication from potential Proponents to City staff other than the contact person regarding the content of this RFP may lead to disqualification of the Proponent from this RFP process, at the City's sole discretion.

2.0 THIS SECTION HAS BEEN INTENTIONALLY DELETED

3.0 EVALUATION OF PROPOSALS

- 3.1 The City currently intends that all Proposals submitted to it in accordance with the RFP will be evaluated by City representatives, using quantitative and qualitative tools and assessments, as appropriate, to determine which Proposal or Proposals offer the overall best value to the City. In so doing, the City expects to examine:

Evaluation Criteria	Evaluation Weighting
Technical	65%
Financial	30%
Sustainability (Environmental and/or Social)	5%
Total	100%

4.0 CITY'S DISCRETION

- 4.1 For the avoidance of doubt, notwithstanding any other provision in the RFP, the City has in its sole discretion, the unfettered right to: (a) accept any Proposal; (b) reject any Proposal; (c) reject all Proposals; (d) accept a Proposal which is not the lowest-price proposal; (e) accept a Proposal that deviates from the Scope of Work or the conditions specified in the RFP; (f) reject a Proposal even if it is the only Proposal received by the City; (g) accept all or any part of a Proposal; (h) split the Scope of Work between one or more Proponents; and (i) enter into one or more agreements respecting the subject matter of the RFP with any entity or entities at any time. Without limiting the foregoing, the City may reject any Proposal by a Proponent that has a conflict of interest, has engaged in collusion with another Proponent or has otherwise attempted to influence the outcome of the RFP other than through the submission of its Proposal.

5.0 LEGAL TERMS AND CONDITIONS

- 5.1 The legal obligations of a Proponent that will arise upon the submission of its Proposal are stated in Appendix 2. Except where expressly stated in these Legal Terms and Conditions:

(i) no part of the RFP consists of an offer by the City to enter into any contractual relationship; and (ii) no part of the RFP is legally binding on the City. EXCEPT WHERE EXPRESSLY STATED OTHERWISE IN APPENDIX 2: (I) NO PART OF THE RFP CONSISTS OF AN OFFER BY THE CITY TO ENTER INTO ANY CONTRACTUAL RELATIONSHIP; AND (II) NO PART OF THE RFP IS LEGALLY BINDING ON THE CITY.

POTENTIAL PROPONENTS MUST REVIEW THESE LEGAL TERMS AND CONDITIONS CAREFULLY BEFORE SUBMITTING A PROPOSAL.

PART B SCOPE OF WORK

The scope of work stated in this Part B (collectively, the “Scope of Work”) IS current as of the date hereof, but may change or be refined in the course of the evaluation of Proposals or otherwise.

2023 Energy Modelling Guidelines Update

Request for Proposals: Scope of Work

Schedule

The anticipated delivery date of draft results is: Monday, May 15th, 2023

The anticipated dates of 2 proposed workshops are: Week of June 5th, 2023

The anticipated delivery date of final results is: Monday July 10th, 2023

Background

The Zero Emissions Building Plan (ZEBP¹) seeks to reduce the operational emissions of new construction in Vancouver to zero by 2030. Changes to the Vancouver Building By-law (VBBL) were approved in May 2022 to reduce greenhouse gas intensity (GHGI) targets consistent with zero emissions heating and hot water equipment for Part 3 new construction, as well as more stringent targets on climate resilience. The City of Vancouver’s Energy Modelling Guidelines (EMGs) version 2.0 needs to be updated to consolidate feedback and new knowledge that has emerged since the release of version 2.0 in July 2018.

The EMGs are used by projects to demonstrate compliance to the energy and emissions limits in the Vancouver Building By-law and is also referenced by the BC Building Code in the application of the Energy Step Code (ESC) for Part 3 buildings. While the focus of the update will be to reflect Vancouver’s context, proponents are encouraged to consider the implications of these updates to users of the provincial ESC and lead discussions on these implications at the stakeholder workshops (see Deliverables).

Intent

The intent of this scope of work is to update the City of Vancouver’s Energy Modelling Guidelines to version 3, for new changes to take into effect in alignment with VBBL Sections 6.6.2 and 10.2 changes in July 2023 and January 2025².

Scope

Throughout the delivery of this scope of work, the proponent should consider applicability or constraints of the common energy modelling software used by modelling professionals in BC for Part 3 large new buildings. Proposed modelling methodologies should work for these modelling software; otherwise provide a recommendation on whether specific software should no longer be used for the purposes of compliance modelling for VBBL or ESC.

¹<https://vancouver.ca/files/cov/zero-emissions-building-plan.pdf>

² <https://council.vancouver.ca/20220517/documents/R1a.pdf#page=34>

It is up to the proponent to propose the necessary methodology to arrive at and justify each recommended change to the EMGs based on the scope items outlined below. Some recommendations may be based on professional judgment and experience of the proponent, while others may require some energy modelling effort to arrive at the recommended approach.

This scope of work is not intended to be an extensive modelling exercise. The energy modelling scope item 14) is meant to provide an overall summary to understand the impact to energy and emissions metrics based on by major impacts such as updated weather files, changes in DHW assumptions, and ventilation standards, etc. Proponents are expected to have access to recent and relevant completed energy models of Part 3 new buildings of different sizes to draw from for the purposes to arriving at the recommendations.

The scope of work consists of the following needs:

1) Weather files

- a) Recommend a change to the standard weather file for demonstrating compliance to VBBL from CWEC 2016 to CWEC 2020 or to another weather file. The intent is to reflect best currently available information to demonstrate compliance to VBBL energy & emissions limits at the time of design.
- b) Recommend standard weather file(s) for completing sensitivity analysis under future climate conditions (e.g. specify climate files with time-scale and Representative Concentration Pathway, or source of climate files, etc.) or the use of Reference Summer Weather Years³. See also Section 5).

2) Domestic hot water

- a) Provide recommendations on whether to include the following changes as per the recommendations of the report “Calibrating the Zero Emissions Building Plan and BC Energy Step Code”⁴
 - o increasing peak load assumption to 0.0021L/s/person (Section 3.1.4.1 of the report)
 - o adopting a seasonal multiplier to DHW use (Section 3.1.4.2)
 - o adopting a recirculation DHW heat loss factor (Section 3.1.4.3)
 - o adopting a multiplier for non-submetered DHW (Section 3.1.4.5)
- b) Suggest any other recommendations to improve modelling of domestic hot water use, if any.

3) Ventilation Standard

Provide advice on the implications of the changes to TEDI, TEUI, GHGI and CEDI using ventilation rates in ASHRAE 62.1 -2016 Ventilation and Acceptable Indoor Air Quality as opposed to current VBBL referenced ASHRAE 62.1-2001 for ventilation.

4) Overheating analysis for Passive Cooled Buildings

³ <https://nrc-publications.canada.ca/eng/view/object/?id=abcd0186-37f3-4051-b752-688f04b7063c>

⁴ Crosby, S. 2019. “Calibrating the Zero Emissions Building Plan and BC Energy Step Code” Report for the Greenest City Scholars Program. https://www.researchgate.net/profile/Sarah-Crosby-2/publication/336654063_Calibrating_the_Zero_Emissions_Building_Plan_and_BC_Energy_Step_Code/links/5e583818a6fdccbeba079aa4/Calibrating-the-Zero-Emissions-Building-Plan-and-BC-Energy-Step-Code.pdf

Recommend standardized assumptions for estimating the number of overheating hours for passively cooled buildings (section 4 of the EMGs) for the purposes of demonstrating compliance with overheating limits within VBBL and ESC. The proposed methodology or assumptions should apply to common natural ventilation and other passive cooling strategies and be simple to apply across different project designs and conditions. Include guidance on the following:

- a) Modelling natural ventilation and shading – for example, how window/patio door opening areas are calculated, how much airflow through openings, schedules of operation, external or internal operable shading.
- b) Occupant assumptions such as clothing, metabolic rate, local airspeed, etc.
- c) Other modelling assumptions such as thermal massing
- d) Recommend whether to require the calculation of operative temperature instead of dry bulb temperature in thermal comfort/overheating analysis based on ASHRAE 55 Section 5.3. Include any technical or software constraints associated with this recommendation.
- e) Recommend changes to the values in Table 4 “Acceptability Limits for Naturally Conditions Spaces in Vancouver” in Section 4 of the EMGs to a standard minimum value across all month, with the intent to accommodate projects outside of Vancouver conducting overheating hours analysis for ESC compliance.

5) Resilience to future climate and shock events

- a) For buildings with partial cooling or no active cooling: recommend a methodology for sensitivity analysis of how the number of overheating hours will shift in the future, such as time period to be modelled, the weather files to be used, etc.
- b) For buildings with active cooling: recommend a methodology for sensitivity analysis of overheating hours in the event of a power outage. Suggest a scenario and set parameters for analysis such as the duration of the power outage, the time period to be modelled, the weather files to be used, the number of overheating hours above a thermal safety threshold temperature, etc. Suggest an approach to encourage design teams to explore additional ways to reduce overheating hours during a power outage with the intent to improve the passive survivability of the building.
- c) Recommend a standard methodology and weather files to be used to analyze and report on how peak cooling and heating loads, TEDI, TEUI, GHGI and CEDI change between current and future climate scenarios. Include recommendations on how this information may be presented in the Energy & Emissions Design Report.

6) Cooling Energy Demand Intensity

Establish a standard methodology for calculating cooling energy demand intensity applicable to all building designs including those with full, partial or no mechanical cooling systems.

7) Refrigerant impact – GHGI-R

Projects will be required to account for the greenhouse gas impacts of refrigerants (GHGI-R) in the whole-building GHGI limit as of January 2025. Draft a new guidance section in the EMGs on GHGI-R that includes the following:

- a) Provide recommendation on incorporating GHGI-R estimates in early design for whole building GHGI compliance, based on existing available resources⁵. Reference existing GHGI-R calculation methodology from the Green Buildings Policy for Rezoning – Process and Requirements (amended June 14, 2019)⁶ to the EMGs and recommend updates to the methodology as necessary.
- b) Recommend whether GHGI-R reporting should be limited to mechanical cooling equipment containing more than a specified volume of refrigerant (nominally 225g)⁷ or a specific cooling capacity (19kW)⁸, or align with any other relevant standards or regulations.
- c) Update the definition of GHGI to include refrigerant impact.

8) Compliance for actively cooled buildings

As of January 2025, dwelling units within Part 3 buildings will be required to have active mechanical cooling capable to maintaining an indoor air temperature of 26°C with windows closed. Provide a recommendation on how compliance may be demonstrated through energy modelling. For example, the weather files and/or peak design condition to be used, the time period to be modelled, any mechanical system details or other compliance information or metrics to be provided by the design and modelling team, etc. Provide insight on any changes to the design and modelling teams' workflow that may be required to demonstrate compliance.

9) Form Factor for slim buildings' TEDI targets

Propose an adjustment factor for small and/or narrow buildings where TEDI targets may be difficult to achieve due to its form factor.

10) Energy efficiency recommendations

Provide technical and policy recommendation on the following items with the intent to further encourage selection of more energy efficient options:

- a. Appliances: should the current credit for EnergyStar appliances for TEUI continue, or should the default modelling assumptions for these appliances be adjusted to Energy Star requirements?
- b. Lighting – is an update to modelling assumptions for lighting necessary and are there other mechanisms to drive better more energy efficient lighting design
- c. Elevators – propose a revision to the current assumption on elevator load or an alternative modelling method to encourage the selection of more efficient elevators
- d. Laundry appliances – does the current assumptions on modelling in-suite laundry require updating?

11) Miscellaneous recommendations

Provide technical and policy recommendations on the following items. Some questions are provided as a starting point for consideration; the proponent is encouraged to provide additional perspectives as they see fit.

- a) Clarify the application of the corridor pressurization adjustment for buildings using energy/heat recovery ventilation systems for corridor supply and return air

⁵ <https://vancouver.ca/files/cov/refrigerant-impact-ghgi-study.pdf>

⁶ <https://vancouver.ca/files/cov/bulletin-green-buildings-policy-for-rezoning-2019-june14.pdf>

⁷ Based on LEED v4 Credit Enhanced Refrigerant Management

⁸ Based on Zero Carbon Buildings v3

- b) The reduction of maximum corridor pressurization adjustment value for TEDI and TEUI to 5
 - c) The removal of the corridor pressurization adjustment for GHGI
 - d) What space uses/types should be included within the building's Modelled Floor Area and Gross Floor Area (e.g. below grade storage or bike storage), and justifications based on anticipate impact on TEDI, TEUI, GHGI, CEDI metrics, etc.
 - e) Recommend changes to the current sub-metering adjustment for hot water for space heating (see 2.7 of the EMGs), if any. Consider whether the adjustment should be removed for simplicity and/or practicality, or if the adjustment should be expanded to include TEDI and DHW heating.
 - f) Recommend whether any further clarifications are needed on the role of the energy modelling professional making reference to the Joint Professional Practice Guidelines for Whole Building Energy Modelling Services⁹
- 12) GHG reduction target methodology for Groups A, B, and F major occupancies
Draft guidance language on the modelling steps for Groups A, B and F major occupancies with GHG reduction targets in VBBL to determine the GHG reduction target based on an all fossil-fuel baseline modelled as per ASHRAE or NECB requirements. If different modelling steps are required for ASHRAE or NECB projects or for different modelling software, provide guidance for different cases.
- 13) Review CSA Z5020 Building Energy Modelling Standard
Provide a high-level review of the soon-to-be published *CSA Z5020 Building Energy Modelling Standard* to identify any significant differences to technical modelling procedures or assumptions compared to the EMGs; provide recommendations on changes to EMGs if necessary.
- 14) Energy Modelling & Report
- a) Apply at least two archetype buildings (at least one 6-storey residential, one 7+ storey residential, etc.) that include typical buildings systems meeting current VBBL requirements, modelled under the methodologies and assumptions outlined in v2.0 of the EMGs and compare the modelled results with the major recommendations from the above list. Provide comparison of how TEDI, TEUI, CEDI, GHGI and overheating hours are affected by the recommended changes. In responding to this RFP, the proponent should specify the methodology for this step.
 - b) Provide a brief report on how various components of building energy usage may be affected by the changes listed above, along with the proponent's list of recommended changes. The report should also provide brief commentary on any significant changes to energy modelling or design workflow related to the recommended changes.
- 15) Engagement with stakeholders
Organize and facilitate a minimum of 2 (two) virtual workshops to share proposed changes to the following groups and gather feedback in June 2023. Create an online survey to collect

⁹<https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories/Document/01525AMW7JPMODAJKVYBCLHGRA24FJJPH3/Whole%20Building%20Energy%20Modelling%20Services>

written feedback to a draft version of the EMG changes. The survey should be made live in time for the workshops and remain open for 4 weeks.

- a) Workshop #1 with stakeholders to include relevant code compliance professionals from BC's Climate Action Secretariat, Building & Safety Standards Branch, BC Housing, BC Hydro, local municipalities etc., with approximate 10-20 individuals
- b) Workshop #2 with local energy modelling professionals (approximately 25-50 individuals)

Deliverables

The project will result in the following deliverables to the City:

- 1) Meetings with City staff as appropriate, including at a minimum:
 - a. Kick-off meeting to review scope and clarify assumptions;
 - b. Regular progress updates, bi-weekly as needed;
 - c. Presentation and review of preliminary findings with core City staff;
 - d. Organize and facilitate two workshops to share proposed changes to industry stakeholders, and to gather input on practical, technical or software issues and opportunities
 - e. Online survey to gather feedback from draft EMG changes
- 2) A preliminary draft of changes to the Energy Modelling Guidelines detailing initial recommendations and questions to be resolved;
- 3) A final report outlining the methodology taken to arrive at the recommended changes, including a table listing the impacts of major recommended change on TEDI, TEUI, GHGI and CEDI; and
- 4) A final electronic version of the Energy Modelling Guidelines v3.0 with tracked changes, which incorporates the feedback from stakeholders and discussions with the project team.

**APPENDIX 1
PROPOSAL FORM**

**RFP No. PS20230002, CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE (the
"RFP")**

Proponent's Name: _____
"Proponent"

Address: _____

Jurisdiction of Legal Organization: _____

Date of Legal Organization: _____

Key Contact Person: _____

Telephone: _____

E-mail: _____

The Proponent, having carefully examined and read the RFP, including all amendments thereto, if any, and all other related information published on the City's website, hereby acknowledges that it has understood all of the foregoing, and in response thereto hereby submits the enclosed Proposal.

The Proponent further acknowledges that it has read and agrees to the Legal Terms & Conditions attached as Appendix 2 to the RFP.

IN WITNESS WHEREOF the Proponent has executed this Proposal Form:

Signature of Authorized Signatory for the Proponent

Date

Name and Title

Signature of Authorized Signatory for the Proponent

Date

Name and Title

Executive Summary

Provide a brief executive summary of your Proposal.

Approach to Performing Scope of Work

Clearly describe the methodology and project work plan for performing the work. Include an estimate of how much energy modelling effort is planned compared to other methods of arriving at technical recommendations (e.g. past project experience, etc.). Provide an indication of the number, types and sizes of building designs that the proponent's organization has access to in carrying out this work.

Key Personnel

Identify and provide professional biographical information for the key personnel that would perform the required services. Indicate the level of experience key personnel have in reviewing energy modelling work by others outside of the proponent's organization or exposure to challenges experienced by modellers outside their organization, and depth of experience on policy and code recommendations.

References	
Client Name # 1	
Address (City and Country)	
Contact Name	
Title of Contact	
Telephone No.	
E-mail Address	
Length of Relationship	
Type of Goods and/or Services provided to this Client	
Client Name # 2	
Address (City and Country)	
Contact Name	
Title of Contact	
Telephone No.	
E-mail Address	
Length of Relationship	
Type of Goods and/or Services provided to this Client	
Client Name # 3	
Address (City and Country)	
Contact Name	

Title of Contact	
Telephone No.	
E-mail Address	
Length of Relationship	
Type of Goods and/or Services provided to this Client	

Subcontractors

List all of the subcontractors that the Proponent proposes to use in carrying out the required services and described the scope of subcontracted work (or write "None" if no subcontractors are proposed).

Declaration of Supplier Code of Conduct

The City of Vancouver expects each supplier of goods and services to the City to comply with the supplier performance standards set out in the City's Supplier Code of Conduct ("SCC") <<https://policy.vancouver.ca/AF01401P1.pdf>>, which defines minimum labour and environmental standards for City suppliers and their subcontractors. To give effect to these requirements, an authorized signatory of each proposed vendor must complete the following declaration.

As an authorized signatory of _____ (*vendor name*), I declare that I have reviewed the SCC and to the best of my knowledge, _____ (*vendor name*) and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted below (include all violations/convictions that have occurred in the past three years as well as plans for corrective action). I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of _____ (*vendor name*).

Signature: _____

Name and Title: _____

Exceptions to Declaration:

Conflicts, Collusion, Lobbying

See Article 9 of Appendix 2 for instructions.

Table 1 – Commercial Table – Project Fees (please complete as stated in Part B – Deliverables Work Scope).

	Description by Activities	Estimated Hours	Total Estimated Fee
1	Meetings with City staff, including review of preliminary findings, workshops with stakeholders and online survey for feedback:		
2	A preliminary draft of changes to the Energy Modelling Guidelines detailing initial recommendations and questions to be resolved		
3	A final report outlining the methodology taken to arrive at the recommended changes, including a table listing the impacts of major recommended change on TEDI, TEUI, GHGI and CEDI		
4	A final electronic version of the Energy Modelling Guidelines v3.0 with tracked changes, which incorporates the feedback from stakeholders and discussions with the project team.		
Totals (fees should include PST but exclude GST)			\$

Table 2 – Commercial Table – Schedule of Hourly Rates (for additional services if required)

Team Members	Activity/Role	Regular Rate
		\$
		\$
		\$
		\$
		\$

Supplier Diversity

Please note that these Supplier Diversity questions are optional but may form part of the evaluation of this RFP. Proponent answers to Supplier Diversity questions are for information gathering purposes only and will be kept confidential in accordance with the Legal Terms and Conditions of this RFP.

In the space below, indicate the Proponent's company profile with regards to social value and economic inclusion supporting equity, diversity, inclusion and reconciliation, including social/environmental certifications, workforce diversity and/or if owned/controlled by an equity-seeking demographic (including but not limited to non-profit, cooperative, Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ+ people).

<p>Majority owned/controlled/ by:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Women <input type="checkbox"/> Indigenous Peoples <input type="checkbox"/> Non-Profit/Charity (Social Enterprise) <input type="checkbox"/> Coop <input type="checkbox"/> Community Contribution Corporation (3C/CCC) <input type="checkbox"/> Ethno-cultural Persons <input type="checkbox"/> People with Disabilities <input type="checkbox"/> LGBTQ+ <input type="checkbox"/> Other: please indicate 	<p>Workforce Diversity:</p> <ul style="list-style-type: none"> % Women % Indigenous Peoples % Ethno-cultural People % People with Disabilities % LGBTQ+ % Other: please indicate 	<p>Social / Environmental Certifications</p> <ul style="list-style-type: none"> <input type="checkbox"/> BCorp <input type="checkbox"/> BuySocial <input type="checkbox"/> Supplier Diversity Certification <input type="checkbox"/> Fairtrade <input type="checkbox"/> Green Business Certification (ie. LEED, ClimateSmart) <input type="checkbox"/> Other: please indicate
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**APPENDIX 2
LEGAL TERMS AND CONDITIONS OF RFP**

1. APPLICATION OF THESE LEGAL TERMS AND CONDITIONS

These legal terms and conditions set out the City's and the Proponent's legal rights and obligations only with respect to the RFP proposal process and any evaluation, selection, negotiation or other related process. In no event will the legal terms and conditions of this Appendix 2 apply to, or have the effect of supplementing, any Contract formed between the City and the Proponent, or otherwise apply as between the Proponent and the City following the signing of any such Contract.

2. DEFINITIONS

In this Appendix 2, the following terms have the following meanings:

- (a) "City" means the City of Vancouver, a municipal corporation continued pursuant to the Vancouver Charter.
- (b) "Contract" means a legal agreement, if any, entered into between the City and the Proponent following and as a result of the Proponent's selection by the City in the City's RFP process.
- (c) "Losses" means, in respect of any matter, all direct or indirect, as well as consequential: claims, demands, proceedings, losses, damages, liabilities, deficiencies, costs and expenses (including without limitation all legal and other professional fees and disbursements, interest, penalties and amounts paid in settlement whether from a third person or otherwise).
- (d) "Proponent" means the legal entity which has signed the Proposal Form, and "proponent" means any proponent responding to the RFP, excluding or including the Proponent, as the context requires.
- (e) "Proposal" means the package of documents consisting of the Proposal Form (including this Appendix 2), the Proponent's proposal submitted under cover of the Proposal Form, and all schedules, appendices and accompanying documents, and "proposal" means any proposal submitted by any proponent, excluding or including the Proponent, as the context requires.
- (f) "Proposal Form" means Appendix 2 of the RFP, as completed and executed by the Proponent.
- (g) "RFP" means the document issued by the City as Request for Proposals No. PS20230002, as amended from time to time and including all addenda.

3. NO LEGAL OBLIGATION ASSUMED BY THE CITY

Despite any other term of the RFP or the Proposal Form, including this Appendix 2 (except only Sections 7, 8.2 and 10 of this Appendix 2, in each case to the extent applicable), the City assumes no legal duty or obligation to the Proponent or to any proposed subcontractor in respect of the RFP, its subject matter or the Proposal unless and until the City enters into a Contract, which the City may decline to do in the City's sole discretion.

4. NO DUTY OF CARE OR FAIRNESS TO THE PROPONENT

The City is a public body required by law to act in the public interest. In no event, however, does the City owe *to the Proponent or to any of the Proponent's proposed subcontractors* (as opposed to the public) any contract or tort law duty of care, fairness, impartiality or procedural fairness in the RFP process, or any contract or tort law duty to preserve the integrity of the RFP process. The Proponent hereby waives and releases the City from any and all such duties and expressly assumes the risk of all Losses arising from participating in the RFP process on this basis.

5. EVALUATION OF PROPOSALS

5.1 Compliance / Non-Compliance

Any proposal which contains an error, omission or misstatement, which contains qualifying conditions, which does not fully address all of the requirements or expectations of the RFP, or which otherwise fails to conform to the RFP may or may not be rejected by the City at the City's sole discretion. The City may also invite a proponent to adjust its proposal to remedy any such problem, without providing the other proponents an opportunity to amend their proposals.

5.2 Reservation of Complete Control over Process

The City reserves the right to retain complete control over the RFP and proposal processes at all times. Accordingly, the City is not legally obligated to review, consider or evaluate the proposals, or any particular proposal, and need not necessarily review, consider or evaluate the proposals, or any particular proposal, in accordance with the procedures set out in the RFP, and the City reserves the right to continue, interrupt, cease or modify its review, evaluation and negotiation processes in respect of any or all proposals at any time without further explanation or notification to any proponents.

5.3 Discussions/Negotiations

The City may, at any time prior to signing a Contract, discuss or negotiate changes to the scope of the RFP, any proposal or any proposed agreement with any one or more of the proponents without having any duty or obligation to advise the Proponent or to allow the Proponent to vary its Proposal as a result of such discussions or negotiations with other proponents or changes to the RFP or such proposals or proposed agreements, and, without limiting the general scope of Section 6 of this Appendix 2, the City will have no liability to the Proponent as a result of such discussions, negotiations or changes.

5.4 Acceptance or Rejection of Proposals

The City has in its sole discretion, the unfettered right to: accept any proposal; reject any proposal; reject all proposals; accept a proposal which is not the lowest-price proposal; accept a proposal that deviates from the requirements of the RFP or the conditions specified in the RFP; reject a proposal even if it is the only proposal received by the City; accept all or any part of a proposal; enter into agreements respecting the subject matter of the RFP with one or more proponents; or enter into one or more agreements respecting the subject matter of the RFP with any other person at any time.

6. PROTECTION OF CITY AGAINST LAWSUITS

6.1 Release by the Proponent

Except only and to the extent that the City is in breach of Section 8.2 of this Appendix 2, the Proponent now releases the City, its officials, its agents and its employees from all liability for any Losses incurred in connection with the RFP or the Proposal, including any Losses in connection with:

- (a) any alleged (or judicially determined) breach by the City or its officials, agents or employees of the RFP (it being agreed that, to the best of the parties' knowledge, the City has no obligation or duty under the RFP which it could breach (other than wholly unanticipated obligations or duties merely alleged or actually imposed judicially));
- (b) any unintentional tort of the City or its officials or employees occurring in the course of conducting the RFP process,
- (c) the Proponent preparing and submitting the Proposal;
- (d) the City accepting or rejecting the Proposal or any other submission; or

- (e) the manner in which the City: reviews, considers, evaluates or negotiates any proposal; addresses or fails to address any proposal or proposals; resolves to enter into a Contract or not enter into a Contract or any similar agreement; or the identity of the proponent(s) or other persons, if any, with whom the City enters any agreement respecting the subject matter of the RFP.

6.2 Indemnity by the Proponent

Except only and to the extent that the City breaches Section 8.2 of this Appendix 2, the Proponent indemnifies and will protect, save and hold harmless the City, its officials, its agents and its employees from and against all Losses, in respect of any claim or threatened claim by the Proponent or any of its proposed subcontractors or agents alleging or pleading:

- (a) any alleged (or judicially determined) breach by the City or its officials or employees of the RFP (it being agreed that, to the best of the parties' knowledge, the City has no obligation or duty under the RFP which it could breach (other than wholly unanticipated obligations or duties merely alleged or actually imposed judicially));
- (b) any unintentional tort of the City or its officials or employees occurring in the course of conducting the RFP process, or
- (c) liability on any other basis related to the RFP or the proposal process.

6.3 Limitation of City Liability

In the event that, with respect to anything relating to the RFP or this proposal process (except only and to the extent that the City breaches Section 8.2 of this Appendix 2), the City or its officials, agents or employees are found to have breached (including fundamentally breached) any duty or obligation of any kind to the Proponent or its subcontractors or agents whether at law or in equity or in contract or in tort, or are found liable to the Proponent or its subcontractors or agents on any basis or legal principle of any kind, the City's liability is limited to a maximum of \$100, despite any other term or agreement to the contrary.

7. DISPUTE RESOLUTION

Any dispute relating in any manner to the RFP or the proposal process (except to the extent that the City breaches this Section 7 or Section 8.2 of this Appendix 2, and also excepting any disputes arising between the City and the Proponent under a Contract (or a similar contract between the City and a proponent other than the Proponent)) will be resolved by arbitration in accordance with the *Commercial Arbitration Act* (British Columbia), amended as follows:

- (a) The arbitrator will be selected by the City's Director of Legal Services;
- (b) Section 6 of this Appendix 2 will: (i) bind the City, the Proponent and the arbitrator; and (ii) survive any and all awards made by the arbitrator; and
- (c) The Proponent will bear all costs of the arbitration.

8. PROTECTION AND OWNERSHIP OF INFORMATION

8.1 RFP and Proposal Documents City's Property

- (a) All RFP-related documents provided to the Proponent by the City remain the property of the City and must be returned to the City, or destroyed, upon request by the City.

- (b) The documentation containing the Proposal, once submitted to the City, becomes the property of the City, and the City is under no obligation to return the Proposal to the Proponent.

8.2 Proponent's Submission Confidential

Subject to the applicable provisions of the *Freedom of Information and Protection of Privacy Act* (British Columbia), other applicable legal requirements, and the City's right to publicly disclose information about or from the Proposal, including without limitation names and prices, in the course of publicly reporting to the Vancouver City Council about the RFP, the City will treat the Proposal (and the City's evaluation of it), in confidence in substantially the same manner as it treats its own confidential material and information.

8.3 All City Information Confidential

- (a) The Proponent will not divulge or disclose to any third parties any non-public documents or information concerning the affairs of the City which have been or are in the future provided or communicated to the Proponent at any time (whether before, during or after the RFP process). Furthermore, the Proponent agrees that it has not and must not use or exploit any such non-public documents or information in any manner, including in submitting its Proposal.
- (b) The Proponent now irrevocably waives all rights it may have by statute, at law or in equity, to obtain any records produced or kept by the City in evaluating its Proposal (and any other submissions) and now agrees that under no circumstances will it make any application to the City or any court for disclosure of any records pertaining to the receipt, evaluation or selection of its Proposal (or any other submissions) including, without limitation, records relating only to the Proponent.

9. NO CONFLICT OF INTEREST / NO COLLUSION / NO LOBBYING

9.1 Declaration as to no Conflict of Interest in RFP Process

- (a) The Proponent confirms and warrants that there is no officer, director, shareholder, partner, employee or contractor of the Proponent or of any of its proposed subcontractors, or any other person related to the Proponent's or any proposed subcontractor's organization (a "person having an interest") or any spouse, business associate, friend or relative of a person having an interest who is: (i) an official or employee of the City; or (ii) related to or has any business or family relationship with an elected official or employee of the City, in each case, such that there could be any conflict of interest or any appearance of conflict of interest in the evaluation or consideration of the Proposal by the City, and, in each case, except as set out, in all material detail, in the section titled "Conflicts; Collusion; Lobbying" in the Proposal Form.
- (b) The Proponent confirms and warrants that there is no person having an interest (as defined above) who is a former official, former employee or former contractor of the City and who has non-public information relevant to the RFP obtained during his or her employment or engagement by the City, except as set out, in all material detail, in the section titled "Conflicts; Collusion; Lobbying" in the Proposal Form.

9.2 Declaration as to No Conflict of Interest Respecting Proposed Supply

The Proponent confirms and warrants that neither the Proponent nor any of its proposed subcontractors is currently engaged in supplying (or is proposing to supply) goods or services to a third party such that entering into an agreement with the City in relation to the subject matter of the RFP would create a conflict of interest or the appearance of a conflict of interest between the Proponent's duties to the City and the Proponent's or its subcontractors' duties to such third party, except as set out, in all material detail, in the section titled "Conflicts; Collusion; Lobbying" in the Proposal Form.

9.3 Declaration as to No Collusion

The Proponent confirms and warrants that:

- (a) the Proponent is not competing within the RFP process with any entity with which it is legally or financially associated or affiliated, and
- (b) the Proponent is not cooperating in any manner in relation to the RFP with any other proponent responding to the RFP,

in each case, except as set out, in all material detail, in the section titled “Conflicts, Collusion, Lobbying” in the Proposal Form.

9.4 Declaration as to Lobbying

The Proponent confirms and warrants that:

- (a) neither it nor any officer, director, shareholder, partner, employee or agent of the Proponent or any of its proposed subcontractors is registered as a lobbyist under any lobbyist legislation in any jurisdiction in Canada or in the United States of America; and
- (b) neither it nor any officer, director, shareholder, partner, employee or agent of the Proponent or any of its proposed subcontractors has engaged in any form of political or other lobbying whatsoever with respect to the RFP or sought, other than through the submission of the Proposal, to influence the outcome of the RFP process,

in each case as set out, in all material detail, in the section titled “Conflicts, Collusion, Lobbying” in the Proposal Form.

10. GENERAL

- (a) All of the terms of this Appendix 2 to this Proposal Form which by their nature require performance or fulfillment following the conclusion of the proposal process will survive the conclusion of such process and will remain legally enforceable by and against the Proponent and the City.
- (b) The legal invalidity or unenforceability of any provision of this Appendix 2 will not affect the validity or enforceability of any other provision of this Appendix 2, which will remain in full force and effect.
- (c) The Proponent now assumes and agrees to bear all costs and expenses incurred by the Proponent in preparing its Proposal and participating in the RFP process.

APPENDIX 3
SAMPLE FORM OF AGREEMENT



PS20230002 - SERVICES CONTRACT

City of Vancouver (the “City”)

AND: <[legal name of other party]> (the “Contractor”)

having the following address:

453 West 12th Avenue

Vancouver, British Columbia, Canada

V5Y 1V4

Tel Number: [phone number of project manager]

Email: [email address of the project manager]

having the following address:

[address of other party]

Tel Number: [phone number]

Email: [email address]

Name of City Project Manager: []

This contract for services is comprised of this cover page, the following parts A, B, C, D and E, the attached Services Contract Terms and Conditions, and any other attachments, schedules, appendices or annexes expressly referred to in the aforementioned parts A, B, C, D and E, and the signature blocks following Part F below. By signing below, the City and the Contractor hereby agree to be bound by the terms of this contract.

PART A - SERVICES:

<  *Insert description.* >

[Note: Describe in detail what the services are, where they will be performed, who will be performing them, etc. Whenever necessary, supplement with a Schedule A further describing the services, as well as any delivery/performance schedule, milestones, etc.]

The Services are further described in Schedule A. <  **Delete if not included.** >

Start date for the Services: <  > (the "Start Date")

The Contractor agrees to complete the Services by: <  >

PART B - FEES AND EXPENSES:

Billing Date(s): See Section 20 of the Services Contract Terms and Conditions

Fees: <description>

[Insert description of fees and state which taxes will be charged in addition to the fees and/or which taxes are included in the fees.]

Definitions:

“GST” means the tax payable and imposed pursuant to Part IX of the Excise Tax Act (Canada), as amended or replaced from time to time.

Expenses: [Tick applicable ONE; tick one.]

- Reimbursable by the City but only in accordance with this Contract (see the Services Contract Terms and Conditions); or
- Not reimbursable (included in fees)

“PST” means the provincial sales tax payable and imposed pursuant to the Provincial Sales Tax Act (British Columbia), as amended or replaced from time to time.

Maximum Amount of Fees and Expenses (the “Maximum Amount”):

<description>

[Insert description of cap and state which taxes will be charged on top of the cap and/or which taxes are to be included in the cap.]

The fees and expenses are further described in Schedule B.

[Delete if not included.]

PART C: APPROVED SUBCONTRACTORS

<description> [Provide names or write “None”.]

PART D: INSURANCE

Without limiting any of its obligations or liabilities under this Services Contract, the Contractor will obtain and continuously carry and will cause its subcontractors to obtain and continuously carry during the term of the Services Contract at its own expense and cost, the following insurance coverages with minimum limits of not less than those shown in the respective items set out below:

- (a) Commercial general liability insurance with a limit of not less than \$5,000,000 per occurrence and a deductible of not more than \$5,000 or other such amounts as the City may approve from time to time, protecting the Contractor and the Contractor's personnel against all claims for bodily injury including death, personal injury, advertising liability, products liability, sudden & accidental pollution, completed operations, or property damage or loss, arising out of the operations of the Contractor or the actions of the Contractor or the Contractor's personnel. The policy will carry blanket contractual liability coverage, include a cross-liability clause in favour of the City, and will name the City and the City's officials, officers, employees and agents as additional insureds;
- (b) All-risks property insurance covering the Contractor's property of every description containing a provision in which the insurer waives all rights which it may acquire by payment of a claim to recover the paid amount from the City or its officials, officers, employees or agents; and
- (c) Automobile insurance covering all vehicles owned, leased, rented or operated by the Contractor in connection with this Services Contract, including third party legal liability insurance in an amount not less than \$5,000,000 per occurrence, or such other amount as the City may approve from time to time.

The Contractor and each of its subcontractors will provide at its own cost other lines of insurance coverages, endorsements, or increased limits of insurance as deemed necessary by the City and as a reasonable and prudent contractor would require to protect their operations or performance of services.

All insurance policies required by this Services Contract shall be with insurers duly authorized to carry on business in the Province of British Columbia, in a form and in amounts satisfactory from time to time and acceptable to the City's Director of Risk Management.

The required insurance shall not be cancelled or endorsed to reduce the limits of liability without thirty (30) days' written notice by registered mail to the City. Should the policy be endorsed to restrict coverage midterm, written notice of such restriction will be provided by registered mail to the City no later than the effective date of change; the exception is cancellation for non-payment of premiums in which case the applicable statutory conditions will apply. Notice must identify the contract title, number, policy holder, and scope of work.

The Contractor's insurance policy (policies) shall be primary with respect to all claims arising out of the operations of the Contractor. Any insurance or self-insurance maintained by or on behalf of the City or its officials, officers, employees, or agents will be excess of the Contractor's insurance and will not contribute to it.

Neither the providing of insurance by the Contractor in accordance with this Agreement, nor the insolvency, bankruptcy or the failure of any insurance company to pay any claim accruing will be held to relieve the Contractor from any other provisions of the Services Contract with respect to liability of the Contractor or otherwise.

Prior to the Start Date, the Contractor will provide the City with evidence of all required insurance in the form of a certificate of insurance satisfactory to the City. The certificate of insurance will identify the contract title, number, policyholder, and scope of work. The Contractor will provide proof of insurance, in the form of a certificate of insurance or certified copies of all insurance policies to the Manager, Contracts and Administration at any time immediately upon request.

The Contractor will provide in its agreements with its subcontractors clauses in the same form as in this Part D. Upon request, the Contractor will deposit with the City detailed certificates of insurance for the policies it has obtained from its subcontractors and a copy of the applicable insurance clauses from its sub-contract agreements.

PART E: ADDITIONAL TERMS

<☒> [Describe or write "None".]

The following are integral parts of this Services Contract:

- <☒name of first schedule>;
- <☒name of second schedule>; and
- <☒name of third schedule>.

[Delete if no attachments.]

The parties hereto have duly executed this Contract as of the <☒> day of <☒month>, 20<☒year>.

SIGNED AND DELIVERED on behalf of the City by its authorized signatory(ies):

Per: _____

[Name and Title]

SIGNED AND DELIVERED on behalf of the Contractor by its authorized signatory(ies):

Per: _____

[Name and Title]

SERVICES CONTRACT TERMS AND CONDITIONS

A. CONTRACTOR'S OBLIGATIONS

1. **Performance of Services.** The Contractor agrees to provide the City with the services described in PART A (and in any schedule referred to therein), including, without limitation, and to the extent not expressly described in PART A (or in any such schedule), all services necessary or incidental to the completion of the services contemplated and described therein (the "Services"), all in accordance with the Services Contract (this "Contract"). The Contractor must provide the Services commencing on the Start Date described in PART A and in accordance with the delivery schedule (if any) specified in PART A (or in any schedule referred to therein), regardless of the date of execution or delivery of this Contract. The Contractor must comply with the City's instructions in performing the Services, but unless otherwise specified herein, the Contractor shall at all times retain control over the manner in which those instructions are carried out.
2. **Provision of Service Inputs.** Unless otherwise specified herein, the Contractor must supply and pay for all labour, materials, permits and approvals (including from any relevant government authority) necessary or advisable to provide the Services.
3. **Standard of Care and Applicable Laws.** The Contractor must perform the Services to the standard of care, skill, and diligence prescribed herein, or where not prescribed herein, to the standard customarily maintained by persons providing, on a commercial basis, services similar to the Services, and in accordance with all statutes, regulations, by-laws, codes, rules, notices, orders, directives, standards and requirements of every competent federal, provincial, regional, municipal and other statutory authority applicable to the Contractor and its personnel and the Services.
4. **Warranty.** Without limitation to any additional warranties provided by the Contractor, whether indicated on the face of this contract or otherwise provided, the Contractor warrants that: (a) all goods, provided by the Contractor in connection with its performance of the Services ("Goods"), shall be of merchantable quality and free from defects in workmanship and materials; (b) all Goods shall strictly conform to applicable samples, specifications and drawings; (c) all Goods and Services shall be fit for the purpose intended by the City; (d) all Goods shall be free and clear of all liens, charges and encumbrances; (e) the Goods and Services shall comply with the standards set forth by applicable federal, provincial, municipal and industry regulatory agencies; (f) the shipping and handling of any hazardous material will be made in accordance with all applicable laws and regulations; and (g) the Goods and Services shall comply with all applicable environmental protection laws and regulations.

Unless a longer warranty period is specified on the face of this Contract or is otherwise provided, the foregoing warranty shall be valid for one year from the date of acceptance of the Goods and Services by the City. If at any time prior to the expiration of any applicable warranty period, any weakness, deficiency, failure, breakdown or deterioration in workmanship or material should appear or be discovered in the Goods and Services furnished by the Contractor, or if the Goods and Services do not conform to the terms and conditions of this Contract, the City may at its option (a) require the Contractor to promptly replace, redesign or correct the defective and non-conforming Goods and Services at no expense to the City, or (b) the City may replace or correct the defective Goods and Services and charge the Contractor with all expenses incurred by the City. The Contractor agrees to indemnify and save harmless the City, its officials, officers, employees, assigns, agents, clients and the public from any liability, loss, cost and expense arising either directly or indirectly, from breach of any warranty given by the Contractor hereunder.

5. **Contractor Personnel.** The Contractor must ensure that all persons it employs or retains to perform the Services are competent to perform them and are properly trained, instructed, and supervised, and that all such persons comply with the provisions of this Contract.
6. **Reporting.** The Contractor must, upon the City's request, fully report to the City on all work it does or has done in connection with providing the Services.
7. **Deliverables.** As a result of or as part of providing the Services, the Contractor may receive, create, produce, acquire or collect items including, without limitation, products, goods, equipment, supplies, models, prototypes and other materials; information and data; reports, drawings, plans, designs, depictions, specifications and other documentation (collectively, "Deliverables"). Deliverables do not include items that are: not required to be produced by the Contractor or supplied to the City as part of or together with the Services unless the City pays for such items; or specified in this Contract as being excluded from the Deliverables category; or items which pre-existed the effective date of this Agreement that are owned by a third party or that are used by the Contractor as part of the services provided to any of its other customers. All Deliverables will be owned solely by the City unless otherwise expressly provided herein and the City will have the complete right to use and deal with the Deliverables for its own benefit in any way it sees fit without limitation. The Contractor waives, in favour of the City, all moral rights in the Deliverables, transfers to the City, free of all liens and encumbrances, ownership of each Deliverable, and assigns all of its world-wide present and future rights, title and interest in and to each Deliverable, including copyright, effective as of the date of creation or acquisition of such Deliverable. The Contractor will permit the City to inspect and copy all Deliverables.
8. **Confidentiality.** The Contractor acknowledges that, in performing the Services required under this Contract, it may acquire information about matters which are confidential to the City, which information is the exclusive world-wide property of the City or its suppliers or citizens, as the case may be. The Contractor undertakes to treat as confidential all Deliverables and all information received by reason of its position as Contractor and agrees not to disclose the same to any third party either during or after the performance of the Services under this Contract, without the City's express prior written consent.
9. **Insurance.** The Contractor must provide, maintain and pay for, and cause all subcontractors to provide, maintain and pay for, the insurance coverage (if any) described in PART D (including the type and form of policy, the coverage amounts, and the amount of deductible). If no insurance coverage is specified in PART D, the Contractor must provide, maintain and pay for, and cause all subcontractors to provide, maintain and pay for, such insurance as would be obtained by a prudent consultant or contractor providing services similar to the Services. The Contractor must provide written proof of such insurance coverage upon the written request of the City.
10. **WorkSafeBC.** The Contractor agrees that it will procure and carry and pay for, full WorkSafeBC coverage for itself and all workers, employees, servants and others engaged in or upon any work or service which is the subject of this Contract. The Contractor agrees that the City has the unfettered right to set off the amount of the unpaid premiums and assessments for such WorkSafeBC coverage against any monies owing by the City to the Contractor. The City will have the right to withhold payment under this Contract until the WorkSafeBC premiums, assessments or penalties in respect of work done or services performed in fulfilling this Contract have been paid in full. The Contractor will provide the City with the Contractor's and each subcontractor's WorkSafeBC registration number and clearance letters from WorkSafeBC confirming that the contractor and each subcontractor is in good standing with WorkSafeBC prior to the City having any obligation to pay monies under this Agreement.

Whenever the Contractor is required or permitted to perform any Services on any City sites, the Contractor is now appointed and now accepts appointment as the "prime contractor" in connection with such Services and will fulfil its obligations as Prime Contractor in accordance with the Workers Compensation Act (British Columbia), and the regulations thereunder, and the Contractor shall comply with all applicable health and safety laws.

11. **City Business Licence.** The Contractor will maintain a valid City of Vancouver business licence in good standing throughout the duration of this Contract.
12. **Resolution of Disputes.** This Contract will be governed by the laws of British Columbia and the parties now irrevocably attorn to the exclusive jurisdiction of, and agree to submit all disputes to, the courts of British Columbia for resolution. The Contractor shall continue performance of its obligations under this Contract notwithstanding the existence of a dispute.
13. **Independent Contractor.** This Contract is a contract for services and neither the Contractor nor the Contractor's personnel or permitted subcontractors, are, or deemed to be, partners, appointees, employees or agents of the City. The Contractor will not represent to anyone that the Contractor has any authority to bind the City or that the Contractor is an employee or agent of the City.
14. **No Assignment or Subcontracting.** The Contractor will not assign or subcontract (other than to persons listed in PART C (or a schedule referred to therein)), either directly or indirectly (including, without limitation, by way of any transfer of control of the shares or ownership interests in the Contractor), this Contract or any right or obligation of the Contractor under this Contract, without the prior written consent of the City, which consent may be arbitrarily withheld. No assignment or subcontract, whether consented to or not, relieves the Contractor from any obligations under this Contract. The Contractor must ensure that any assignee or subcontractor fully complies with this Contract in performing the Services and nothing in this Contract creates any contractual relationship between a subcontractor and the City.
15. **Conflict of Interest.** The Contractor must not provide any services to any person in circumstances which, in the City's reasonable opinion, could give rise to a conflict of interest between its duties to that person and its duties to the City under this Contract.

16. **Release and Indemnification**

a. Release

The Contractor now releases the City and the City's personnel from all losses including those caused by personal injury, death, property damage or loss, and economic loss, arising out of, suffered or experienced by the Contractor or the Contractor's personnel in connection with their performance of the Services.

b. Acceptance "As Is"

In undertaking the Services, the Contractor acknowledges that it has inspected the City's site(s), agrees to accept the site(s) "as-is" and undertakes to take all precautions necessary to ensure the safety of all the Contractor's personnel.

c. Indemnity

Despite any insurance which may be placed by the City, the Contractor now agrees to indemnify and save harmless the City and its officials, officers, employees, agents, successors, assigns and authorized representatives (in each case, an "Indemnified Party") from and against all costs, losses, claims, damages, actions and causes of action ("Claims") that an Indemnified Party may sustain, incur, suffer or be put to at any time either before or after the completion of the Services or sooner cancellation of this Contract, that arise out of any act or failure to act of the Contractor or the Contractor's personnel, permitted assignees or subcontractors in connection with the performance of this Contract, including any Claims that arise out of or are in any way related to unpaid WorkSafeBC assessments or the failure to observe safety rules, regulations and practices of WorkSafeBC, excepting always that this indemnity does not apply to the extent, if any, to which the Claims are caused by errors, omissions or negligent acts of an Indemnified Party.

d. Separate from Other Remedies and Rights

Nothing in this Contract (including this indemnity) will affect or prejudice the City from exercising any other rights that may be available to it at law or in equity.

e. Survival of Release/Indemnity

This Section 16 will survive the expiry or sooner termination of this Contract.

B. CHANGES TO SERVICES

17. **Changes.** The City may, at any time and from time to time and without invalidating this Contract, require a change to the Services and/or to the schedule for the delivery of the Services. Should the Contractor consider that any such request or instruction constitutes a change warranting amendment of the Maximum Amount, another price or the schedule for the Services set forth in the Contract, the Contractor must advise the City in writing prior to acting on any such request or instruction, and in any event within five (5) City of Vancouver business days of such request or instruction. In that case, the Maximum Amount, other price and/or schedule will be adjusted, if/as agreed to by both parties in writing, and failing agreement, if/as the City may determine, acting reasonably. Failing any such adjustment, the Services provided pursuant to the request or instruction will be deemed to be included within the prices specified herein, and to be subject to the schedule prescribed herein.

18. **Changes to Key Personnel.** The City may from time to time request reasonable changes to the key personnel of the Contractor engaged in performing the Services, and the Contractor shall comply with any such request. The Contractor shall not change any of such key personnel without the prior written approval of the City, which approval will not be unreasonably withheld.

C. PAYMENT

19. **Payment of Fees and Expenses.** In consideration for the satisfactory performance of the Services, The City will pay to the Contractor the fees specified in PART B (as supplemented by any schedule referred to therein), subject to this Section C. In addition, if the parties have specified in PART B that the Contractor's expenses are reimbursable in accordance with this Contract, the City will reimburse the Contractor for all expenses that: (i) are approved by the City in writing (in accordance with the City's existing policies and procedures for expense reimbursement) prior to their being incurred by the Contractor; (ii) are necessary, in the opinion of the City, to perform the Services; and (iii) are supported by proper receipts or other documentation satisfactory to the City (acting reasonably), provided always that the City reserves the right to make arrangements through its service providers for any flights and/or accommodations required by the Contractor in connection with its performance of the Services. If a "Maximum Amount" is specified in Part B, then the City is not, and shall not be, obliged to pay to the Contractor more than such Maximum Amount on account of aggregate fees (and, if applicable, expenses). Payment terms are "net 30 days" from the date of receipt of a valid invoice.

20. **Invoicing.** The Contractor will, by the 25th day of each month, provide to the City's Project Manager (named on the cover page of this Contract) a draft invoice with an attached detailed account of all charges to be claimed by the Contractor for the preceding month. The City's Project Manager shall review the draft, raise any concerns with the Contractor within ten working days and, after settlement of any issues (in the Project Manager's discretion), approve the draft invoice. The Contractor, if so requested, will meet with the City's Project Manager to expedite and settle the draft invoice. The Contractor will submit its final invoice, as per the approved draft invoice, to the City of Vancouver, Attention: Accounts Payable, by email to APInvoice@vancouver.ca. Each invoice must contain:

- Contractor name, address and telephone;
- City purchase order number;
- Name of the City's Project Manager;
- Invoice number and date;
- Details of any applicable taxes; and
- Tax registration number(s).

21. **Builders Lien Act.** If the Services to be performed under this Contract are subject to the holdback requirements set out in the *Builders Lien Act* (British Columbia) (the "Lien Act"), the City will withhold and discharge the required holdback amounts in accordance with the requirements set out in the Lien Act.

22. **Discharge of Liens and Withholding.** The Contractor will, if applicable, make payment and take all other steps which may be necessary so that no lien claims, including lien claims made under the Lien Act, are made in connection with the provision of the Services, and that the compensation payable to the Contractor by the City is not subject to attachment for debt, garnishing process or otherwise. In the event that any lien is filed in connection with the provision of the Services at any court or land title office, the Contractor shall immediately cause such lien to be discharged. The City may withhold from any payment due to the Contractor an amount sufficient to indemnify the City against any lien claim that could arise in connection with the provision of the Services, until such time as the lien has been discharged or other arrangements to satisfy such lien have been made by the Contractor.

23. **Withholding for Non-Residents.** If the Contractor is a non-resident of Canada, the City may withhold from any payment due to the Contractor such amounts as may be required to be withheld pursuant to the applicable provisions of the Canada *Income Tax Act* (the "ITA"). Any amount so withheld shall be remitted to the Receiver General for Canada or otherwise dealt with by the City strictly in accordance with the provisions of the ITA.

24. **Record Keeping.** The Contractor must maintain, and shall cause any subcontractors to maintain, time records and books of account, invoices, receipts, and vouchers of all expenses incurred, in form and content satisfactory to the City. The City or any of its authorized representatives will, for the purposes of audit and examination, have access and be permitted, upon reasonable notice to the Contractor, to inspect such records for review, copy and audit at any time and from time to time while this Contract is in effect and for a period of three years after the expiry or termination of this Contract for any reason.

25. **Currency.** Unless otherwise specified in this Contract, all references to money are to Canadian dollars.

26. **Electronic Funds Transfer.** The City expects to make payments by electronic funds transfer and the Contractor must provide banking information to the City in order to permit this.

D. GENERAL

27. **Time for Performance.** Time is of the essence in this Contract.
28. **Amendments.** No modification of this Contract is effective unless it is in writing and signed by all the parties.
29. **Entire Agreement.** This Contract constitutes the entire agreement between the parties as to performance of the Services, and replaces and supersedes any other agreements, correspondence or other discussions between the parties, whether or not any of the foregoing have been reduced to writing.
30. **Conflict.** If there is a conflict between a provision of a schedule to this Contract and the terms and conditions of this Services Contract, the provision in the relevant schedule is inoperative to the extent of the conflict unless it states that it operates despite a conflicting provision of this Contract.
31. **Severability.** If any provision of this Contract is determined to be void or unenforceable, in whole or in part, it shall not be deemed to affect or impair the enforceability or validity of any other provision of this Contract, and any such void or unenforceable provision may be severed from this Contract without affecting the remainder of the Contract.
32. **Termination.** The City may terminate this Contract:
- a. Upon failure of the Contractor to comply with this Contract, immediately on giving written notice of termination to the Contractor, or
 - b. For any other reason, on giving at least 10 days' written notice of termination to the Contractor.

If the City terminates this Contract under paragraph b. above, the City must pay the Contractor that portion of the fees and expenses described in PART B which equals the portion of the Services that was completed to the City's satisfaction before termination. That payment discharges the City from all liability to the Contractor under this Contract. If the Contractor fails to comply with this Contract, the City may terminate it and pursue other remedies as well.

33. **Binding Effect.** This Contract shall be binding on the Contractor's successors and permitted assigns and shall enure to the benefit of any successors and assigns of the City.
34. **Voluntary Agreement.** The Contractor acknowledges and declares that it has carefully considered and understood the terms of this Contract, that it has either consulted legal counsel or waived such right, and that it is executing this Contract voluntarily.
35. **Further Assurances.** The Contractor agrees that upon any reasonable request of the City, the Contractor will make, do, execute or cause to be made, done or executed all such other acts as may be required to more fully give effect to the terms and conditions hereof.
36. **Headings.** The headings used in the Parts and sections of this Contract are for convenience of reference only, and shall not operate to expand, modify or interpret the language therein.
37. **Counterparts.** This Contract may be executed in one or more counterparts, including by facsimile or other electronic transmission, and each of such counterparts shall be deemed to be taken together to constitute one and the same original document.
38. **Additional Terms:** The additional terms set out in Part E (or in any schedule referred to therein) apply to this Contract. **END OF TERMS AND CONDITIONS OF SERVICES CONTRACT**

[Add schedules.]

From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Enright, Patrick" <Patrick.Enright@vancouver.ca>](mailto:Patrick.Enright@vancouver.ca)
Date: 1/15/2025 6:44:00 PM
Subject: EMGs update - corridor pressurization

Hi Patrick,

The change in weather files from CWEC 2016 to NRC GW 1.0 results in very minor absolute changes to TEDI and TEUI, based on Focal's modelling of 12 buildings ranging from residential to office and hotel (p 22 of Final Draft v3).

s.13(1)



This comparison would suggest that there is little reason to reduce the corridor pressurization adjustment to balance out TEDI changes due to weather files.

From an overheating prevention perspective, reducing the effective TEDI limit via the corridor pressurization adjustment is likely to be neutral on thermal safety outcomes. Thermal safety should be addressed separately through overheating limits or prescriptive requirements on WWR or shading, to be resolved as part of the "Balanced Thermal Resilience" research project.

A focus group was assembled in April 2024 to help us understand potential unintended consequences to fire safety by reducing the corridor pressurization adjustment. This group confirmed that corridor pressurization is not to be considered a fire/smoke control strategy, meaning any changes to the corridor pressurization adjustment in energy compliance should not have indirect impacts on the fire safety of MURBs. Corridor pressurization is still a prevalent industry practice in 2024, with most projects settling around 20CFM/door or less as the current rule of thumb. Whether that is an effective air volume to control the movement of pests and odours in the context of more airtight and compartmentalized MURB construction is still an open question best left to researchers, and it may not be the best use of the EMGs to attempt to shift this practice at this time.

Based on the research and analysis carried out over the course of 2023-2024, I recommend that we can leave the TEDI and TEUI adjustment for corridor pressurization at 10.

Changes to the GHGI adjustment may warrant a separate discussion, as 17% of projects are able to

receive a GHGI reduction between 1.0 and 1.9 due to this adjustment when using gas fired corridor ventilation systems. Compared against current GHGI limits of 3 to 4 kgCO₂e/m²/yr, this adjustment may create a significant loophole. Under previous GHGI limits of 6 to 14 for residential, this adjustment was not as significant. It may be worth limiting the GHGI reduction to 1.0 or 1.5 to partly align with the reduction in GHGI since the introduction of the corridor pressurization adjustment in 2017. Let me know if you would like to discuss.

Thanks,
Charling

Charling Li, P.Eng., M.Urb. | Green Building Engineer
(she/her/hers)
Green & Resilient Buildings Branch | Sustainability Group | City of Vancouver
Charling.Li@vancouver.ca | 604.871.6833

For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̓əm (Musqueam), Skwx̓ʷu817_wú7mesh (Squamish), and səllwətaʔ / səllwutlh (Tsleil-Waututh) nations.

From: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
To: "Li, Charling" <charling.li@vancouver.ca>
Date: 4/1/2025 4:23:29 PM
Subject: Enright, Patrick replied to a comment in "PDS - SUS - Energy Modelling Guidelines v3.0 for Council 20250415 - IN PROGRESS"
Attachments: AttachedImage (5)



PDS - SUS - Energy Modelling Guidelines



LC

You left a comment

Maybe we just delete this whole paragraph altogether, since v2.0 aligns with 2019 VBBL, and for 2025 VBBL there should be no circumstance where there are uncooled residential buildings.

EP

Enright, Patrick replied

Yes, I agree, it makes sense to delete 4.1. for our purposes. It does leave a potential gap for daycares, but as you say above, this doesn't apply to group A, B, or F, and this will be most closely aligned with the BCBC. But do some other AHJs use this for zoning req'ts or something? I don't know if anyone needs it anymore

s.13(1)



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From: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
To: ["Roberto Pecora" <roberto@zebx.org>](mailto:roberto@zebx.org)
CC: ["Williams, Scott B OHCS:EX" <Scott.B.Williams@gov.bc.ca>](mailto:Scott.B.Williams@gov.bc.ca)
["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
Date: 7/24/2023 8:20:23 AM
Subject: [EXT] RE: Calculating GHGI

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Hi Roberto,

Thanks for the email and your excellent points.

We've had similar conversations with Scott and Charling (hi both!) and this is being considered in the updates for CoV EMG v3, though of course it will be up to the City to decide.

We'll be presenting draft versions of the guideline updates shortly so will be sure to engage with you at that point.

Thanks!
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Roberto Pecora
Sent: Monday, July 24, 2023 8:00 AM
To: Susan MacDougall
Cc: Williams, Scott B OHCS:EX ; charling.li@vancouver.ca
Subject: Re: Calculating GHGI

Hi Susan,

During the B2E All-Member last week, I believe that Charling mentioned that Focal has been engaged by CoV to help evolve their EMGs. Coincidentally, for a while now, I've been trying to wrap my head around the CoV EMG's emissions factor adjustment formula when there's renewable power generated on-site (in seven increments). I *believe* that the BCBC now uses fixed EFs that remain constant regardless of whether a building generates renewable power or not. *It would be great if the CoV EMGs aligned with the BCBC in this regard.*

If I have my facts straight, then the Province's approach is simpler, more readily understood
f a large building is covered in PVs, even if it produces 7%

of the Site Electrical Energy Use, it will not be "zero-emissions" in reality ... and that's OK. Even with a non-variable EF, the GHGI would be very low for new (say Step 2 of 4, Step 3 of 5 for homes) all-electric or almost-all-electric buildings with PVs.

And ... by not adjusting the EF, we essentially place more of a burden on BC Hydro to decarbonize their grids and allow all buildings to reach an even lower GHGI, especially if the building sector keeps on using the term "zero-emissions." Possibly (dare to dream), it might actually make BC Hydro reconsider its maximum 100 kW net-metering maximum too.

For some background, see the thread below.

Happy to chat if you want.

Roberto

From: Roberto Pecora
Sent: Wednesday, May 24, 2023 4:23 PM
To: Williams, Scott B HOUS:EX
Subject: Re: Calculating GHGI

Hmmm. That's too bad. I was available tmrw. The closer the meeting is to the end of June, the fewer ppl might attend. I know lots of ppl taking a bit of time off in June.

From: Williams, Scott B HOUS:EX
Sent: Wednesday, May 24, 2023 3:05 PM
To: Roberto Pecora
Subject: RE: Calculating GHGI

Hi Roberto,

This is something that we were hoping to chat about in the upcoming Part 3 technical subco meeting. This was scheduled for tomorrow, but Toby has just requested that it be postponed. We will keep you posted regarding rescheduling.

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Housing
Phone: 236-478-2043 cell: 250-880-7712
Email: Scott.B.Williams@gov.bc.ca

From: Roberto Pecora
Sent: Wednesday, May 24, 2023 2:48 PM

To: Williams, Scott B HOUS:EX
Subject: Re: Calculating GHGI

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hi Scott,

Your comment today about how BSSB isn't totally aligned with the CoV EMGs when it comes to their EF adjustment approach intrigued/encouraged me. Can we chat about this in the next week or two?

Roberto

From: Roberto Pecora <roberto@zebx.org>
Sent: Thursday, April 13, 2023 7:48 AM
To: Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: Re: Calculating GHGI

Yes, of course I forgot to mention that I'm calculating it for projects with PV. I'm trying to wrap my head around 1.4.1 of the EMGs. I'll call you around 4pm.

From: Enright, Patrick <Patrick.Enright@vancouver.ca>
Date: Wednesday, April 12, 2023 at 7:15 PM
To: Roberto Pecora <roberto@zebx.org>
Subject: RE: Calculating GHGI

Hi Roberto,

I'm not sure what you mean by an offset approach. Happy to chat tomorrow afternoon anytime after 3pm if you want to give me a call.

GHGI is described very much like you described. Here is the equation from the [EMG's](#):

$$GHGI \left[\frac{kgCO_{2e}}{m^2a} \right] = \frac{\sum \left(Site \ Energy \ Use \left[\frac{kWh}{a} \right] \times Emissions \ Factor \left[\frac{kgCO_{2e}}{kWh} \right] \right)}{Modelled \ Floor \ Area \ [m^2]}$$

GHGI shall be reported in kg eCO_{2e}/m²a, where *a* represents year.

There is an adjustment factor for corridor pressurization which does affect the GHGI slightly, but this is small and we are moving to eliminate in the next version.

Note that if you're talking about PV and getting to really low or near-zero GHGI's, there probably are

some nuances worth talking about in the equation for GHGI, TEUI, and how emissions factor of electricity is adjusted based on PV generation.

Thanks,

Patrick Enright, P.Eng | Senior Green Building Engineer

(he/him/his)

Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver

patrick.enright@vancouver.ca | 604.871.6158

For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̓əm ([Musqueam \[musqueam.bc.ca\]](http://musqueam.bc.ca)), Sḵwxwú7mesh ([Squamish \[squamish.net\]](http://squamish.net)), and səliłwətaʔ / səliłwituł ([Tsleil-Waututh \[twnation.ca\]](http://tsleil-waututh.twnation.ca)) nations.

From: Roberto Pecora <roberto@zebx.org>

Sent: Wednesday, April 12, 2023 11:23 AM

To: Enright, Patrick <Patrick.Enright@vancouver.ca>

Subject: [EXT] FW: Calculating GHGI

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Hi Patrick,

Do you (or someone on your team) have 20m to walk me through the CoV EMGs GHGI calculation methodology. I feel like it uses an offset approach to GHGI and I'm trying to understand how/why. Phone or video is fine.

Roberto

From: Williams, Scott B HOUS:EX <Scott.B.Williams@gov.bc.ca>

Date: Wednesday, April 12, 2023 at 10:15 AM

To: Roberto Pecora <roberto@zebx.org>

Subject: RE: Calculating GHGI

Hi Roberto,

For Part 3, we reference the CoV EMGs for the calculation methodology.

So not as simple as taking the total gas used and electricity used and multiplying by the associated emissions factors.

The CoV EMGs have allowances for gas cook tops, fireplaces and supplementary fuel use for MUA units when heat pump technology is used.

So not necessarily applies to apples when taking into account the modeling ruleset.

For the case studies conducted, I assume that they may have used the Part3 Energy Design Report, in which case the GHGis would be included in the outputs of the tool.

Fundamentally, if you are using the methodology you proposed in your email, you will be most of the way there, but it just won't be exactly what is used for code compliance.

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Housing

Phone: 236-478-2043 cell: 250-880-7712

Email: Scott.B.Williams@gov.bc.ca

From: Roberto Pecora <roberto@zebx.org>

Sent: Wednesday, April 5, 2023 3:55 PM

To: Williams, Scott B HOUS:EX <Scott.B.Williams@gov.bc.ca>

Subject: Calculating GHGI

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hi Scott,

How do you calculate GHGI? What I've been doing for the case studies we're producing is:

FortisBC emissions factor x gas consumed in a year

plus

BC Hydro EF x electricity consumed in a year (net electricity use if the building has PV)

divided by

GFA

The CoV EMGs have a very different approach to GHGI (very much like an offset approach). Does BCBC reference the CoV's EMGs for GHGI calcs? PHPP has another approach too (based on treated floor area).

Thanks,

Roberto

From: "Eoghan Hayes" <ehayes@edgec.ca>
To: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
CC: "Martina Soderlund" <martina@reloadsustainable.com>
"McCall, Gregory" <Gregory.McCall@vancouver.ca>
"Li, Charling" <charling.li@vancouver.ca>
Date: 1/22/2026 4:50:57 PM
Subject: [EXT] RE: GFA/MFA

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Thank you, Patrick,

Much appreciated.

Best regards,

Eoghan Hayes, P.Eng, BEMP, RESET AP, LEED AP BD&C

Managing Director

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102–211 East Georgia St., Vancouver BC, V6A 1Z6



From: Enright, Patrick <Patrick.Enright@vancouver.ca>
Sent: November 22, 2022 9:49 AM
To: Eoghan Hayes <ehayes@edgec.ca>
Cc: Martina Soderlund <martina@reloadsustainable.com>; McCall, Gregory <Gregory.McCall@vancouver.ca>; Li, Charling <charling.li@vancouver.ca>
Subject: RE: GFA/MFA
Sensitivity: Confidential

Hi Eoghan,

Thanks for following-up. This is the response that I sent to others that inquired about this:

There seems to be good agreement that definition of MFA is clear on what spaces to include – all indoor spaces except parking. This was always intended to be the floor area as entered /modelled in the modelling software, so that the denominator of TEDI was coming from the same source as the heat loss take-offs that would go in the numerator of TEDI.

The challenges comes with the second half of the MFA definition, which requires that it be within 5% of gross floor area, unless otherwise justified. The intent of this was to place a limit on how much the modelled floor areas could deviate from the actual floor areas of the building, as shown on the architectural drawings. My understanding at the time of the writing

of the MFA definition was that gross floor area would refer to the total program area of the building, including below-grade spaces.

So my expectation is that modellers use the MFA as defined, and if that is not within 5% of gross floor area, they note what the differences are. This is intended as a check to help ensure modellers aren't padding their MFA, and has led us to this conversation.

I've also come to understand that the definition of gross floor area differs greatly from jurisdiction to jurisdiction, so it's not as helpful a benchmark of MFA as I once thought, especially when all of BC is considered. Perhaps it would be clearer if the MFA definition said, "The MFA must be within 5% of the ~~gross floor area from~~ corresponding areas as shown on the architectural drawings, unless justification is provided..." This is something we can explore with the next update to the guidelines.

Please let me know if there is anything else I can provide.

Sincerely,

Patrick Enright, P.Eng | Senior Green Building Engineer
(he/him/his)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
patrick.enright@vancouver.ca | 604.871.6158

For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

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From: Eoghan Hayes <ehayes@edgec.ca>
Sent: Monday, November 21, 2022 5:10 PM
To: Martina Soderlund <martina@reloadsustainable.com>; McCall, Gregory <Gregory.McCall@vancouver.ca>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: [EXT] RE: GFA/MFA
Sensitivity: Confidential

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Hi Patrick

As discussed, just following up on the COV response to this item.

Cheers
E

Best regards,
Eoghan Hayes, P.Eng, BEMP, RESET AP, LEED AP BD&C
Managing Director

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102-211 East Georgia St., Vancouver BC, V6A 1Z6



From: Martina Soderlund <martina@reloadsustainable.com>

Sent: November 16, 2022 1:48 PM

To: Eoghan Hayes <ehayes@edgec.ca>; 'McCall, Gregory' <Gregory.McCall@vancouver.ca>

Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>

Subject: RE: GFA/MFA

Sensitivity: Confidential

Thanks Eoghan for looping us in.

One thing that might be worth clarifying in the GFA definition in the guide is the line of GFA, exterior side or interior side of the thermal envelope.....

ASHRAE defines Gross Floor Area as including of the exterior wall area. Passive House as you know measure TFA at inside of exterior wall (and excluding other things so TFA is not comparable for other reasons).

Some people I have heard measure the middle point of exterior wall. This question comes up a lot and makes quite a difference of course...

A bulleting or definition update would be great for industry consistency!

Best regards,

Martina Soderlund, P.Eng., BEMP, LEED AP BD+C

T: 778-861-5666

E: martina@reloadsustainable.com

reLoad Sustainable Design Inc.

From: Eoghan Hayes <ehayes@edgec.ca>

Sent: November 16, 2022 11:04 AM

To: 'McCall, Gregory' <Gregory.McCall@vancouver.ca>

Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>; Martina Soderlund

<martina@reloadsustainable.com>

Subject: FW: GFA/MFA

Sensitivity: Confidential

FYI Greg and Patrick

Please read from the bottom up.

The definition of MFA is clear to me anyway. We can't go changing the goal posts because of a "reasonable argument" or bias. The language is clear and should not be open to interpretation just because a bike room is larger than they think it should be.

I also bounced this off Martina Soderlund from Reload, cc'd. she takes the same approach to us for MFA.

I think a bulletin on GFA with our approach noted below would be beneficial to get consistency , extract below.

"When we compare MFA to architectural GFA, we ensure they are inclusive of the same spaces. GFA is usually called out including only above grade spaces. In this scenario, we add the additional below grade spaces which we have included in the MFA to the GFA to have a fair comparison. Using this approach, we have not encountered issues with being within the 5% of architectural area in our models."

Best regards,

Eoghan Hayes, P.Eng, BEMP, RESET AP , LEED AP BD&C
Managing Director

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102-211 East Georgia St., Vancouver BC, V6A 1Z6



From: Eoghan Hayes

Sent: November 1, 2022 1:18 PM

To: Martina Soderlund <martina@reloadsustainable.com>

Subject: FW: GFA/MFA

Sensitivity: Confidential

Sent in confidence, read from bottom up. No action required for info and your take only.

Best regards,

Eoghan Hayes, P.Eng, BEMP, RESET AP , LEED AP BD&C
Managing Director

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102-211 East Georgia St., Vancouver BC, V6A 1Z6



From: Eoghan Hayes

Sent: November 1, 2022 11:36 AM

To: Farshid Bagheri (BCBS) <farshid@bcbuildingscience.com>; Susan MacDougall <susan@focaleng.com>

Cc: Chad Cranswick (BCBS) <Chad@bcbuildingscience.com>

Subject: RE: GFA/MFA

Hi Farshid

When we compare MFA to architectural GFA, we ensure they are inclusive of the same spaces. GFA is usually called out including only above grade spaces. In this scenario, we add the additional below grade spaces which we have included in the MFA to the GFA to have a fair comparison. Using this approach, we have not encountered issues with being within the 5% of architectural area in our models.

I hope this clarifies our approach.

Best regards,

Eoghan Hayes, P.Eng, BEMP, RESET AP , LEED AP BD&C

Managing Director

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102-211 East Georgia St., Vancouver BC, V6A 1Z6



From: Farshid Bagheri (BCBS) <farshid@bcbuildingscience.com>

Sent: November 1, 2022 11:20 AM

To: Eoghan Hayes <ehayes@edgec.ca>; Susan MacDougall <susan@focaleng.com>

Cc: Chad Cranswick (BCBS) <Chad@bcbuildingscience.com>

Subject: RE: GFA/MFA

Hi Susan / Eoghan,

Thanks for your inputs on this. It seems what you are explaining aligns with what our team has been doing.

We include all the below grade heating, lighting, fans etc in the simulation AND always keep the MFA withing GFA +/- 5%.

The only issue is Architects don't include the BG areas under their reported GFA and in some projects, if we include all the storage / bike etc rooms' areas in the MFA, then we end up deviating more than 5%.

I think Susan nailed it, the MFA is justifiable to include / exclude these areas and keep within 5% of GFA. The was justification is done is our issue in the current peer-review process that the other team is 16% deviant on GFA vs. MFA (MFA being 16% higher and relaxing TEDI by a lot).

They justify the deviant MFA is OK because of BG storage etc included, we justify the MFA to exclude these areas AND fall within 5%. Both models included heat, fan, lighting etc of those spaces.

Not sure what you'd do in this situation, the difference between the results are ~\$1 million and that's not something to ignore / resolve easily, we reached out to Patrick & Charling for clarifications.

Anyway, appreciate your inputs.

Regards,

s.15(1), s.22(1)

Farshid Bagheri, P.Eng., Ph.D., EA, CBCP
bcbuildingscience.com



From: Eoghan Hayes <ehayes@edgec.ca>
Sent: November 1, 2022 10:14 AM
To: Susan MacDougall <susan@focaleng.com>; Chad Cranswick (BCBS) <Chad@bcbuildingscience.com>
Cc: Farshid Bagheri (BCBS) <farshid@bcbuildingscience.com>
Subject: RE: GFA/MFA

Hi Chad

Our take is the definition of MFA is clear in the COV EMG V2.0.

*"The total enclosed floor area of the building, as reported by the energy simulation software, excluding exterior areas and indoor (including underground) parking areas. All other spaces, including **partially-conditioned and unconditioned spaces, are included in the MFA.** The MFA must be within 5% of the gross floor area from the architectural drawings, unless justification is provided demonstrating where the discrepancy arises and why the MFA should differ from the gross floor area by greater than 5%"*

Edge have never issued a ZEPB checklist or a Step Code model where we have not been within the 5 % threshold, we also have a rigorous QA/QC process in place to ensure we are never over the 5 % threshold in comparison to the architectural drawings. The reason for this 5 % is to ensure the model generated is representative of the architectural drawings at the time of model update and is representative of the design.

I also don't understand the situation you are presenting here with the two glazing scenarios..

I don't agree with excluding anything else from the MFA definition as per the COV energy modeling guideline or deviating from this language. These bike and other ancillary rooms that are partially conditioned do have to be heated and provided you are simulating your parkade fans correctly, which should run for 2 hours per day twice a day, you will bring cold air into the parkade and these partially conditioned areas will have heating/ typically baseboards that will engage. We don't see many enormous bike rooms unfortunately. Modelers using IESVE will typically simulate this way, other folks may not be simulating this airflow coming into the parkade, and therefore thermal heating can be under reported.

There are other aspects to the TEDI target, like form factor that were not addressed that make it harder to meet the TEDI target and can be deemed unfair, but the rules and guidelines are what they are and should be followed for consistency. It's also a requirement as per the EGBC energy modeling guideline. [Practice Guidelines on Whole Building Energy Modelling Services Released \(egbc.ca\)](https://www.egbc.ca/practice-guidelines-on-whole-building-energy-modelling-services-released) [\[egbc.ca\]](https://www.egbc.ca)

I think we need consistency in modeling approach as an industry as a whole, I would recommend staying with the clear definition in the COV EMG otherwise the industry will not be consistent in approach.

Best regards,

Eoghan Hayes, P.Eng, BEMP, RESET AP , LEED AP BD&C

Managing Director

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102-211 East Georgia St., Vancouver BC, V6A 1Z6



From: Susan MacDougall <susan@focaleng.com>

Sent: November 1, 2022 9:40 AM

To: Chad Cranswick (BCBS) <Chad@bcbuildingscience.com>; Eoghan Hayes <ehayes@edgec.ca>

Cc: Farshid Bagheri (BCBS) <farshid@bcbuildingscience.com>

Subject: RE: GFA/MFA

Hi Chad,

I'm not sure I recall any ZEBP checklists that we've submitted outside of the 5%.

That said I don't entirely understand the situation you're presenting with the two glazing scenarios.

If the issue is below grade area; as you stated, conditioned space (lobbies, corridors, etc.) is supposed to be included within the MFA, or differ with justification. If the GFA doesn't include this causing a >5% difference, this seems like a reasonable justification. That said, I would suggest discretion, so if, for example, there is an enormous bike room that is only tempered to prevent freeze protection, I could see a reasonable argument for excluding it from the MFA.

Cheers,

Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC

Principal | Building Performance Engineer

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susan@focaleng.com

From: Chad Cranswick (BCBS) <Chad@bcbuildingscience.com>

Sent: October 31, 2022 12:51 PM

To: Eoghan Hayes <ehayes@edgec.ca>; Susan MacDougall <susan@focaleng.com>
Cc: Farshid Bagheri (BCBS) <farshid@bcbuildingscience.com>
Subject: GFA/MFA

Hi Eoghan and Susan,

Hope you can help here with some EMG interpretation stuff as I trust you two as competent energy modellers.

It's a long story with details that I can share later but basically Farshid and I are modelling a CoV Rezone tower (~Step 3ish, no LCES) project and there is a third party modeler as part of the peer review process.

We are getting different solutions and it turns out its primarily the difference between our MFAs. (We have seen this issue on a few other projects as well.)

Two solutions, high level:

1. Double Glazed Window Wall. All floor areas are included like below grade storage (everything but parking) and the MFA is NOT within 5% of the GFA. This is diluting the TEDI/TEDU quite a bit.
2. Triple Glazed Window Wall. MFA = GFA +/-5%

Have you ever issued a ZEBP Checklist where the MFA is NOT within 5% of the GFA?

s.15(1), s.22(1)

Chad Cranswick, P.Eng.
bcbuildingscience.com



From: "Riley Beise" <riley@focaleng.com>
To: "Williams, Scott B HOUS:EX" <Scott.B.Williams@gov.bc.ca>
 "Enright, Patrick" <Patrick.Enright@vancouver.ca>
CC: "Li, Charling" <charling.li@vancouver.ca>
 "Susan MacDougall" <susan@focaleng.com>
Date: 5/23/2023 1:14:13 PM
Subject: [EXT] RE: NECB 2020 Ref Building Infiltration Rate vs CoV EMG
Attachments: 220523 Mixed Use Bldg Infiltration Calc Example.xlsx

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Hello Scott, Patrick,

Yes, this sounds viable. As nice as it would be to have the same conversion from tested leakage to infiltration for all models, what you propose is likely the easiest solution. It's a bit odd that for the same tested leakage rate, buildings with TEDI/TEUI will have lower modelled infiltration rates than those without, but it's doable. For clarity I have summarized my understanding in the table below, as well as in an example calculation in the attached spreadsheet.

Model Type	Whole Building Airtightness Level (L /s·m ² of enclosure at 75 Pa)	Conversion Method
Step Code with Steps 2+ (those with TEDI/TEUI limits defined) Hotel/Motel, MURB, Office, Business Mercantile	Design target then test result	CoV EMG sec
Step Code 2 without TEDI/TEUI limits defined and non Step Code portion of mixed use building with Step Code portion (Proposed Model)	Design target then test result	NECB 2020 se
NECB 2020 Reference Model for Step Code (Reference Model)	1.50 as per NECB 8.4.4.3.6	NECB 2020 se

At least the non Step 2+ buildings will be aligned with the NECB 2020. It will result in higher results for TEDI TEUI and GHGI but with no absolute targets set for archetypes, that's fine.

Best regards,

Riley Beise P.Eng., BEMP
 Principal | he/him
 t 250.516.6088 ext. 2 | m 250.661.3817
 riley@focaleng.com



From: Williams, Scott B HOUS:EX
Sent: Tuesday, May 9, 2023 12:22 PM
To: Riley Beise ; Enright, Patrick
Cc: Li, Charling ; Susan MacDougall

Subject: RE: NECB 2020 Ref Building Infiltration Rate vs CoV EMG

Hi Riley and Patrick,

Thanks for reaching out and providing your insight and input.

From a high level, in the context of mixed use buildings, the reduced stringency via NECB for overall energy efficiency as a result of the air tightness methodology will impact the overall baseline for the whole building when following Section 5 in the CoV EMGs and the area weighted approach. Using the NECB ruleset (including air tightness procedures), you would determine the TEDI/TEUI/GHGI of the reference case and these would inform the whole building 'targets' in conjunction with the Step Code occupancies.

When demonstrating compliance for the design case, you would then factor in the whole building air tightness value obtained through the on-site testing. For the NECB occupancy, the tested value would be better than the assumed value that was used for the reference, which would make it easier to comply.

Simplest would be to follow the NECB ruleset for the non-step code occupancy and follow the CoV EMG ruleset for the step code occupancies. For whole building evaluation, Section 5 of the CoV EMGs would be followed.

I am not overly concerned with the decreased stringency vis-à-vis NECB given that this is one part of many with respect to a 'Step Code' building. Regarding modelling complexities – this does add a step and you would have different infiltration rates when constructing the reference case, but I assume that this would not be too onerous to overcome. Fundamentally, you would be following the CoV for whole building and NECB for only the non-step code occupancies.

Does this sound viable?

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Housing

Phone: 236-478-2043 cell: 250-880-7712

Email: Scott.B.Williams@gov.bc.ca

From: Riley Beise <riley@focaleng.com>

Sent: Friday, May 5, 2023 11:05 AM

To: Enright, Patrick <Patrick.Enright@vancouver.ca>; Williams, Scott B HOUS:EX <Scott.B.Williams@gov.bc.ca>

Cc: Li, Charling <charling.li@vancouver.ca>; Susan MacDougall <susan@focaleng.com>

Subject: RE: NECB 2020 Ref Building Infiltration Rate vs CoV EMG

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hi Patrick. Yes you have it right (comments in your email below in blue). And just to be clear the 0.295

value is per m² of total enclosure in my example as I did not use any building enclosure areas. I've attached a spreadsheet with some example calcs for a random project of ours. It happens to be a MURB but it still serves the purpose to highlight the gaps.

Based on the airtightness test results we have been getting, we typically target a tested leakage rate of 1.0 for an experienced team using self-adhered membrane. Using the CoV method for this example project, the per façade infiltration is 0.22. Using NECB conversion this would be 0.39

An NECB reference infiltration using tested leakage of 1.50 and the NECB method results in a façade infiltration of 0.58.

For CoV EMGs, there is also ASHRAE 90.1-2019 that may be mismatched if / when it is adopted by the City. We haven't purchased it yet but I expect it uses the same conversion that CoV currently does.

My main concern is that this is a gap that is now currently in effect provincially for Step 2 NECB projects.

Riley Beise P.Eng., BEMP
Principal | he/him
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riley@focaleng.com focaleng.com



From: Enright, Patrick <Patrick.Enright@vancouver.ca>
Sent: Thursday, May 4, 2023 5:12 PM
To: Riley Beise <riley@focaleng.com>; scott.b.williams@gov.bc.ca
Cc: Li, Charling <charling.li@vancouver.ca>; Susan MacDougall <susan@focaleng.com>
Subject: Re: NECB 2020 Ref Building Infiltration Rate vs CoV EMG

Ok let me see if I understand the issue.

In a mixed-use building, you'll model the group A, B, or F occupancy to NECB 2020, using their baseline rules and conversions, which works out to an infiltration rate of 0.295 (of total enclosure area). You take the TEDI and TEUI, and blend them with your targets for Step Code occupancies to get your overall target.

You then model your proposed design - including the NECB occupancies - using the SC/CoV rules and conversions, and compare that against your overall target.

So there is a discrepancy between the conversion factors used in the baseline and proposed for the NECB occupancies, correct? **Yes, unless users come to their own conclusion that the CoV guideline conversion overrides the NECB for the reference (which I think is unlikely).**

So we could either require the NECB occupancies use the CoV/SC conversion for the baseline, or, require the NECB occupancies use the NECB conversion for the proposed, correct? Is there a reason we wouldn't use the latter? It's maybe more a touch more complicated, as it would require two different infiltration rates in your model, but it would be more consistent with the NECB.

Since the building is tested as a whole, it would be strange to have the tested leakage converted to infiltration differently for different parts of the building, but yes this could be done without too much trouble. It does add complexity for the modellers, and then of course that introduces more room for error and inconsistency. The cleaner way to do it is make the NECB use the CoV conversion.

Curious to hear if I have this right and if that idea makes any sense.

Thanks!
Patrick

From: Riley Beise <riley@focaleng.com>
Sent: May 4, 2023 3:35 PM
To: scott.b.williams@gov.bc.ca <scott.b.williams@gov.bc.ca>
Cc: Li, Charling <charling.li@vancouver.ca>; Enright, Patrick <Patrick.Enright@vancouver.ca>; Susan MacDougall <susan@focaleng.com>
Subject: [EXT] NECB 2020 Ref Building Infiltration Rate vs CoV EMG

City of Vancouver security warning: Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Hello Scott,

In our updates to the CoV Energy Modelling Guidelines we're coming across some wrinkles between CoV and NECB 2020. There is the thermal bridging of the reference building which you have already commented on, and now we're looking at infiltration.

Currently, under Section 5 of the EMGs "Mixed Use and Other Building Types", there is no guidance on how the infiltration for the Reference building is to be determined. Therefore, it is reasonable to say that the default from that standard is used.

Now that NECB 2020 is the applicable reference standard for non floor area metric Step2 buildings (which it has for this particular daycare I'm writing a proposal for in Invermere), there is an issue.

If there is no specific language to override the NECB 2020 conversion from tested leakage to infiltration, the reference buildings will have significantly higher infiltration rates. NECB2020 says the reference building uses an tested leakage rate of 1.50, then converted with their conversion rate, which we know is 75% higher than the CoV conversion factor. If you were to use the CoV conversion, that equates to a tested leakage rate of 2.63(!).

	Tested L/s·m ² at 75 Pa	Conversion	L/s·m ² enclos area Infiltrati
CoV conversion	1.50	0.112	
NECB 2020	1.50	$(5/75)^{0.60} = 0.197$	
NECB 2020 equivalent leakage rate using CoV conversion	2.63	0.112	

Unless there is some clarification added, I expect most modellers will use the NECB 2020 default rate,

which makes for a significant advantage for the proposed building. One could say that the conversion methodology between tested and modelled rates included in section 2.4.1 of the CoV EMGs supersedes the NECB 2020 conversion, but that is not going to be obvious to most (myself included), and so there are likely to be Step 2 (NECB 2020) models out there where the Reference building is much too easy to beat.

We could propose adding clarification to the CoV EMGs, but that still leaves a gap for the interim, between now and when/if the province adopts the revised Guidelines (v3).

While it would be nice to align the CoV methodology to convert tested to modelled leakage rates to be consistent with NECB 2020, that would require revising the Step Code limits as it is a significant change to building loads, and that sounds like too large of a task.

So, would it make sense to include a clarification on this in a bulletin for the BCBC? I'm thinking of a bulletin along the lines of:

Conversion of NECB 2020 tested leakage rate to modelled infiltration rate shall be calculated using the methodology provided in section 2.4.1 of the City of Vancouver Energy Modelling Guidelines (v2).

Or, maybe the methodology is added directly to the BCBC and the CoV EMGs are not referenced. I believe there is a bulletin in the works for the envelope de-rating issue, perhaps this could tag along.

Thanks.

Riley Beise P.Eng., BEMP

Principal | he/him

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[riley@focaleng.com]riley@focaleng.com



Proposed Model with Design Leakage Targets

Portion of Building	Total Enclosure Area m ²	Façade Area m ²	Whole Building Air Leakage Rate at 75 Pa	Conversion Reference	Conversion (tested to modelled)	Modelled Infiltration Rate (L/s)	Modelled Infiltration Rate (L/s-m ² facade)
			(L/s-m ²) <i>Design Target</i>				
Step Code	5000	4000		1.2 CoV EMG	0.112	672	0.17
Non Step 2+	1000	800		1.2 NECB 2020	0.197	236	0.30

Reference Model for Non TEDI/TEUI Occupancies

Portion of Building	Total Enclosure Area m ²	Façade Area m ²	Whole Building Air Leakage Rate at 75 Pa	Conversion Reference	Conversion (tested to modelled)	Modelled Infiltration Rate (L/s)	Modelled Infiltration Rate (L/s-m ² facade)
			(L/s-m ²) <i>REFERENCE</i>				
Step Code	--	--	--	--	--	--	--
Non Step 2+	1000	800		1.5 NECB 2020	0.197	296	0.37

Proposed Model with Final Test Leakage Results

Portion of Building	Enclosure Area m ²	Façade Area m ²	Tested Whole Building Air Leakage Rate at 75 Pa	Conversion Reference	Conversion (tested to modelled)	Modelled Infiltration Rate (L/s)	Modelled Infiltration Rate (L/s-m ² facade)
			(L/s-m ²) <i>TESTED</i>				
Step Code	5000	4000		1.1 CoV EMG	0.112	616	0.154
Non Step 2+	1000	800		1.1 NECB 2020	0.197	217	0.27

Model Type	Whole Building Airtightness Level (L/s·m ² of enclosure at 75 Pa)	Conversion Methodology
Step Code with Steps 2+ (those with TEDI/TEUI limits defined) Hotel/Motel, MURB, Office, Business Mercantile	Design target then test result	CoV EMG section 5
Step Code 2 (NECB) and Non Step Code portion of Mixed Use Building with Step Code Portion (Proposed)	Design target then test result	NECB 2020 section 8.4.2.9
NECB 2020 Reference Model for Step Code (Reference)	1.50 as per NECB 8.4.4.3.6	NECB 2020 section 8.4.2.9

From: "Li, Charling" <charling.li@vancouver.ca>
To: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
Date: 3/22/2023 12:11:00 PM
Subject: Focal EMGs workplan
Attachments: 23009 230314 CoV EMG Updated Project Work Plan_CL20230315.xlsx

Hi Patrick, here's the work plan from Focal that I provided feedback on last week.

As discussed, I'll ask the team to add DHW item to the discussion during the workshop.

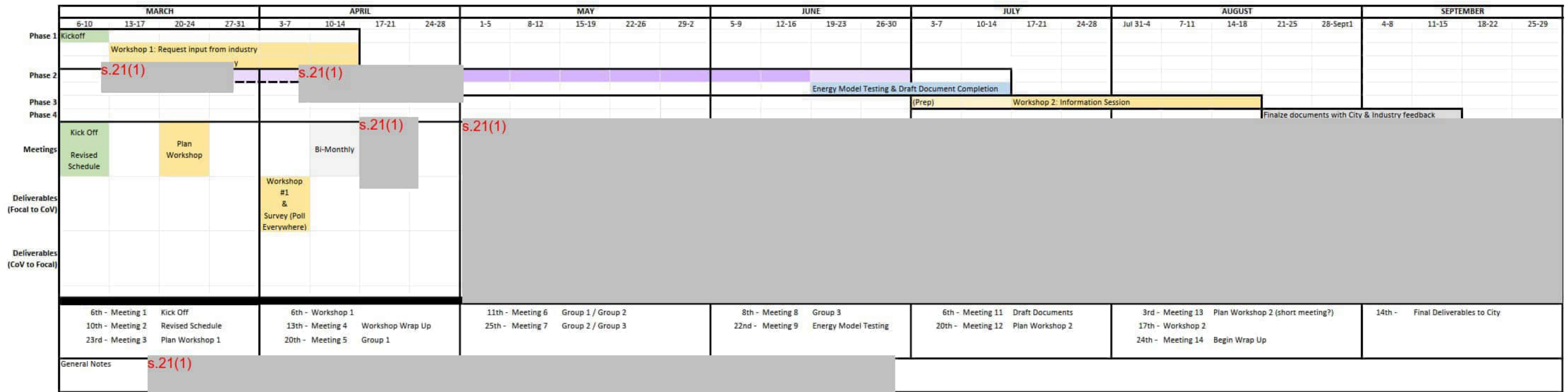
Charling

Charling Li, P.Eng., M.Urb. | Green Building Engineer
(she/her/hers)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
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For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̅əm (Musqueam), Skwxwú7mesh (Squamish), and səl̓ilwətaʔt̓ / səl̓ilwítulh (Tsleil-Waututh) nations.

23009 CoV EMG Update - Revised Work Plan
 Revised Work Plan
 Project Gantt



Detailed Steps

- Design Workshop (1 hr)
- Suggest < 8 topics, max. 5 mins each, 5 min intro, 15 min open
- Suggest Poll EV to ask questions, allow upvoting of results
- Leave survey open for a few days for those who can't attend
- Generate invitation/ marketing list

s.21(1)

s.21(1)

as necessary

s.21(1)















s.13(1)







s.13(1)



From: "Li, Charling" <charling.li@vancouver.ca>
To: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
Date: 9/29/2023 4:28:00 PM
Subject: FOR REVIEW RE: CoV EMG v3.0 - tracked changes draft

Hi Patrick, the latest version of the EMGs can be found below. Please take a look as soon as you are able – we are planning to release this on Oct 13th for public review.

[PDS - SUS - Energy Modelling Guidelines v3.0 - DRAFT - TRACKED CHANGES_20230929.DOCX](#)

Thanks!

From: Li, Charling
Sent: Friday, September 29, 2023 4:21 PM
To: 'Danny Taylor'
Cc: Susan MacDougall ; Riley Beise ; Kristian Storgard ; Enright, Patrick
Subject: RE: CoV EMG v3.0 - tracked changes draft

Hi Danny and team, thanks for the tracked changes version – I've moved it to our updated template, and incorporated your tracked changes (plus my editorial and structural changes). I have a few comments for you, highlighted in yellow. Please take a look when you get a chance in case my rewording has changed the meaning.

There were a few comments on Susan's edit that I don't think has been resolved and I've added these in the document. I've also reorganized the section on overheating analysis, please see if the structure still makes sense!

Cheers,
Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Monday, September 18, 2023 4:58 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Kristian Storgard <kristian@focaleng.com>
Subject: CoV EMG v3.0 - tracked changes draft

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Hi Charling,

Sorry we missed getting the documents to you last week, we're still working our way through some of

the updates and refinements on some of the larger topics. We've attached our in progress tracked changes version of the Guidelines with most of the changes included for you to review ahead of our meeting this week to discuss. The updated report will need to follow after the meeting, but the this document should have quite a bit of content to discuss and give you a better idea of the scope and direction of the proposed changes.

Danny Taylor, CPHC

Associate | he/him

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From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
["Riley Beise" <riley@focaleng.com>](mailto:riley@focaleng.com)
Date: 4/3/2023 8:51:00 AM
Subject: FW: Comments regarding the City of Vancouver's Energy Modelling Guidelines v2
Attachments: VAN.099121.0001-LTR-20230208-WM-CoV Energy Modelling Changes.pdf

Hi Susan, Riley, forwarding some feedback from RJC on their comments to the EMGs we received earlier this year. FYI.

Charling

From: Wendy Macdonald
Sent: Wednesday, February 8, 2023 2:28 PM
To: Enright, Patrick ; Li, Charling
Cc: Mohammad Fakoor ; Mark Felt
Subject: [EXT] Comments regarding the City of Vancouver's Energy Modelling Guidelines v2

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Hi Patrick and Charling,
I hope 2023 is treating you well so far! Certainly these are exciting and important times in the green building industry as we collectively move forward designing and constructing buildings for the remainder of the 21st century. After deep dives and experience working with the City of Vancouver's Energy Modelling Guidelines v2, we'd like to offer some considerations for when you perform updates to the guidelines (please see attached letter). Your guidelines are instrumental in directing our industry, and we appreciate your willingness to receive feedback from consultants like ourselves. (Teamwork for the win!)

If you have any questions, please feel free to reach out to Mohammad or myself.

Thank you for your time and consideration, and wishing you successes and big wins in our mutual pursuit a greener future!

Wendy C. Macdonald, P.Eng., ENV SP, LEED® AP BD+C
Sustainability Consultant

Read Jones Christoffersen Ltd.
Engineers



Structural Engineering | Building Science | Energy Modelling | Structural Restoration | Parking Facility Design

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February 8, 2023



Engineers

Patrick Enright, Senior Green Building Engineer
City of Vancouver
453 West 12th Ave
Vancouver, BC V5Y 1V4
patrick.enright@vancouver.ca

Dear Patrick,

RE: 2023 update to City of Vancouver Energy Modelling Guidelines

RJC No. VAN.099121.0001

It is a unique privilege to live, work and generally be associated with a municipality with the power to dictate its own building codes. And what an added treat for us west coasters in the green building industry that the City of Vancouver uses this power to push the boundaries on what it means to build “green”. The fact that other standards and codes look to City of Vancouver’s process and requirements is tribute to the success of your initiatives.

The building industry’s understanding of how to build low carbon, resilient buildings has evolved rapidly since the release of the City of Vancouver’s July 11, 2018 Energy Modelling Guidelines (version 2). We are pleased to offer our support with some recommended improvements to the guidelines. Our recommendations are based on our feeling of how to best capitalize on the industry’s evolution and best balance additional simplicity with increased relevance. With that context in mind, the following are comments on sections of July 11, 2018 version 2 of the Energy Modelling Guidelines which we feel bear reflection and improvement:

Section 1.3 Definitions - Table 1.2 Emissions Factors by Fuel Type

We recommend emissions factors for Natural Gas and Electricity be updated per latest Canada’s National Inventory Report. *Alternatively...*

Recognizing that (hopefully) our electrical grids are increasingly being decarbonized, there is discussion in some circles about the benefit of using future electrical grid emission factors to advise building design. Emission factors could be drawn from Canada Energy Regulator’s analysis of future electrical grid scenarios (Current Policies scenario or the more optimistic Evolving Policies scenario) for use in determining project GHG emissions. Regardless of whether this ends up being the preferred approach for this iteration of the guidelines, it is a development worth watching.

1.4 Renewable Energy

Currently per the guidelines, a building is considered to be zero emissions if it can provide 7% of its electrical consumption from on-site renewables. In lieu of that static figure, we suggest the use of emission factors by fuel type (as discussed per section 1.3). The term “net zero” is wide spread but with too many different definitions, and this 7% figure adds an unnecessary additional definition to the market. There is benefit in the City of Vancouver abandoning the 7% definition, and instead evolving to align with other definitions such as the upcoming BC Carbon Pollution Standards definition of Zero Carbon, or the calculations and requirements of zero carbon emissions as per CAGBC’s Zero Carbon Building Standard.

1.5 Weather File

Buildings are designed based on a climate they will not operate in. We recommend requiring buildings be modelled using traditional sources (i.e. CWEC data), but also using future weather files. This “double model” methodology would be exclusively to demonstrate building performance, not as a basis for design (e.g. capacities of systems, etc.).

As a Code authority, it is important for buildings to be compared using methods and data that are consistent, creating an equal playing field. The science of forecasting future weather is an ever evolving one and currently different future weather files (PCIC, IES, WeatherShift) are based on different approaches. For the use of future weather files to be fair and successful, the City would need to provide modellers with specific direction about which data set to use, selecting *one* that is to be used for all City of Vancouver energy models. Note that using future weather files may result in the need for TEDI and TEUI targets to be updated.

2.4.1 Reduced Infiltration Rates

As a powerful method of reducing energy use, we are in strong agreement with rewarding those projects that target *and are able to demonstrate achievement of* reduced infiltration rates. With our experience in modelling and airtightness testing, we’re opinionated about the calculations used to convert between modelled rates and air leakage targets. We recommend replacing the conversion calculation with the formula used in *NECB 2017 Article 8.4.2.9 Air Leakage*. This same NECB conversion is referenced in CAGBC’s Zero Carbon Building Standard and is a more flexible yet precise formula allowing better representation of measured data.

2.5.2 Corridor Pressurization in MURBs

Per the 2018 version, the industry has been in transition with evolving levels of airtightness and energy use, and the resulting relationship with ventilation to corridor spaces. Even more so, we feel that at this point the Section 2.5.2 TEDI Adjustment now only introduces confusion, needless added complexity, and a loop-hole that permits some buildings to over represent their level of passive energy efficiency. Note the following:

- Maintaining this clause puts City of Vancouver out of alignment with other policies and standards also using the TEDI metric (e.g. Toronto Green Standard, CAGBC's Zero Carbon Building Standard).
- Since all buildings are able to claim the allowance, it results in over-reporting of performance (e.g. following prescribed protocols, a building with a central heat recovery ventilator for corridor pressurization can achieve low TEDI/TEUI and high BC Step Code Step levels, despite a "business as usual" envelope).

Further, thanks to how quickly the industry is responding to the need for improved energy design, it is our opinion that the TEDI Adjustment permitted through Section 2.5.2 is no longer necessary. The industry is ready to have enabling crutches removed. We recommend removing this allowance for all projects.

4 Passively Cooled Buildings

With heat domes and general warming trends, it is critical that the industry maintain sight that we build energy efficient, climate mitigating buildings *that are actually occupiable*. And with increased electrification and increased burden on the grid, it is wise to promote building design that achieves this passively.

For all those reasons we are in full support of maintaining requirements around passively cooled buildings in the guidelines. We do, however, recommend the section be updated to reference ASHRAE 55-2017 (or later) with regards to determining acceptable thermal conditions in naturally conditioned spaces. Further, that the wording in the guide not be modified from what is in ASHRAE 55. We note that Table 4 of the City 's guidelines list temperatures which we expect are being interpreted as drybulb temperatures, not operative temperatures as are indicated in ASHRAE 55. The distinction between drybulb and operative temperatures is sufficient that this nuance should be accurately captured within the energy modelling guidelines. Focusing on drybulb temperature rather than operative temperature result in inaccurate thermal comfort representation for buildings with high percentages of glass (i.e., high or low radiant temperature of these building due to large areas of glass will create a big difference between drybulb and operative temperatures). While not all energy modelling software is capable of modelling operative temperatures, historically there have been work-arounds made available to address this issue. We suggest the guidelines be focused on the preferred approach and workarounds be made available solely to outliers.



Thank you for the opportunity to provide this input, we are pleased to be able to add our wisdom and experience to support you in this evolution toward even more energy efficient, even more carbon conscious buildings.
Teamwork.

Yours truly,

READ JONES CHRISTOFFERSEN LTD.

Wendy Macdonald, P.Eng., ENV SP, LEED® AP BD+C Sustainability Consultant Mohammad Fakoor, PhD, CEA, P.Eng., CPHD, LEED® AP BD+C, CEM Associate

WM/rt

cc: Charling Li, Green Building Engineer, City of Vancouver

From: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
To: "Li, Charling" <charling.li@vancouver.ca>
Date: 1/26/2023 5:19:28 PM
Subject: FW: CoV EMGs - Fenestration Uvalues

FYI

Patrick Enright, P.Eng | Senior Green Building Engineer
(he/him/his)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
patrick.enright@vancouver.ca | 604.871.6158

For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̍əm (Musqueam), Skwxwú7mesh (Squamish), and səɫwəʔt / səɫwɪtʌh (Tsleil-Waututh) nations.

From: Williams, Scott B OHCS:EX
Sent: Thursday, January 26, 2023 5:02 PM
To: Enright, Patrick ; Faught, Brady
Subject: [EXT] RE: CoV EMGs - Fenestration Uvalues

City of Vancouver security warning: Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Hi Patrick and Brady,

Thanks so much for providing your input regarding this matter and sorry for taking so long to chime back in.

When following the Step Code and using NECB there are requirements for determining the thermal performance of the windows via either A440.2 or NFRC 100, which stipulate either lab testing or modelling with software such as THERM.

When there are assemblies that deviate from the standard test sizes, the project team will then follow the A440.2/NFRC requirements to demonstrate compliance for the project specific window sizes in order to meet code requirements and they would not simply scale the test size results through third party software (ie software not outlined within the requirements of A440.2 or NFRC) as this would deviate from code requirements.

Understanding full well that they do have the option of going with the area weighted approach and they would essentially only have to address one window size as opposed to multiple or they can take the worst case scenario approach. However, given complexities of some projects, I am sure they would want to have something more detailed to more accurately represent building performance, which would mean more time and cost required to verify window thermal performance.

Not sure what the easy answer is for this. It would be great to be able to just scale the results from standard test sizes however, this deviates from code requirements.

For next steps, I will be bouncing this issue off of the Part 3 technical subcommittee and will also be looping back to FenCanada to get more detail on the perceived issues and what they are seeing in practice. For the meeting with FenCanada, it would be great to have a CoV rep, if you are interested in joining.

Cheers,

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Housing
Phone: 236-478-2043 cell: 250-880-7712
Email: Scott.B.Williams@gov.bc.ca

From: Enright, Patrick <Patrick.Enright@vancouver.ca>
Sent: Tuesday, December 6, 2022 1:22 PM
To: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>
Cc: Li, Charling <charling.li@vancouver.ca>; Faught, Brady <Brady.Faught@vancouver.ca>
Subject: RE: CoV EMGs - Fenestration Uvalues

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Perhaps rather than, “must be modelled with actual window size” it would be more accurate to say in the EMG’s, “must be modelled with to account for actual window size”. This would more clearly allow the area-averaging suggested and allowed in the following sentence. We can note this for the next update.

Also just to clarify, Brady’s comment on 3 compliance paths and the attachment apply to Part 9 only.

Patrick Enright, P.Eng | Senior Green Building Engineer
(he/him/his)
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From: Faught, Brady <Brady.Faught@vancouver.ca>
Sent: Tuesday, December 06, 2022 12:53 PM
To: Enright, Patrick <Patrick.Enright@vancouver.ca>; Williams, Scott B OHCS:EX

<Scott.B.Williams@gov.bc.ca>

Cc: Li, Charling <charling.li@vancouver.ca>

Subject: RE: CoV EMGs - Fenestration Uvalues

I can chime in, if helpful

Experienced modelling industry has in fact noted that the EMG 'must be modelled with actual window size' has caused confusion for modellers, as the NFRC / CSA allows one to model a standard NFRC size for a particular window type. This is how most window products are certified and labelled. Modelling an actual size window can take ~6 hours of work. Hearing from Patrick, this wasn't our intent, perhaps we should revisit this language – especially if BCBC is referencing it!

Speaking for our VBBL, it does contradict EMG here, as we simply point to 'follow NFRC100, CSA A440.2 modelling procedures.' That way, we stay neutral to modelling details for mullions (which I know there are issues with the NFRC approach), standard vs. actual sizing and so on.

Scott, as an FYI, VBBL Part 10 allows 3 compliance paths for fenestration ([notes to 10.2.2.7 \[can01.safelinks.protection.outlook.com\]](#)) – I made an internal 'Primer' presentation attached to outline these if helpful.

Brady

From: Enright, Patrick <Patrick.Enright@vancouver.ca>

Sent: December 6, 2022 9:53 AM

To: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>

Cc: Li, Charling <charling.li@vancouver.ca>; Faught, Brady <Brady.Faught@vancouver.ca>

Subject: RE: CoV EMGs - Fenestration Uvalues

Hi folks,

I worry people may be overthinking this. I haven't provided much direction on this in the past and mostly left it to up to professional judgement as this is the part of the guidelines I'm least familiar with. But I did check-in recently with Christian Cianfrone on the original intent behind [3.2.\(a\). \[can01.safelinks.protection.outlook.com\]](#)

He said, "The intent was to just not have people use U-values for 2m x 2m windows when they were actually 0.6m x 1m. It had nothing to do with any of the other assumptions that go into the modelling for NFRC ratings."

So I think area-weighting is totally fine, as noted in the guidelines. The basic idea, as I understand it, is that it's not good enough just to take the standard NFRC100 numbers and punch it into the software. The shape and size of the windows relative to the mullions matters, because it affects the proportions of centre-of-glass performance compared to frame performance, which affects the overall performance of the fenestration assembly (even before applying psi-values to account for full3D thermal bridging). When I was a modeller there was a software/website we used to do this but I can't remember what it was; I'm sure different modellers have their preferred way of doing this, I could reach out and ask a few if it would help.

Let me know if that helps,

Sincerely,

Patrick Enright, P.Eng | Senior Green Building Engineer
(he/him/his)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
patrick.enright@vancouver.ca | 604.871.6158

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From: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>
Sent: Tuesday, December 06, 2022 9:23 AM
To: Li, Charling <charling.li@vancouver.ca>; Faught, Brady <Brady.Faught@vancouver.ca>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: [EXT] RE: CoV EMGs - Fenestration Uvalues

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Thanks Charling.

I have been chatting with Terry Adamson at FenCanada. I understand that there has been some ongoing dialogue with the City of Vancouver.

Brady – any insight you can provide would be great.

Thanks!

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Attorney General and Minister Responsible for Housing
Phone: 236-478-2043 cell: 250-880-7712
Email: Scott.B.Williams@gov.bc.ca

From: Li, Charling <charling.li@vancouver.ca>
Sent: Monday, December 5, 2022 9:07 PM
To: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>; Faught, Brady <Brady.Faught@vancouver.ca>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>

Subject: FW: CoV EMGs - Fenestration Uvalues

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Hi Scott,

I have heard a little bit about this issue but haven't had time to dig into it. We've heard that manufacturers push back against testing the actual window product and we have been in general directing projects to follow NRFC guidance, not sure what more we can do about this at the moment. Brady has looked into this topic a bit more so maybe he will jump in.

Cheers,
Charling

From: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>
Sent: Monday, December 5, 2022 5:36 PM
To: Li, Charling <charling.li@vancouver.ca>
Subject: [EXT] CoV EMGs - Fenestration Uvalues

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Hi Charling,

I wanted to touch base with you regarding the CoV EMG requirements for Uvalue calculations of windows and the requirement for the calcs to represent the actual window size (Section 3.2). Given the cost to undertake the testing/analysis for each given window, I am assuming that most projects will either go the area weighted approach or assume the worst case.

Do you have a sense of what design teams are typically doing to comply and have any issues been identified?

I recently had a meeting with FenCanada and they indicated that this has become an issue on a few projects for a few of their members.

Thanks

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Attorney General and Minister Responsible for Housing
Phone: 236-478-2043 cell: 250-880-7712
Email: Scott.B.Williams@gov.bc.ca

From: ["Jimenez, Jaclyn" <jaclyn.jimenez@vancouver.ca>](mailto:jaclyn.jimenez@vancouver.ca)
To: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
["Smith, Doug" <doug.smith@vancouver.ca>](mailto:doug.smith@vancouver.ca)
["Londo, Dina" <Dina.Londo@vancouver.ca>](mailto:Dina.Londo@vancouver.ca)
CC: ["Pander, Sean" <sean.pander@vancouver.ca>](mailto:sean.pander@vancouver.ca)
["Enright, Patrick" <Patrick.Enright@vancouver.ca>](mailto:Patrick.Enright@vancouver.ca)
["Lee, Lloyd" <Lloyd.Lee@vancouver.ca>](mailto:Lloyd.Lee@vancouver.ca)
["Enns, Melissa" <Melissa.Enns@vancouver.ca>](mailto:Melissa.Enns@vancouver.ca)
Date: 1/6/2023 5:02:11 PM
Subject: FW: Shopping Cart for "Energy Modelling Guidelines Update 2023"
Attachments: PDS - SUS - GRBT - EMGs v3.0 - SOW - draft 20230104.DOCX

Shopping cart 1000214064 has been created.

I added \$10K contingency to the \$65K expected value (vendors don't see the contingency)

Dina in Finance to approve first then Doug. Once approved, a buyer will be assigned and will contact Charling and Patrick as I listed them as project managers.

Dina/Lloyd/Charling: I left the account code undefined for now as it may go under capital. I'll need the account code once we get invoiced.

Thanks,
JJ

Hi JJ can you please open up a shopping cart for this project "Energy Modelling Guidelines 2023 Update", for \$65k plus contingency?

Sean, we briefed you on this item before the holiday break, let me know if you want a refresher.

Attached is the scope of work.

Thank you,
Charling

Charling Li, P.Eng., M.Urb. | Green Building Engineer
(she/her/hers)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
Charling.Li@vancouver.ca | 604.871.6833

Learn about recently approved green building changes for Part 3 New Construction [here](#)
For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

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2023 Part 3 Energy Modelling Guidelines Update

Request for Proposals: Scope of Work

Contact

For questions about this scope of work, please contact:

Charling Li, P.Eng, M.Urb. | Green Building Engineer
Sustainability Group | City of Vancouver
453 West 12th Ave, Vancouver, BC V5Y 1V4
T: 604.871.6833

Schedule

The anticipated delivery date of draft results is: Monday, May 15th, 2023

The anticipated dates of 2 proposed workshops are: Week of June 5th, 2023

The anticipated delivery date of final results is: Monday July 10th, 2023

Background

The Zero Emissions Building Plan (ZEBP¹) seeks to reduce the operational emissions of new construction in Vancouver to zero by 2030. Changes to the Vancouver Building By-law (VBBL) were approved in May 2022 to reduce greenhouse gas intensity (GHGI) targets consistent with zero emissions heating and hot water equipment, as well as more stringent targets on climate resilience. The City of Vancouver's Energy Modelling Guidelines (EMGs) version 2.0 needs to be updated to consolidate feedback and new knowledge that has emerged since the release of version 2.0 in July 2018.

The EMGs are used by projects to demonstrate compliance to the energy and emissions limits in the Vancouver Building By-law and is also referenced by the BC Building Code in the application of the Energy Step Code (ESC). While the focus of the update will be to reflect Vancouver's context, proponents are encouraged to consider the implications of these updates to users of the provincial ESC and lead discussions on these implications at the stakeholder workshops (see Deliverables).

Intent

¹<https://vancouver.ca/files/cov/zero-emissions-building-plan.pdf>

The intent of this scope of work is to update the City of Vancouver's Energy Modelling Guidelines to version 3, for new changes to take into effect in alignment with VBBL Sections 6.6.2 and 10.2 changes in July 2023 and January 2025².

Scope

Throughout the delivery of this scope of work, the proponent should consider applicability or constraints of the popular energy modelling software used by modelling professionals in BC for Part 3 large new buildings. Proposed modelling methodologies should work for these modelling software; otherwise provide a recommendation on whether specific software should no longer be used for the purposes of compliance modelling for VBBL or ESC.

It is up to the proponent to propose the necessary methodology to arrive at and justify each recommended change to the EMGs based on the scope items outlined below. Some recommendations may be based on professional judgment and experience of the proponent, while others may require some energy modelling effort to arrive at the recommended approach.

This scope of work is not intended to be an extensive modelling exercise. The energy modelling scope item 13) is meant to provide an overall summary to understand the impact to energy and emissions metrics based on by major impacts such as updated weather files, changes in DHW assumptions, and ventilation standards, etc. Proponents are expected to have access to recent and relevant completed energy models of Part 3 new buildings of different sizes to draw from for the purposes to arriving at the recommendations.

The scope of work consists of the following needs:

- 1) Weather files
 - a) Recommend a change to the standard weather file for demonstrating compliance to VBBL from CWEC 2016 to CWEC 2020 or to another weather file. The intent is to reflect best currently available information to demonstrate compliance to VBBL energy & emissions limits at the time of design.
 - b) Recommend standard weather file(s) for completing sensitivity analysis under future climate conditions (e.g. specify climate files with time-scale and Representative Concentration Pathway, or source of climate files, etc.) or the use of Reference Summer Weather Years³. See also Section 5).
- 2) Domestic hot water
 - a) Provide recommendations on whether to include the following changes as per the recommendations of the report "Calibrating the Zero Emissions Building Plan and BC Energy Step Code"⁴
 - increasing peak load assumption to 0.0021L/s/person (Section 3.1.4.1 of the report)

² <https://council.vancouver.ca/20220517/documents/R1a.pdf#page=34>

³ <https://nrc-publications.canada.ca/eng/view/object/?id=abcd0186-37f3-4051-b752-688f04b7063c>

⁴ Crosby, S. 2019. "Calibrating the Zero Emissions Building Plan and BC Energy Step Code" Report for the Greenest City Scholars Program. https://www.researchgate.net/profile/Sarah-Crosby-2/publication/336654063_Calibrating_the_Zero_Emissions_Building_Plan_and_BC_Energy_Step_Code/links/5e583818a6fdccbeba079aa4/Calibrating-the-Zero-Emissions-Building-Plan-and-BC-Energy-Step-Code.pdf

- adopting a seasonal multiplier to DHW use (Section 3.1.4.2)
 - adopting a recirculation DHW heat loss factor (Section 3.1.4.3)
 - adopting a multiplier for non-submetered DHW (Section 3.1.4.5)
- b) Suggest any other recommendations to improve modelling of domestic hot water use, if any.
- 3) Ventilation Standard
Provide advice on the implications of the changes to TEDI, TEUI, GHGI and CEDI using ventilation rates in ASHRAE 62.1 -2016 Ventilation and Acceptable Indoor Air Quality as opposed to current VBBL referenced ASHRAE 62.1-2001 for ventilation.
- 4) Natural Ventilation
Recommend a standardized methodology for modelling natural ventilation for the purposes of modelling compliance with VBBL and ESC. The proposed methodology should include commonly applied natural ventilation strategies and be easy to apply across different project designs and conditions.
- 5) Resilience to future climate and shock events
- a) Provide a recommendation to update the current overheating hours limit methodology in Section 4 of the EMGs:
 - i) Recommend whether to require the calculation of operative temperature instead of dry bulb temperature in thermal comfort/overheating analysis based on ASHRAE 55 Section 5.3. Include any technical or software constraints associated with this recommendation.
 - ii) Recommend whether to change the values in Table 4 “Acceptability Limits for Naturally Conditions Spaces in Vancouver” in Section 4 of the EMGs to a standard minimum value across all month, with the intent to accommodate projects outside of Vancouver conducting overheating hours analysis for ESC compliance.
 - b) For buildings with partial cooling or no active cooling: recommend a methodology for sensitivity analysis of how the number of overheating hours will shift in the future, such as time period to be modelled, the weather files to be used, etc.
 - c) For buildings with active cooling: recommend a methodology for sensitivity analysis of overheating hours in the event of a power outage. Suggest a scenario and set parameters for analysis such as the duration of the power outage, the time period to be modelled, the weather files to be used, the number of overheating hours above a thermal safety threshold temperature, etc. Suggest an approach to encourage design teams to explore additional ways to reduce overheating hours during a power outage with the intent to improve the passive survivability of the building.
 - d) Recommend a standard methodology and weather files to be used to analyze and report on how peak cooling and heating loads, TEDI, TEUI, GHGI and CEDI change between current and future climate scenarios. Include recommendations on how this information may be presented in the Energy & Emissions Design Report.
- 6) Cooling Energy Demand Intensity
Establish a standard methodology for calculating cooling energy demand intensity applicable to all building designs including those with full, partial or no mechanical cooling systems.
- 7) Refrigerant impact – GHGI-R

Projects will be required to account for the greenhouse gas impacts of refrigerants (GHGI-R) in the whole-building GHGI limit as of January 2025. Draft a new guidance section in the EMGs on GHGI-R that includes the following

- a) Provide recommendation on incorporating GHGI-R estimates in early design for whole building GHGI compliance. Reference existing GHGI-R calculation methodology from the Green Buildings Policy for Rezoning – Process and Requirements (amended June 14, 2019)⁵ to the EMGs and recommend updates to the methodology as necessary.
 - b) Recommend whether GHGI-R reporting should be limited to mechanical cooling equipment containing more than a specified volume of refrigerant (nominally 225g)⁶ or a specific cooling capacity (19kW)⁷, or align with other relevant standards or regulations.
 - c) Update the definition of GHGI to include refrigerant impact.
- 8) Compliance for actively cooled buildings
As of January 2025, dwelling units within Part 3 buildings will be required to have active mechanical cooling capable to maintaining an indoor air temperature of 26°C with windows closed. Provide a recommendation on how compliance may be demonstrated through energy modelling. For example, suggest the weather file to be used, the mechanical system details or other compliance information or metrics to be provided by the design team, etc. Provide insight on any changes to the design and modelling teams' workflow that may be required to demonstrate compliance.
- 9) Form Factor for slim buildings
Propose an adjustment factor for small and/or narrow buildings where TEDI targets may be difficult to achieve due to its form factor.
- 10) Energy efficiency recommendations
Provide technical and policy recommendation on the following items with the intent to further encourage selection of more energy efficient options:
- a) Appliances: should the current credit for EnergyStar appliances for TEUI continue, or should the default modelling assumptions for these appliances be adjusted to Energy Star requirements?
 - b) Lighting – is an update to modelling assumptions for lighting necessary and are there other mechanisms to drive better more energy efficient lighting design
 - c) Elevators – propose a revision to the current assumption on elevator load or an alternative modelling method to encourage the selection of more efficient elevators
 - d) Laundry appliances – does the current assumptions on modelling in-suite laundry require updating?
- 11) Miscellaneous recommendations
Provide technical and policy recommendations on the following items. Some questions are provided as a starting point for consideration; the proponent is encouraged to provide additional perspective as they see fit.
- a) Clarify the application of the corridor pressurization adjustment for buildings using energy/heat recovery ventilation systems for corridor supply and return air

⁵ <https://vancouver.ca/files/cov/bulletin-green-buildings-policy-for-rezoning-2019-june14.pdf>

⁶ Based on LEED v4 Credit Enhanced Refrigerant Management

⁷ Based on Zero Carbon Buildings v3

- b) The reduction of maximum corridor pressurization adjustment value for TEDI and TEUI to 5
- c) The removal of the corridor pressurization adjustment for GHGI
- d) What space uses/types should be included within the building's Modelled Floor Area and Gross Floor Area (e.g. below grade storage or bike storage)
- e) Recommend changes to the current sub-metering adjustment for hot water for space heating (see 2.7 of the EMGs), if any. Consider whether the adjustment should be removed for simplicity and/or practicality, or if the adjustment should be expanded to include TEDI and DHW heating.
- f) Are any further clarifications needed on the role of the energy modelling professional making reference to the Joint Professional Practice Guidelines for Whole Building Energy Modelling Services⁸

12) GHG reduction target methodology for Groups A, B, and F major occupancies

Draft guidance language on the modelling steps for Groups A, B and F major occupancies with GHG reduction targets in VBBL to determine the GHG reduction target based on an all fossil-fuel baseline modelled as per ASHRAE or NECB requirements. If different modelling steps are required for ASHRAE or NECB projects, guidance should be provided for each compliance standard.

13) Energy Modelling

- a) Apply at least two archetype buildings (at least one 6-storey residential, one 7+ storey residential, etc.) that include typical buildings systems meeting current VBBL requirements, modelled under the methodologies and assumptions outlined in v2.0 of the EMGs and compare the modelled results with the major recommendations from the above list. Provide comparison of how TEDI, TEUI, CEDI, GHGI and overheating hours are affected by the recommended changes.
- b) Provide a report on how various components of building energy usage may be affected by the changes along with the recommended list of changes. The report should also provide comments on any significant changes to energy modelling workflow or design workflow related to the recommended changes.

14) Engagement with stakeholders

Organize and facilitate a minimum of 2 (two) virtual workshops to share proposed changes to the following groups and gather feedback in June 2023. Create an online survey to collect written feedback to a draft version of the EMG changes. The survey should be made live in time for the workshops and remain open for 4 weeks minimum.

- a) Workshop #1 with stakeholders to include relevant code compliance professionals from BC's Climate Action Secretariat, Building & Safety Standards Branch, BC Housing, BC Hydro, local municipalities etc., with approximate 10-20 individuals
- b) Workshop #2 with local energy modelling professionals (approximately 25-50 individuals)

⁸ <https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories/Document/01525AMW7JPMODAJKVYBCLHGRA24FJJPH3/Whole%20Building%20Energy%20Modelling%20Services>

Deliverables

The project will result in the following deliverables to the City:

- 1) Meetings with City staff as appropriate, including at a minimum:
 - a. Kick-off meeting to review scope and clarify assumptions;
 - b. Regular progress updates, bi-weekly as needed;
 - c. Presentation and review of preliminary findings with core City staff;
 - d. Organize and facilitate two workshops to share proposed changes to industry stakeholders, and to gather input on practical, technical or software issues and opportunities
 - e. Online survey to gather feedback from draft EMG changes
- 2) A preliminary draft of changes to the Energy Modelling Guidelines detailing initial recommendations and questions to be resolved;
- 3) A final report outlining the methodology taken to arrive at the recommended changes, including a table listing the impacts of major recommended change on TEDI, TEUI, GHGI and CEDI; and
- 4) A final electronic version of the Energy Modelling Guidelines v3.0 with tracked changes, incorporating feedback from stakeholders.

From: "McCall, Gregory" <Gregory.McCall@vancouver.ca>
To: "Li, Charling" <charling.li@vancouver.ca>
Date: 11/2/2023 2:41:27 PM
Subject: FW: TEDI for Skinny Bldgs - Proposed CoV MG
Attachments: Skinny Building vs Narrow Building for TEDI.xlsx

FYI&R

M. Greg McCall
B.Sc.(Gen), P.Eng., LEED AP

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From: McCall, Gregory
Sent: Thursday, November 2, 2023 12:51 PM
To: Danny Taylor <danny@focaleng.com>; Susan MacDougall <susan@focaleng.com>
Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

Susan and Danny,

Please see my tweaks to the VFAR Adjustment = $80 * (VFAR - 0.6)$ really helps buildings as they get skinnier but does not over-assist between 35-50' wide.

Take a look and let me know what you think.

Cheers,
G

M. Greg McCall
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From: McCall, Gregory

Sent: Wednesday, November 1, 2023 2:29 PM

To: Danny Taylor <danny@focaleng.com>; Susan MacDougall <susan@focaleng.com>

Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

Thank you Danny.

These items really need to consider practical application with real-world scenarios.

On today's call we even discussed how if the R8 wall (in this case at a 1.02 VFAR) results in a TEDI value under 25 in the Typical row then we should consider that as acceptable with no need for adjustments. This option may be a simple solution for the skinniest buildings. This is why I included column M which seems to be Pathfinder normalizing the inputs for a more typical VFAR. (Pathfinder however ends at VFAR 1.2 or in this case 22ft wide.)

We also discussed the idea of capping an effective R-value for a wall and roof such that one never needs to exceed R26 nominal for example. My view is that if the same building could be designed on a wider plot and comply with R26 nominal then why does the skinnier version have to build to R40 or 50 nominal? If an R26 is acceptable then why not on equivalent buildings?

Anyway, this is where I am with the present applicant's building. It turns out the glazing is double not triple glazed and the building is concrete not wood. I'm going to have to make a decision asap as they are wanting to apply for building permit this week.

Cheers,

G

M. Greg McCall
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From: Danny Taylor <danny@focaleng.com>

Sent: Wednesday, November 1, 2023 1:59 PM

To: McCall, Gregory <Gregory.McCall@vancouver.ca>; Susan MacDougall <susan@focaleng.com>

Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

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Thanks Greg. More of our own experience has been related to the issues on smaller 1 or 2 storey Part 3 buildings, so this additional feedback for slim buildings from actual projects is very helpful. Like Susan mentioned, we have received a similar piece of feedback on the VFAR adjustment and we're open to these suggestions and hearing more from projects this would affect. We plan to look more at revising the equation and maximum at the end of the public feedback period.

For the airtightness in Pathfinder our understanding is that this is the normalized leakage rate (per unit envelope area at 75 Pa) which should be achievable with lower values regardless of building form. For your initial example a Code leakage rate of 2.0 L/s/m² @ 75 Pa total envelope area would correspond to about an infiltration rate of 0.33 L/s/m² vertical façade area @ 2.6 Pa (65% greater than the default CoV EMG rate of 0.20). A slim building definitely has higher infiltration loads per unit modelled floor area, but this was part of the considerations going into work on this topic. This also ties in with some of the proposed infiltration changes Riley is working on.

Danny Taylor, CPHC
Associate | he/him
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danny@focaleng.com



From: McCall, Gregory <Gregory.McCall@vancouver.ca>
Sent: Wednesday, November 1, 2023 1:48 PM
To: Susan MacDougall <susan@focaleng.com>
Cc: Danny Taylor <danny@focaleng.com>
Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG
Importance: High

Susan and David,
Use this version please.

Thanks,
G

M. Greg McCall
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From: McCall, Gregory

Sent: Wednesday, November 1, 2023 1:41 PM
To: Susan MacDougall <susan@focaleng.com>
Cc: Danny Taylor <danny@focaleng.com>
Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

Susan and Danny,
Please see my analysis attached.
It looks like skinny buildings start around 40 feet wide as either R16 effective walls or larger adjustments are needed.

In the meantime I have confirmed the building is NOT wood construction but concrete.

Regards,
G

M. Greg McCall
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From: McCall, Gregory
Sent: Wednesday, November 1, 2023 12:03 PM
To: Susan MacDougall <susan@focaleng.com>
Cc: Danny Taylor <danny@focaleng.com>
Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

I'm sorry, my apologies, but I guess I misheard from the applicant that they are NOT wanting to be pushed to triple glazing and so the double glazed value of 0.32 was correct.
Meanwhile apparently the "Air Tight" has the same issue as the VFAR in that it is a (flow rate)/(interior area) where again with a small interior area the allowed infiltration is impossible to meet.

Thoughts?
G

M. Greg McCall
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From: Susan MacDougall <susan@focaleng.com>
Sent: Wednesday, November 1, 2023 11:26 AM
To: McCall, Gregory <Gregory.McCall@vancouver.ca>
Cc: Danny Taylor <danny@focaleng.com>
Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

Hi Greg,

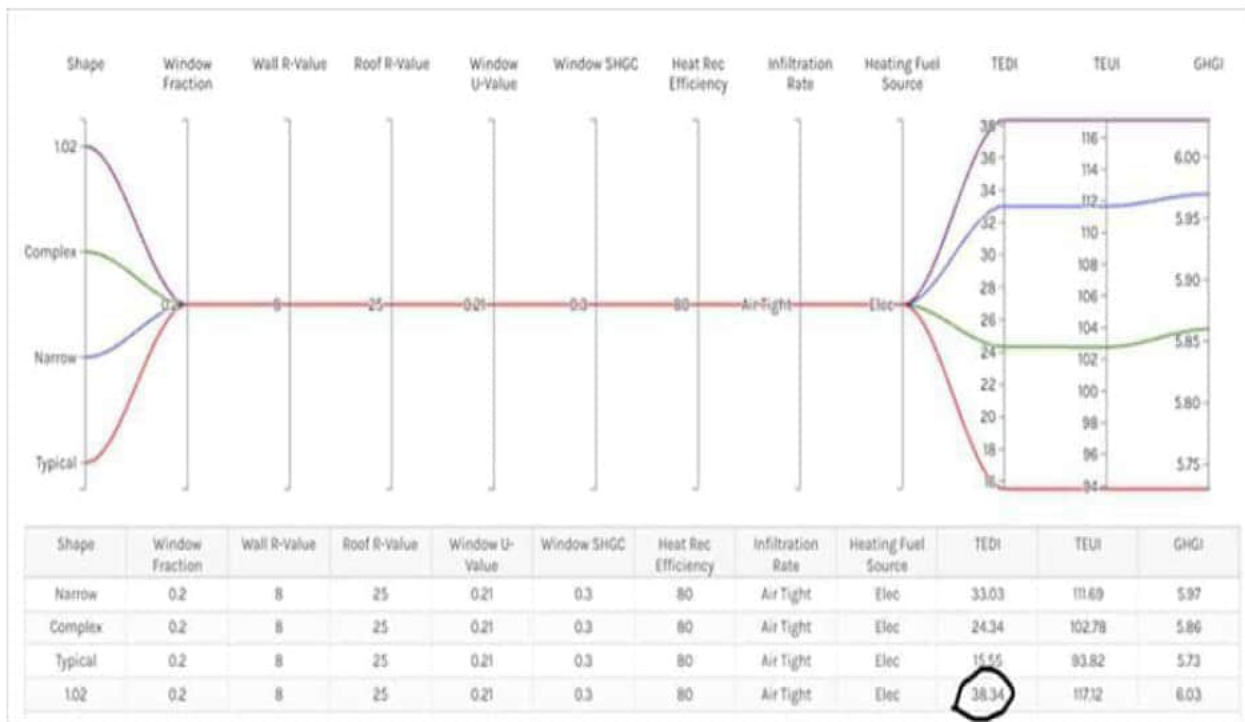
Danny and I chatted and have a few follow up notes.

Project Design

First, we updated the “baseline” as follows:

1. **Glazing:** Triple glazing can usually perform better than UIP-035 (USI-2.0), which is what we typically see for double glazing. We updated to UIP-021 (USI-1.2). However, this often goes with a reduction in SHGC, so we reduced that to 0.3 (from 0.32).
2. **Airtightness:** The “code” value represents 2.0 L/s.m2 at 75 Pa and we are finding most projects are better than this, especially when using a SAM. Using an “airtight” value makes a big difference.

You can see that with these 2 changes, the project achieves TEDI 38, just above the adjusted limit of 35 (25 + 10).



3. **Walls:** I know you said that the building was “a simply rectangle” but it’s unusual for an R28 nominal wall

3. to be de-rated to R8 on a 4-storey building (especially if it's wood-framed, which I didn't ask you about). We rarely see projects with less than R12-15 effective walls unless they are high-rise, and even then we try to push them higher.

If they could improve the details to get only 50% de-rating from nominal to R14, they could achieve TEDI 26, which meets the Adjusted TEDI limit of 35 with lots of room.

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
Narrow	0.2	14	25	0.21	0.3	80	Air Tight	Elec	22.23	100.89	5.82
Complex	0.2	14	25	0.21	0.3	80	Air Tight	Elec	15.7	94.21	5.73
Typical	0.2	14	25	0.21	0.3	80	Air Tight	Elec	9.06	87.33	5.63
1.02	0.2	14	25	0.21	0.3	80	Air Tight	Elec	26.23	105.11	5.88

(I also tested this going back to the code airtightness and again, they are just above the TEDI limit of 35.

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
1.02	0.2	14	25	0.21	0.3	80	Code	Elec	36.78	115.15	6

Updated Adjustment

That said, we are still interested in looking to whether there could/ should be a "narrow building" component of the VFAR adjustment. We have received feedback from others that the cap is too low in some circumstances, so can look further. We'll look forward to hearing your thoughts on what defines a "narrow building".

Thanks for reaching out,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: McCall, Gregory <Gregory.McCall@vancouver.ca>
Sent: Wednesday, November 1, 2023 10:10 AM
To: Susan MacDougall <susan@focaleng.com>
Cc: Danny Taylor <danny@focaleng.com>
Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

No,
Just scroll down.
It is different from my first email.

Are we chatting? Time?
G

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From: Susan MacDougall <susan@focaleng.com>
Sent: Wednesday, November 1, 2023 10:09 AM
To: McCall, Gregory <Gregory.McCall@vancouver.ca>
Cc: Danny Taylor <danny@focaleng.com>
Subject: RE: TEDI for Skinny Bldgs - Proposed CoV MG

Hi Greg,

Was there meant to be an attachment?

If you'd like to have a quick call now let me know and I can send a meeting invitation. I think we might need to share screen as I'm not fully up to speed with the calcs you originally sent.

Thanks,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
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susan@focaleng.com

From: McCall, Gregory <Gregory.McCall@vancouver.ca>
Sent: Wednesday, November 1, 2023 8:55 AM
To: Susan MacDougall <susan@focaleng.com>
Cc: Danny Taylor <danny@focaleng.com>
Subject: Re: TEDI for Skinny Bldgs - Proposed CoV MG

Susan and Danny,

Here is something I created yesterday for myself just trying to get my head around the effect of caps and storeys has on the 27.5' wide building I'm dealing with.

Cheers,
G

M. Greg McCall
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From: McCall, Gregory <Gregory.McCall@vancouver.ca>

Sent: Tuesday, October 31, 2023 9:08:42 PM

To: McCall, Gregory <Gregory.McCall@vancouver.ca>

Subject: TEDI for Skinny Bldgs - Proposed CoV MG

SIMULATION (Base design meeting TEUI, GHGI and TEDI of "Normalized" width

- i) 4 storeys,
- ii) MFA = 951
- iii) Width = 27.5 ft
- iv) VFAR = $(975/951) = 1.02$
- v) Wall Eff R-value per EMG = 8 (nominal R24)
- vi) Roof Eff R-value per EMG = 25 (nominal R30)

R8 Wall (nominal R23), R25 Roof (nominal R30), Heat Recovery @ 80%



Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel	TEDI	TEUI	GHGI
Narrow	0.2	8	25	0.35	0.32	80	Code	Elec	51.96	129.85	6.19
Complex	0.2	8	25	0.35	0.32	80	Code	Elec	37.51	115.35	6.02
Typical	0.2	8	25	0.35	0.32	80	Code	Elec	23.2	101.04	5.84
1.02	0.2	8	25	0.35	0.32	80	Code	Elec	60.83	138.75	6.29

What is the cost of the VFAR Adjustment Cap at 10 instead of allowing 16?

i) VFAR calc;

$$\begin{aligned}
 & \text{VFAR Adjustment calc;} \\
 & = 50(1.02-0.70) \\
 & = 50(0.32) \\
 & = 16 \quad (\text{as opposed to a cap at 10})
 \end{aligned}$$

ii) Difference is R55 (nominal) wall instead of R30 (nominal);

- Material and construction cost?
- Embodied carbon?
- Operational savings and payback?

TEDI Adjustment (No Cap): **R18 Wall (nominal R30?), R30 Roof (nominal R35?), Heat Recovery @ 85%**

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel	TEDI	TEUI
Narrow	0.2	18	30	0.35	0.32	85	Code	Elec	34.25	112.12
Complex	0.2	18	30	0.35	0.32	85	Code	Elec	23.12	100.95
Typical	0.2	18	30	0.35	0.32	85	Code	Elec	12.08	89.86
1.02	0.2	18	30	0.35	0.32	85	Code	Elec	41.11	118.95

TEDI Adjustment (Cap = 10): R28 Wall (nominal R55?), R30 Roof (nominal R35?), Heat Recovery @ 85%

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel	TEDI	TEUI
Narrow	0.2	28	30	0.35	0.32	85	Code	Elec	29.33	107.04
Complex	0.2	28	30	0.35	0.32	85	Code	Elec	20.06	97.81
Typical	0.2	28	30	0.35	0.32	85	Code	Elec	10.84	88.56
1.02	0.2	28	30	0.35	0.32	85	Code	Elec	35.06	112.67

What is the cost of disallowing Small Building Adjustment because of height (storeys)?

i) Difference per floor is

<p>Small Bldg Adjustment calc (for 4 storeys);</p> $= 15(3-4)(600/951)$ $/475.5)$ $= 15(0)(0.6)$ $15(2)(2.52)$ $= 0$ 75.7	<p>Small Bldg Adjustment calc (for 2 storeys);</p> $= 15(3-2)(600$ $= 15(3-1)(600/237.75)$ $= 15(1)(1.2)$ $= 18.9$	<p>=</p> <p>=</p>
---	--	-------------------

ii) Difference from 1 to 2 floors (with VFAR cap of 10 as baseline)

Total TEDI Adjustments(without caps).....(with caps)		
2 storeys:	18.9 + 16 = 35	35 + 25 (orig target) = 60 (18.9 + 10)
	+ 25 (orig target) = 54	
1 storey:	75.7 + 16 = 91.7	92 + 25 (orig target) = 117 (30 + 10) + 25 (orig target) = 65

TEDI Adjustment 1 Storey (Baseline Cap = 10) TEDI target = 76+10+25 = 111: No

change from basic design R8 Wall (nominal R24)

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltrati... Rate	Heating Fuel	TEDI	TEUI	GHGI
Narrow	0.2	8	25	0.35	0.2	80	Code	Elec	57.04	134.65	6.26
Complex	0.2	8	25	0.35	0.2	80	Code	Elec	41.11	119.12	6.08
Typical	0.2	8	25	0.35	0.2	80	Code	Elec	25.5	103.86	5.89
1.02	0.2	8	25	0.35	0.2	80	Code	Elec	66.88	144.2	6.37

TEDI Adjustment 2 Storeys (Baseline Cap = 10) TEDI target = 19+10+25 = 54: R14 Wall (nominal R32?)

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltrati... Rate	Heating Fuel	TEDI	TEUI	GHGI
Narrow	0.2	14	25	0.35	0.2	80	Code	Elec	45.69	123.19	6.12
Complex	0.2	14	25	0.35	0.2	80	Code	Elec	31.87	109.82	5.96
Typical	0.2	14	25	0.35	0.2	80	Code	Elec	18.34	96.67	5.79
1.02	0.2	14	25	0.35	0.2	80	Code	Elec	54.26	131.42	6.22

R32 (nominal) wall instead of R24 (nominal);

- a. Material and construction cost?
- b. Embodied carbon?
- c. Operational savings

iii) Difference from 2 to 3+ floors (with VFAR cap of 10 as baseline)

Total TEDI Adjustments(without caps).....(with caps)

3 or 4 storeys: 0.0 + 16 = 16 16 + 25 (orig target) = 41 (0.0 + 10)
 + 25 (orig target) = 35

2 storeys: 18.9 + 16 = 35 35 + 25 (orig target) = 60 (18.9 + 10)
 + 25 (orig target) = 54

TEDI Adjustment 2 Storeys (Baseline Cap = 10) TEDI target = 19+10+25 = 54: R14 Wall (nominal R32?)

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltrati... Rate	Heating Fuel	TEDI	TEUI	GHGI
Narrow	0.2	14	25	0.35	0.2	80	Code	Elec	45.69	123.19	6.12
Complex	0.2	14	25	0.35	0.2	80	Code	Elec	31.87	109.82	5.96
Typical	0.2	14	25	0.35	0.2	80	Code	Elec	18.34	96.67	5.79
1.02	0.2	14	25	0.35	0.2	80	Code	Elec	54.26	131.42	6.22

TEDI Adjustment 3+ Storeys (Baseline Cap = 10) TEDI target = 0+10+25 = 35: R39 Wall (nominal R85?), R42 Roof (nominal R50?), Heat Recovery @ 85%

Shape	Window Fraction	Wall R-Value	Roof R-Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltrati... Rate	Heating Fuel	TEDI	TEUI	GHGI
Narrow	0.2	39	42	0.35	0.2	85	Code	Elec	29.44	107.28	5.93
Complex	0.2	39	42	0.35	0.2	85	Code	Elec	19.85	98.39	5.81
Typical	0.2	39	42	0.35	0.2	85	Code	Elec	10.45	89.48	5.68
1.02	0.2	39	42	0.35	0.2	85	Code	Elec	35.44	112.69	6

R85 (nominal) wall instead of R32 (nominal), R50 (nominal) roof instead of R30 (nominal), Heat Recovery @ 85% instead of 80%;

- Material and construction cost?
- Embodied carbon?
- Operational savings

G

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Total Modelled Floor Area = 951 sqm (4 flrs)
 Each Floor Area = 237.8
 Width (m) = 8.4 27.5 ft
 Length (m) = 28.4 93.1 ft
 Perimeter Length (m) = 73.5 241.1 ft
 Building Height (m) = 13.3 43.5 ft

Vertical Envelope Area = 975 sqm

	Vertical Envelope				MFA	VFAR	Wall Eff R-value	TEDI		VFAR Adjustment		
	Width (ft and m)	Length	Perim Lgth	Env V Area				VFAR	Typical	Required to Reach 25	Calc	Cap
	15	4.6	28.4	65.9	873.9	518.7	1.68				49.2	10
	16	4.9	28.4	66.5	882.0	553.3	1.59				44.7	10
	17	5.2	28.4	67.1	890.1	587.9	1.51				40.7	10
	18	5.5	28.4	67.7	898.2	622.5	1.44				37.1	10
	19	5.8	28.4	68.3	906.3	657.1	1.38				34.0	10
	20	6.1	28.4	68.9	914.3	691.6	1.32				31.1	10
	21	6.4	28.4	69.5	922.4	726.2	1.27				28.5	10
	22	6.7	28.4	70.1	930.5	760.8	1.22				26.2	10
Pathfinder's limit (1.2)	22.5	6.9	28.4	70.4	934.6	778.1	1.20	R8 eff	73.1	22.35	48.1	10
								R35 eff	43.18	11.65	18.18	
	23	7.0	28.4	70.7	938.6	795.4	1.18				24.0	10
	24	7.3	28.4	71.4	946.7	830.0	1.14				22.0	10
	25	7.6	28.4	72.0	954.8	864.5	1.10	R8 eff	65.45	22.35	40.45	10
								R35 eff	38.35	11.65	13.35	
	26	7.9	28.4	72.6	962.9	899.1	1.07				18.5	10
	27	8.2	28.4	73.2	971.0	933.7	1.04				17.0	10
Actual building for BP	27.5	8.4	28.4	73.5	975.0	951.0	1.025	R8 eff	59.48	22.35	34.48	10
								R35 eff	34.84	11.65	9.84	
								R30 eff	35.84	11.86	10.84	
	28	8.5	28.4	73.8	979.0	968.3	1.01				15.6	10
	29	8.8	28.4	74.4	987.1	1002.9	0.98				14.2	10
	30	9.1	28.4	75.0	995.2	1037.5	0.96	R8 eff	55.07	22.35	30.07	10
								R25 eff	34.19	11.86	9.19	
	31	9.4	28.4	75.6	1003.3	1072.0	0.94				11.8	10
	32	9.8	28.4	76.2	1011.4	1106.6	0.91				10.7	10
	33	10.1	28.4	76.8	1019.5	1141.2	0.89				9.7	9.7
	34	10.4	28.4	77.5	1027.6	1175.8	0.87				8.7	8.7
	35	10.7	28.4	78.1	1035.7	1210.4	0.86	R8 eff	47.84	22.35	22.84	7.8
								R20 eff	31.61	12.54	6.61	
	36	11.0	28.4	78.7	1043.7	1244.9	0.84				6.9	6.9
	37	11.3	28.4	79.3	1051.8	1279.5	0.82				6.1	6.1

Shape	Window Fraction	Wall R-Value	Roof R-Va
Narrow	0.2	35	32
Complex	0.2	35	32
Typical	0.2	35	32
1.2	0.2	35	32

Shape	Window Fraction	Wall R-Value	Roof R-Va
Narrow	0.2	8	32
Complex	0.2	8	32
Typical	0.2	8	32
1.025	0.2	8	32

Shape	Window Fraction	Wall R-Value	Roof R-Va
Narrow	0.2	25	32
Complex	0.2	25	32
Typical	0.2	25	32
.96	0.2	25	32

Shape	Window Fraction	Wall R-Value	Roof R-Va
Narrow	0.2	20	32
Complex	0.2	20	32
Typical	0.2	20	32
.86	0.2	20	32

38	11.6	28.4	79.9	1059.9	1314.1	0.81						5.3	5.3
39	11.9	28.4	80.5	1068.0	1348.7	0.79						4.6	4.6
40	12.2	28.4	81.1	1076.1	1383.3	0.78	R8 eff	42.12	22.35	17.12		3.9	3.9
							R20 eff	27.33	12.54	2.33			
							R16 eff	30.35	14.18	5.35			
41	12.5	28.4	81.7	1084.2	1417.9	0.76						3.2	3.2
42	12.8	28.4	82.3	1092.3	1452.4	0.75						2.6	2.6
43	13.1	28.4	82.9	1100.4	1487.0	0.74						2.0	2.0
44	13.4	28.4	83.6	1108.4	1521.6	0.73						1.4	1.4
45	13.7	28.4	84.2	1116.5	1556.2	0.72	R8 eff	37.87	22.35	12.87		0.9	0.9
							R16 eff	31.29	17.3	6.29			
46	14.0	28.4	84.8	1124.6	1590.8	0.71						0.3	0.3
47	14.3	28.4	85.4	1132.7	1625.3	0.70						-0.2	-0.2
48	14.6	28.4	86.0	1140.8	1659.9	0.69						-0.6	-0.6
49	14.9	28.4	86.6	1148.9	1694.5	0.68						-1.1	-1.1
50	15.2	28.4	87.2	1157.0	1729.1	0.67	R8 eff	34.34	22.35	9.34		-1.5	-1.5

Shape	Window Fraction	Wall R-Value	Roof R-Value
Narrow	0.2	16	32
Complex	0.2	16	32
Typical	0.2	16	32
.78	0.2	16	32

Shape	Window Fraction	Wall R-Value	Roof R-Value
Narrow	0.2	12	32
Complex	0.2	12	32
Typical	0.2	12	32
.72	0.2	12	32

- 1) Skinny buildings seem to appear when less than 50 feet wide, but certainly less than 40 feet wide where one starts to need R16 effective or a much bigger adjustment.
- 2) Column P shows the VFAR adjustment does not help skinny building yet as they are significantly behind the adjustment needed (Column O) to reach the code target of 25.
- 3) **See Formula Tweaks tab:** It seems an adjustment based more on the "VFAR-Z" difference keeps up with the skinniest of buildings when "X" is 80.

Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
	0.35	0.32	80	Code	Elec	29.18	106.86	5.9
	0.35	0.32	80	Code	Elec	20.38	99.18	5.78
	0.35	0.32	80	Code	Elec	11.65	89.46	5.65
	0.35	0.32	80	Code	Elec	43.18	120.31	6.06

Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
	0.35	0.32	80	Code	Elec	50.72	128.66	6.18
	0.35	0.32	80	Code	Elec	36.46	114.35	6
	0.35	0.32	80	Code	Elec	22.35	100.24	5.82
	0.35	0.32	80	Code	Elec	59.85	137.8	6.28

Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
	0.35	0.32	80	Code	Elec	31.21	108.96	5.93
	0.35	0.32	80	Code	Elec	21.49	99.25	5.8
	0.35	0.32	80	Code	Elec	11.86	89.58	5.66
	0.35	0.32	80	Code	Elec	34.19	111.91	5.96

Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
	0.35	0.32	80	Code	Elec	33.77	111.59	5.96
	0.35	0.32	80	Code	Elec	23.1	100.9	5.82
	0.35	0.32	80	Code	Elec	12.54	90.29	5.68
	0.35	0.32	80	Code	Elec	31.61	109.43	5.93

Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
	0.35	0.32	80	Code	Elec	37.38	115.25	6.01
	0.35	0.32	80	Code	Elec	25.72	103.55	5.86
	0.35	0.32	80	Code	Elec	14.18	91.98	5.71
	0.35	0.32	80	Code	Elec	30.35	108.2	5.92

Value	Window U-Value	Window SHGC	Heat Rec Efficiency	Infiltration Rate	Heating Fuel Source	TEDI	TEUI	GHGI
	0.35	0.32	80	Code	Elec	42.87	120.79	6.08
	0.35	0.32	80	Code	Elec	30.01	107.89	5.92
	0.35	0.32	80	Code	Elec	17.3	95.14	5.75
	0.35	0.32	80	Code	Elec	31.29	109.17	5.94

Total Modelled Floor Area = 951 sqm (4 flrs)
 Each Floor Area = 237.8
 Width (m) = 8.4 27.5 ft
 Length (m) = 28.4 93.1 ft
 Perimeter Length (m) = 73.5 241.1 ft
 Building Height (m) = 13.3 43.5 ft

Vertical Envelope Area = 975 sqm

	Vertical Envelope						Wall Eff R-value	TEDI		VFAR Adjustment							
	Width (ft and m)	Length	Perim Lgth	Env V Area	MFA	VFAR		VFAR	Typical	Required to Reach 25	Original Calc	Calc = X (VFAR - Z)				Cap	
												X = 70	X = 90	X(90), Z(0.6)	X(80), Z(0.6)		
	15	4.6	28.4	65.9	873.9	518.7	1.68				49.2	68.9	88.6	97.6	86.8	10	
	16	4.9	28.4	66.5	882.0	553.3	1.59										
	17	5.2	28.4	67.1	890.1	587.9	1.51										
	18	5.5	28.4	67.7	898.2	622.5	1.44										
	19	5.8	28.4	68.3	906.3	657.1	1.38										
	20	6.1	28.4	68.9	914.3	691.6	1.32				31.1	43.5	56.0	65.0	57.8	10	
	21	6.4	28.4	69.5	922.4	726.2	1.27										
	22	6.7	28.4	70.1	930.5	760.8	1.22										
Pathfinder's limit (1.2)	22.5	6.9	28.4	70.4	934.6	778.1	1.20	R8 eff	73.1	22.35	48.1	25.1	35.1	45.1	54.1	48.1	10
								R35 eff	43.18	11.65	18.18						
	23	7.0	28.4	70.7	938.6	795.4	1.18										
	24	7.3	28.4	71.4	946.7	830.0	1.14										
	25	7.6	28.4	72.0	954.8	864.5	1.10	R8 eff	65.45	22.35	40.45	20.2	28.3	36.4	45.4	40.3	10
								R35 eff	38.35	11.65	13.35						
	26	7.9	28.4	72.6	962.9	899.1	1.07										
Actual building for BP	27.5	8.4	28.4	73.5	975.0	951.0	1.025	R8 eff	59.48	22.35	34.48	16.3	22.8	29.3	38.3	34.0	10
								R35 eff	34.84	11.65	9.84						
								R30 eff	35.84	11.86	10.84						
	28	8.5	28.4	73.8	979.0	968.3	1.01										
	29	8.8	28.4	74.4	987.1	1002.9	0.98										
	30	9.1	28.4	75.0	995.2	1037.5	0.96	R8 eff	55.07	22.35	30.07	13.0	18.2	23.3	32.3	28.7	10
								R25 eff	34.19	11.86	9.19						
	31	9.4	28.4	75.6	1003.3	1072.0	0.94										
	32	9.8	28.4	76.2	1011.4	1106.6	0.91										
	33	10.1	28.4	76.8	1019.5	1141.2	0.89										
	34	10.4	28.4	77.5	1027.6	1175.8	0.87										
	35	10.7	28.4	78.1	1035.7	1210.4	0.86	R8 eff	47.84	22.35	22.84	7.8	10.9	14.0	23.0	20.5	7.8
								R20 eff	31.61	12.54	6.61						
	36	11.0	28.4	78.7	1043.7	1244.9	0.84										
	37	11.3	28.4	79.3	1051.8	1279.5	0.82										

38	11.6	28.4	79.9	1059.9	1314.1	0.81											
39	11.9	28.4	80.5	1068.0	1348.7	0.79											
40	12.2	28.4	81.1	1076.1	1383.3	0.78	R8 eff	42.12	22.35	17.12	3.9	5.5	7.0	16.0	14.2	3.9	
							R20 eff	27.33	12.54	2.33							
							R16 eff	30.35	14.18	5.35							
41	12.5	28.4	81.7	1084.2	1417.9	0.76											
42	12.8	28.4	82.3	1092.3	1452.4	0.75											
43	13.1	28.4	82.9	1100.4	1487.0	0.74											
44	13.4	28.4	83.6	1108.4	1521.6	0.73											
45	13.7	28.4	84.2	1116.5	1556.2	0.72	R8 eff	37.87	22.35	12.87	0.9	1.2	1.6	10.6	9.4	0.9	
							R16 eff	31.29	17.3	6.29							
46	14.0	28.4	84.8	1124.6	1590.8	0.71											
47	14.3	28.4	85.4	1132.7	1625.3	0.70											
48	14.6	28.4	86.0	1140.8	1659.9	0.69											
49	14.9	28.4	86.6	1148.9	1694.5	0.68											
50	15.2	28.4	87.2	1157.0	1729.1	0.67	R8 eff	34.34	22.35	9.34	-1.5	-2.2	-2.8	6.2	5.5	-1.5	

- 1) Skinny buildings seem to appear when less than 50 feet wide, but certainly less than 40 feet wide where one starts to need R16 effective or a much bigger adjustment.
- 2) Column P shows the VFAR adjustment does not help skinny building yet as they are significantly behind the adjustment needed (Column O) to reach the code target of 25.
- 3) It seems an adjustment based more on the "VFAR-Z" difference (Z=0.6) keeps up with the skinniest of buildings when "X" is 80, while not over-assisting buildings >30ft wide.

From: "Li, Charling" <charling.li@vancouver.ca>
To: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
Date: 11/15/2023 11:25:00 AM
Subject: INTERNAL NOTES RE: Update to the COV EMG v3.0

Hi Patrick, I'll share some notes from what I discussed with Eoghan on the phone this morning.

We can discuss further in terms of what you want to reply.

Thanks,
Charling

From: Eoghan Hayes
Sent: Wednesday, November 8, 2023 8:36 AM
To: Li, Charling ; Enright, Patrick
Cc: Maura Gatensby ; McCall, Gregory ; Harshan Radhakrishnan ; Martina Soderlund ; Susan Hayes ; Curt Hepting ; Donal Dignan
Subject: RE: Update to the COV EMG v3.0

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Hi Charling

CC Patrick, Maura, Susan, Martina, Curt, Donal, Greg, Harshan.

Thank you providing this. I have the following queries/ requests pertaining to the attached RFP and the Workshop that took place on October 13th.

- 1) **Background Information, Page 4 of the RFP:** What "feedback and new knowledge has emerged since the release of the version 2.0 in July 2018" ? Can this information be shared ? The information is based on conversations we've had with project applicants and EMG users since the release of the EMGs in 2017. We don't have a summary other than the topics listed in the RFP scope of work.
- 2) **Background Information, Page 4 of the RFP:** It is stated that "While the focus of the update will be to reflect Vancouver's context, proponents are encouraged to consider the implications of these updates to users of the provincial ESC and lead discussions on these implications at the stakeholder workshops (see Deliverables)." Can you elaborate on this please ? Is the COV also asking proponents to undertake and consider updates to another building code, specifically the BC Building Code that is outside the COV's jurisdiction ? Since we know that the EMGs are referenced by the Energy Step Code, we wanted to make sure the update are considered through the lens of how they may affect projects outside of COV. We do not intend to dictate whether BSSB will adopt the updated EMGs for the administration of Energy Step Code and

the Zero Carbon Step Code. BSSB staff are involved in the consultations and I understand that is decision they plan to take once the next version is finalized.

- 3) I did not see any reference to any other professionals, Architects, structural engineers, mechanical engineers, and electrical engineers who are key stakeholders in the design of buildings mentioned in the RFP document or present at the workshop (Please correct me if I'm mistaken here) that took place on October 13th, 2023. Is the intent to update the guidelines in isolation of feedback from these industry professionals? **As part of a package of VBBL changes, we will be holding more stakeholder engagement with wider groups of design professionals in Q1 2024, and will highlight the proposed EMG changes.**
- 4) Some proposed impacts, the TEDI corridor adjustment limit reduction from 10 to 5 directly impact life safety. Corridor pressurization systems are connected to the CACF (Central alarm control facility) in each building. As per the RFP the proponent is meant to provide "Technical and Policy" recommendations on this item. While we did see policy recommendations on this item presented in the workshop, Edge asked for technical rationale on this item and the response given was essentially the COV dictated this change, and no technical rationale was provided. **[Patrick – let's discuss]**
- 5) As per my comments at the October 13th workshop I'm formally recommending another workshop be put on and industry be given time to process and shared the impact the proposed changes will have on their current energy modeling projects and share their experience of the impacts as part of the workshop feedback. It would also be good to get feedback from the other disciplines mentioned in comment 3 on these impacts. **Noted; there will be further engagement as part of the VBBL updates in Q1 2024.**
- 6) Based on the workshop on October 13th, it was our understanding each of the proposed changes were going to be quantified using energy modeling simulations by the proponent. To date, this information has not been provided and the deadline for feedback is this Friday November 10th at 5pm. **This information is forthcoming and the review period will be extended.**

It's unexpected to have to go to the proponent's own company website to provide the feedback on the proposed changes. One would expect this feedback link to be present on the City of Vancouver website. **Noted.**

Best regards,

Eoghan Hayes, P.Eng, BEMP, RESET AP, LEED AP BD&C

Managing Director

M: [+1 \(604\) 338 1063](tel:+16043381063)

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From: Li, Charling <charling.li@vancouver.ca>
Sent: Thursday, October 26, 2023 8:43 AM
To: Eoghan Hayes <ehayes@edgec.ca>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: Update to the COV EMG v3.0

Hi Eoghan, see attached. The RFP was sent in January to 3 vendors who were invited to respond. The scope was awarded to Focal Engineering in March.

Thanks,
Charling

From: Enright, Patrick <Patrick.Enright@vancouver.ca>
Sent: Wednesday, October 25, 2023 5:17 PM
To: Li, Charling <charling.li@vancouver.ca>
Subject: FW: Update to the COV EMG v3.0

Hi Charling,

Do you mind forwarding the scope to Eoghan?

Thanks,

Patrick Enright, P.Eng (he/him/his)
Team Lead, Small Existing and New Developments
Green & Resilient Buildings Branch | Sustainability Group
Planning, Urban Design & Sustainability | City of Vancouver
patrick.enright@vancouver.ca | 604.871.6158

For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̍əm (Musqueam [musqueam.bc.ca]), Skwxwú7mesh (Squamish [squamish.net]), and səɫɪwətaʔt / səɫɪwɪtulh (Tsleil-Waututh [twnation.ca]) nations.

From: Eoghan Hayes <ehayes@edgec.ca>
Sent: Wednesday, October 25, 2023 3:45 PM
To: Enright, Patrick <Patrick.Enright@vancouver.ca>; McCall, Gregory <Gregory.McCall@vancouver.ca>
Cc: Donal Dignan <donal@edgec.ca>; Anu John <anu@edgec.ca>
Subject: Update to the COV EMG v3.0

Hi Patrick

Can you please provide the scope of work/ RFP issued by the COV for this update and details of when it was posted , awarded etc.?

Thank you in advance.

Best regards,

Eoghan Hayes, P.Eng, BEMP, RESET AP , LEED AP BD&C

Managing Director

M: [+1 \(604\) 338 1063](tel:+16043381063)

T: [+1 \(888\) 939 3343](tel:+18889393343) Ext. [701](tel:+18889393343)

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From: "Li, Charling" <charling.li@vancouver.ca>
To: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
Date: 4/9/2025 9:12:27 AM
Subject: Li, Charling replied to a comment in "PDS - SUS - Energy Modelling Guidelines v3.0 for Council 20250415 - IN PROGRESS"
Attachments: AttachedImage (6)



PDS - SUS - Energy Modelling Guidelines



Li, Charling left a comment

Patrick to add something tying to 26 C in one room in suite (VBBL 9.33.X).



You left a comment

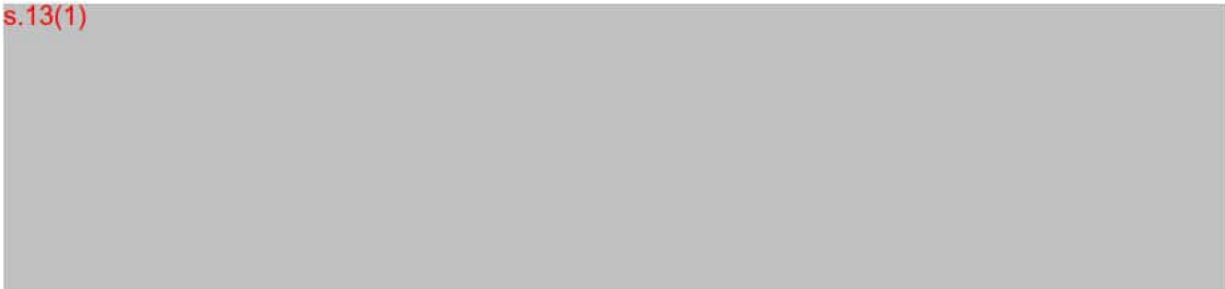
Done



Li, Charling replied

Great thank you

s.13(1)



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From: "Li, Charling" <charling.li@vancouver.ca>
To: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
Date: 10/11/2023 2:24:00 PM
Subject: Link to EMGs tracked changes

Hi Patrick, here's the link to the latest version of the EMGs with tracked changes. It's hosted on Focal's team so we can only view on the web browser for now.

 [PDS - SUS - Energy Modelling Guidelines v3.0 - DRAFT - TRACKED CHANGES_20231005.docx \[focaleng.sharepoint.com\]](#)

Thanks,
Charling

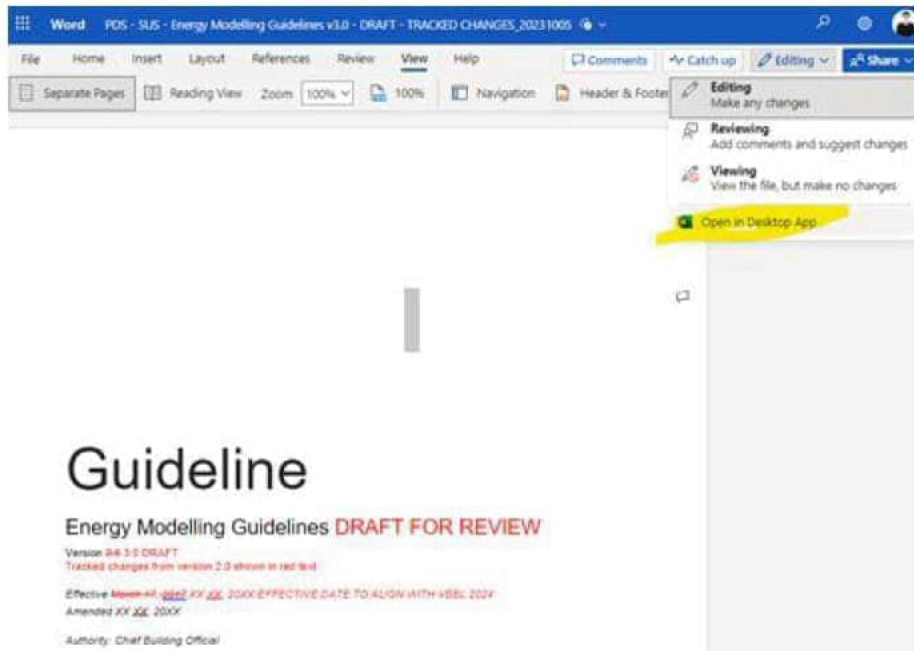
From: Danny Taylor
Sent: Wednesday, October 11, 2023 1:34 PM
To: Li, Charling
Cc: Susan MacDougall ; Riley Beise ; Kristian Storgard
Subject: RE: CoV EMG Workshop 2 - v3.0

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Thanks Charling, I've closed the resolved comments and responded to yours with a few final other tweaks, working on getting this wrapped up. If you're able to opening the file in the desktop app might fix the formatting issues.



Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>
Sent: Tuesday, October 10, 2023 11:28 AM
To: Danny Taylor <danny@focaleng.com>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Kristian Storgard <kristian@focaleng.com>
Subject: RE: CoV EMG Workshop 2 - v3.0

Hi Danny, thanks for this. I've accepted all the changes you've made, and rearranged Section 4 as we discussed last week. I have a few minor comments in Section 5 for you.

The formatting looks a bit funny in the web view of the file and all the equations are not showing up but I'm assuming that's a Teams issue. If it looks fine on your end I'm not worried about it and I'll have to fix formatting again when we finally publish it. I'm planning to share the PDF version as part of the public review.

I hope everyone had a wonderful Thanksgiving weekend with your loved ones!

Charling

From: Danny Taylor <danny@focaleng.com>

Sent: Thursday, October 5, 2023 2:06 PM

To: Li, Charling <charling.li@vancouver.ca>

Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Kristian Storgard <kristian@focaleng.com>

Subject: RE: CoV EMG Workshop 2 - v3.0

Hi Charling,

Here's the copy of the v3.0 document on our Sharepoint which we'll be working in before the workshop; appears to be working for formatting on our end in Word. Let us know if you run into any issues accessing it. Right now it's just an open link, so you can send it to Patrick or others, but we can also restrict it to just your account to access if needed.

 [PDS - SUS - Energy Modelling Guidelines v3.0 - DRAFT - TRACKED CHANGES_20231005.docx \[focaleng.sharepoint.com\]](#)

Danny Taylor, CPHC

Associate | he/him

t 250.516.6088 ext. 3 | m 778.995.9863

danny@focaleng.com



From: Danny Taylor

Sent: Wednesday, October 4, 2023 4:06 PM

To: Li, Charling <charling.li@vancouver.ca>

Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Kristian Storgard <kristian@focaleng.com>

Subject: RE: CoV EMG Workshop 2 - draft slides

Thanks Charling, and thanks for the commented Guidelines document last week. Looking forward to going over this tomorrow.

Danny Taylor, CPHC

Associate | he/him

t 250.516.6088 ext. 3 | m 778.995.9863

danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>

Sent: Wednesday, October 4, 2023 4:03 PM

To: Danny Taylor <danny@focaleng.com>

Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Kristian Storgard

[<kristian@focaleng.com>](mailto:kristian@focaleng.com)

Subject: RE: CoV EMG Workshop 2 - draft slides

Hi Danny, returning the slides to you – I have a few minor comments and edits in red text but it generally looks good.

Talk to you tomorrow,

Charling

From: Danny Taylor <danny@focaleng.com>

Sent: Friday, September 29, 2023 2:51 PM

To: Li, Charling <charling.li@vancouver.ca>

Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Kristian Storgard <kristian@focaleng.com>

Subject: CoV EMG Workshop 2 - draft slides

Hi Charling,

We wanted to send over the in-progress workshop slides ahead of our Thursday meeting. We're still working on building out some of the content and polish, but it should give you an idea of the structure and pacing if you wanted to review before we meet, and had content you want added. We'll likely have some updates and changes to bring to the meeting as well, and could schedule an additional meeting before the 13th if needed.

Have a great weekend!

Danny Taylor, CPHC

Associate | he/him

t 250.516.6088 ext. 3 | m 778.995.9863

danny@focaleng.com



From: "Li, Charling" <charling.li@vancouver.ca>
To: "Williams, Scott B OHCS:EX" <Scott.B.Williams@gov.bc.ca>
Date: 1/22/2026 4:50:58 PM
Subject: Part 3 EMGs update
Attachments: PDS - SUS - GRBT - EMGs v3.0 - SOW - draft 20221216.DOCX

Hi Scott,

I was hoping to catch you for a chat on this s.22(1) but perhaps we can connect in the new year. We're working on getting the RFP out to market to help us update the Part3 EMGs so I'm sharing the draft scope for feedback and suggestions, and let me know what your gut sense of how much the scope of work might be. I'll put a time in your calendar in January for us to talk about this as well.

Please keep this document confidential for now.

Have a great holiday break!

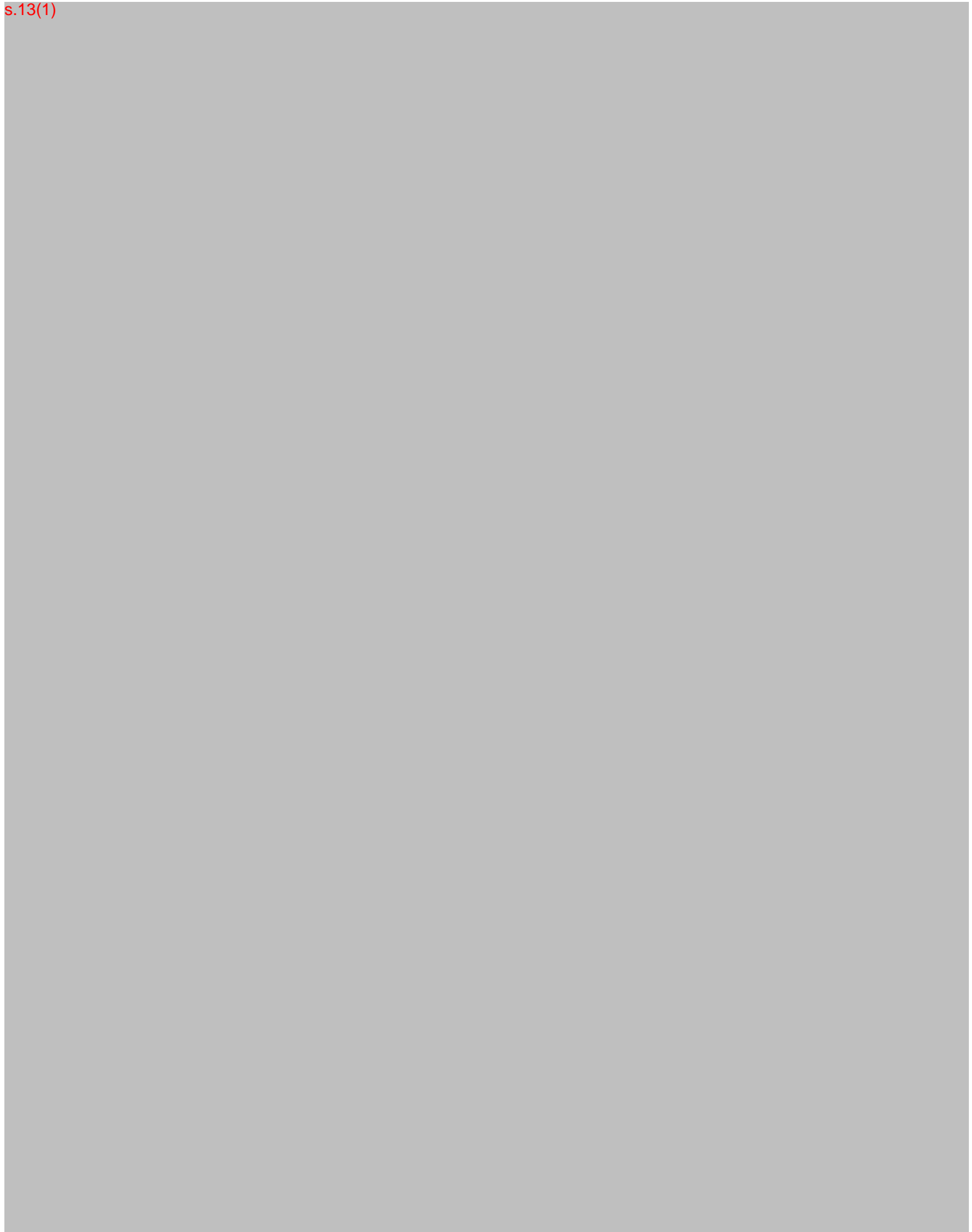
Charling

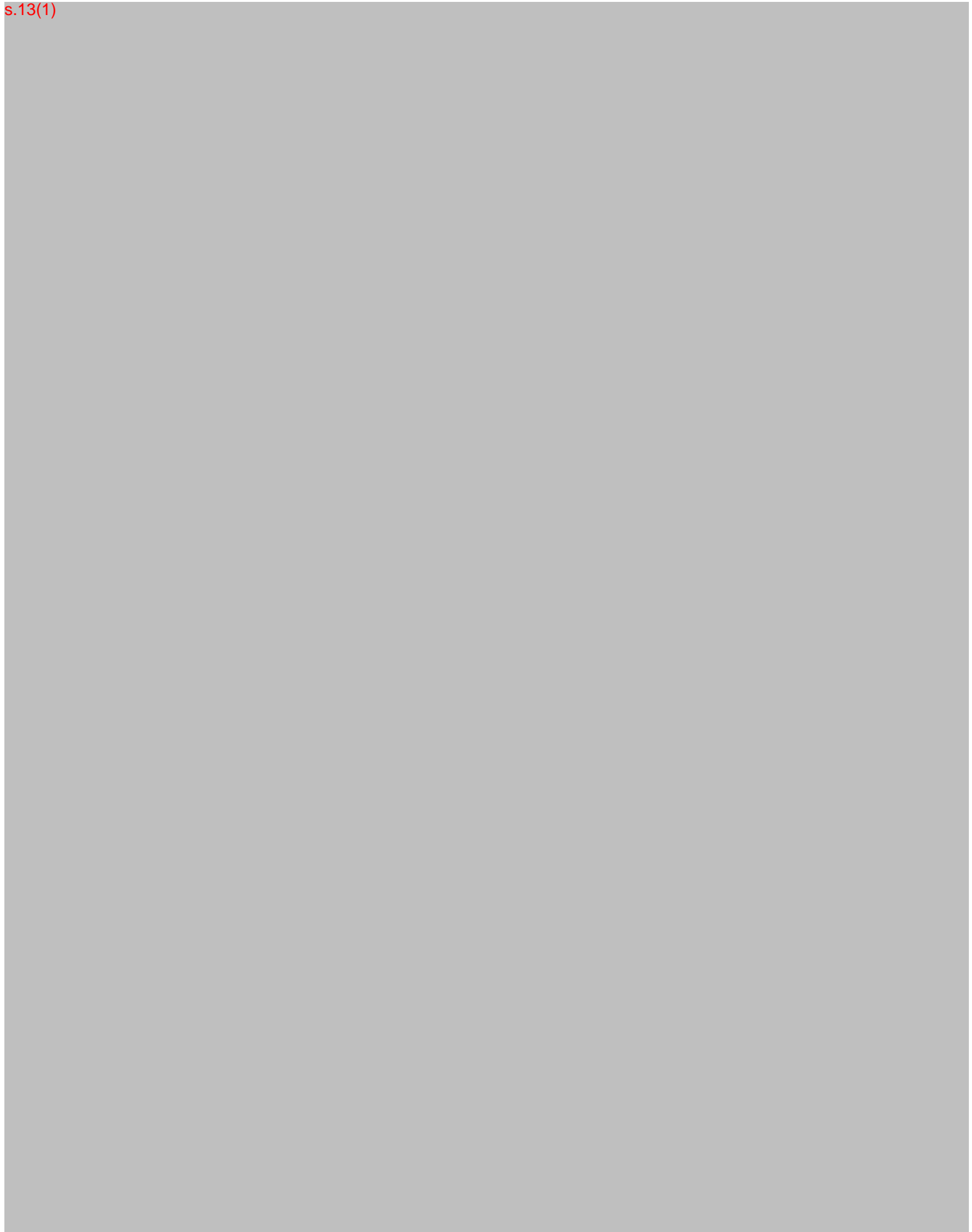
Charling Li, P.Eng., M.Urb. | Green Building Engineer
(she/her/hers)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
Charling.Li@vancouver.ca | 604.871.6833

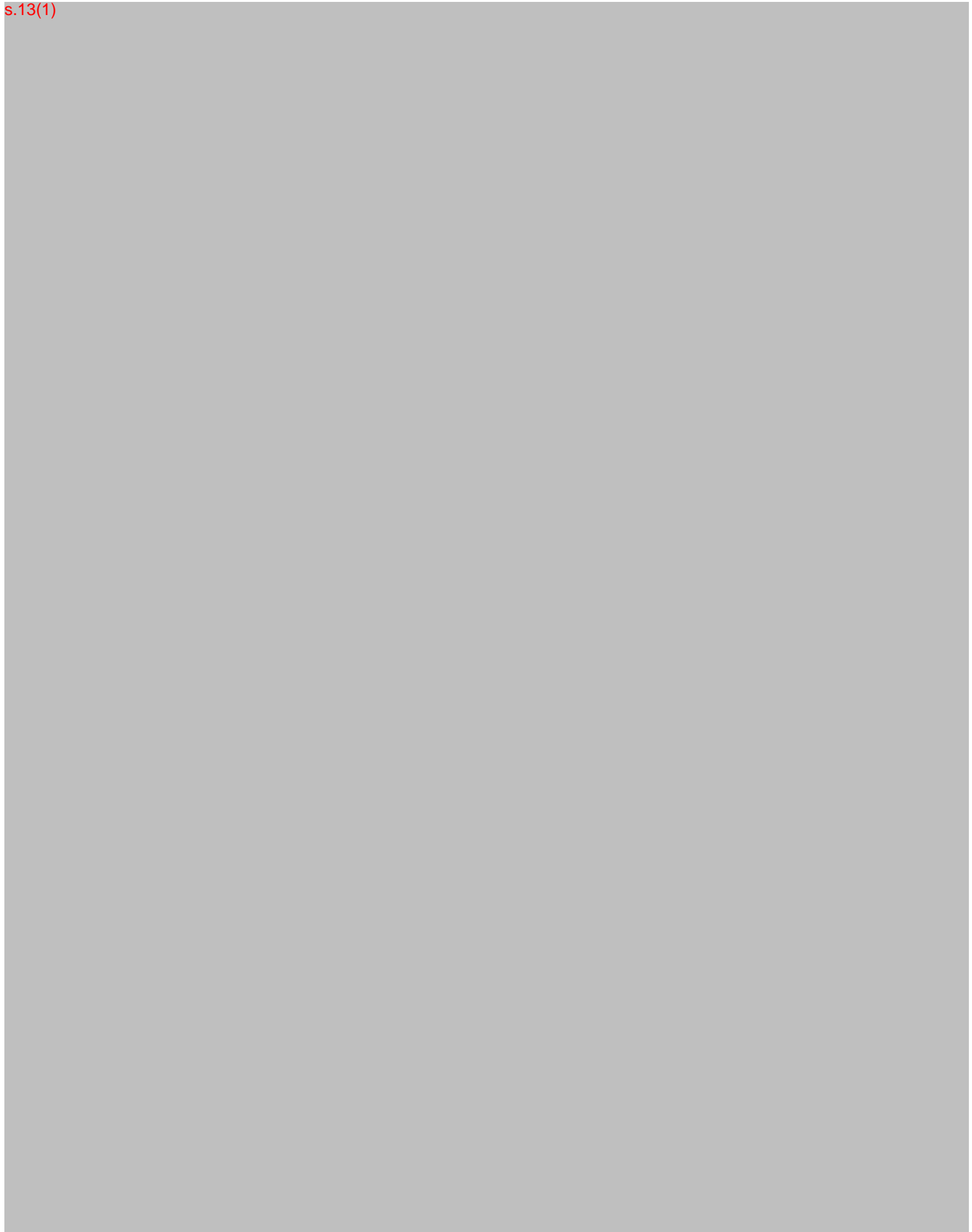
[Learn about recently approved green building changes for Part 3 New Construction here](#)

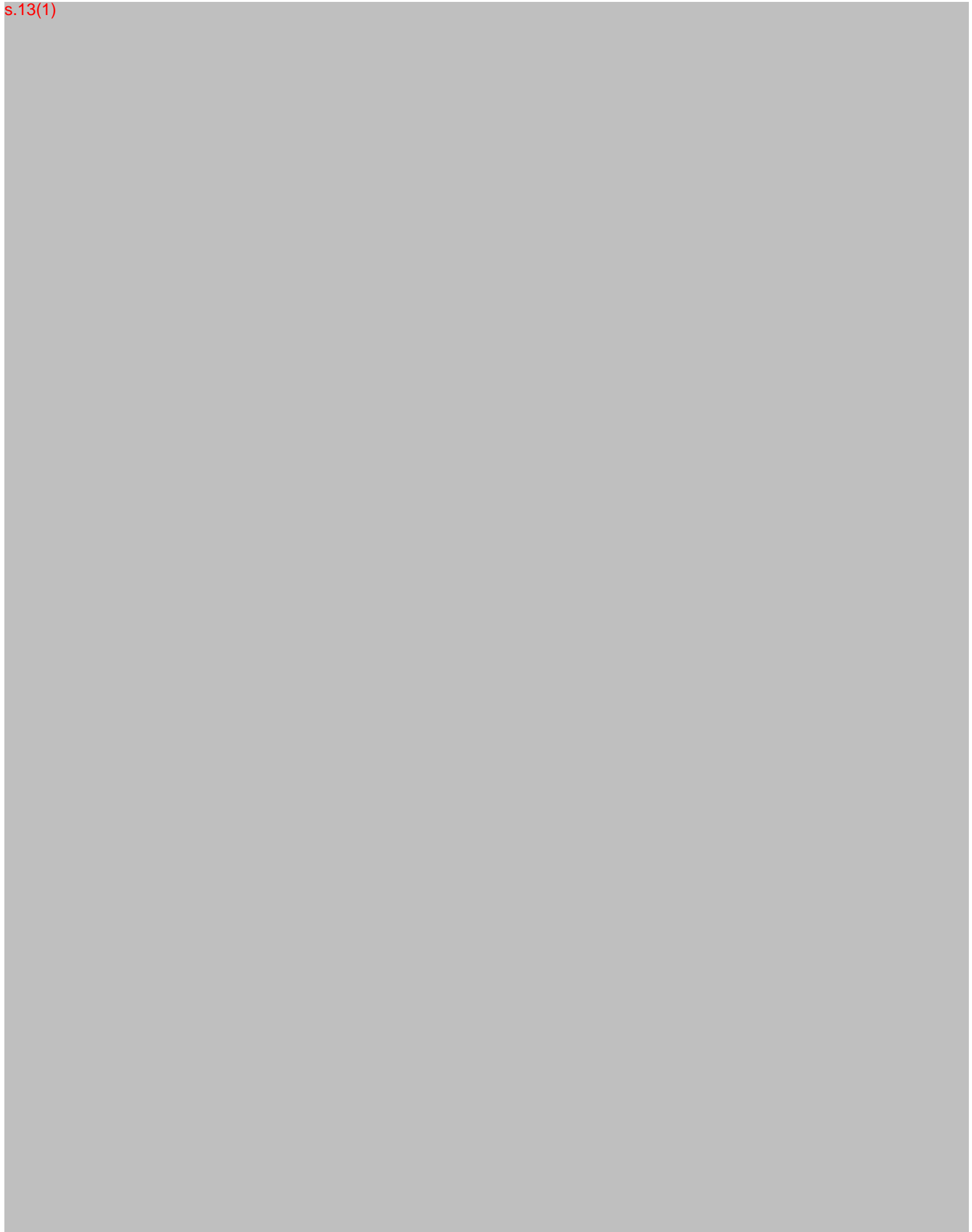
For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

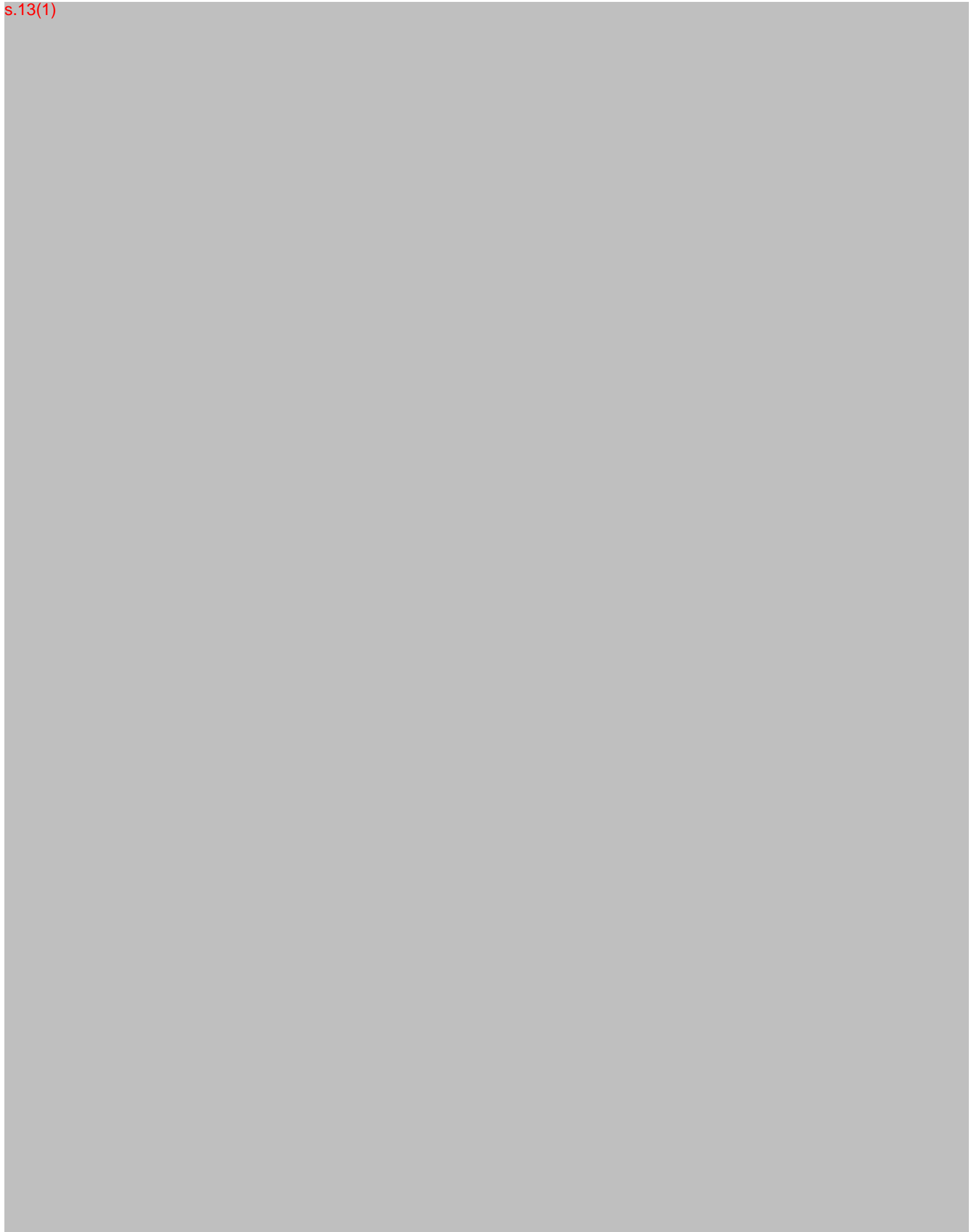
I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̅əm (Musqueam), Skwxwú7mesh (Squamish), and səlilwətaʔ / səlilwitulh (Tsleil-Waututh) nations.











From: ["Goundouvas, Dino" <dino.goundouvas@vancouver.ca>](mailto:dino.goundouvas@vancouver.ca)
To: ["Higgins, Chris \(Sustainability\)" <Chris.Higgins@vancouver.ca>](mailto:Chris.Higgins@vancouver.ca)
CC: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
Date: 2/14/2023 2:53:26 PM
Subject: PS20230002 - Evaluation of Proposals
Attachments: PS20230002 Evoke Proposal.pdf
PS20230002 Focal Proposal.pdf
PS20230002 - Evaluators Declaration and Evaluation Guide.docx
PS20230002 - Evaluation Matrix (individual).XLSX
City of Vancouver RFP No. PS20230002.pdf

Hi Chris,

I understand you will now be an evaluator relating to RFP PS20230002 - CONSULTANT SERVICES –2023 ENERGY MODELLING GUIDELINES UPDATE please find the attached submissions for your individual review and scoring of the technical requirements. Pricing and hourly rates have been removed to not bias the technical scoring process.

The RFP that was issued/posted is also attached as a reference document.

Two submissions were received by the closing time from:

1. Focal Engineering Inc.
2. Evoke Buildings Engineering Inc.

Also attached is the evaluation matrix in order to individually score the submissions. Please complete the matrix including comments and return me via email at your earliest convenience.

It is also required that all evaluators must review, complete and signed the attached "Evaluators Guidelines & Declaration Form". Please complete this form as soon as possible and return to me via email.

If you have any questions or clarifications please contact me.

Regards,
Dino

REQUEST FOR PROPOSAL NO. PS20230002
CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE

APPENDIX 1
PROPOSAL FORM

RFP No. PS20230002, CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE (the
"RFP")

Proponent's Name: Evoke Buildings Engineering Inc.
"Proponent"

Address: 250-997 Seymour Street, Vancouver, BC V6B 3M1

Jurisdiction of Legal Organization: British Columbia

Date of Legal Organization: Extra provincially in BC 2020/12/02

Key Contact Person: Alex Blue

Telephone: 604-260-1124

E-mail: ablue@evokebuildings.com

The Proponent, having carefully examined and read the RFP, including all amendments thereto, if any, and all other related information published on the City's website, hereby acknowledges that it has understood all of the foregoing, and in response thereto hereby submits the enclosed Proposal.

The Proponent further acknowledges that it has read and agrees to the Legal Terms & Conditions attached as Appendix 2 to the RFP.

IN WITNESS WHEREOF the Proponent has executed this Proposal Form:

s.15(1), s.22(1)

Signature of Authorized Signatory for the Proponent

February 6, 2023

Date

Alex Blue, Principal, Building Energy Specialist

Name and Title

s.15(1), s.22(1)

Signature of Authorized Signatory for the Proponent

February 6, 2023

Date

Sophie Mercier, Principal & Director

Name and Title

Executive Summary

Provide a brief executive summary of your Proposal.

Evoke is proposing a multi-company collaboration with RDH and AME, bringing a number of specialty focusses together under a single umbrella. The project will be led and completed by practicing energy modellers and designers with practical knowledge and current project experience, combined with policy and guideline development expertise.

The project will be led by Evoke, providing a single clear point of contact for City staff. We will work with RDH and AME to draw on specific technical expertise. Each firm's input will be led by practicing energy modellers with different areas of focus, and with both envelope and mechanical design engineers available to draw on for expertise. Elements of scope will be divided up, with Evoke acting as the technical clearinghouse to provide oversight and coordination between these elements. We also believe having multiple firms on the team will bring significant value to the City, allowing us to readily compare methodologies, perspectives, and software requirements in early discussions. In addition, the multi-company team approach will facilitate meeting the project timeline, as initial development of recommendations can proceed in parallel on different topics, bringing recommendations back together for validation, discussion, and consultation.

Initial recommendation development will draw on our existing expertise and previous modelling as well as existing sources, which will then be validated by modelling using actual recent project models that were designed and modeled based on the Energy Modelling Guidelines v2.0. These models will be updated to the proposed v3.0, in mechanical cooling and passive cooling scenarios.

Consultation is understood to be an important element of this RFP. We will plan and lead two virtual workshops as well as conducting an online survey.

Our project team members have significant experience in working with other modellers, reviewing models and outcomes, and working on development of policies, codes, guides, and standards. We have been involved in developing guides, research, and policies for the City of Vancouver, the BC Energy Step Code, UBC, ZEBx, BC Housing, the City of Mississauga, and more. We include members of technical and industry advisory groups including the City of Vancouver's UDP, CaGBC, the CSA Z5020 committee, Step Code technical advisory and more. We are involved in the industry beyond our individual firms, and are well positioned to collaboratively understand and address likely concerns both from policy makers and from users of the guidelines.

Approach to Performing Scope of Work

Clearly describe the methodology and project work plan for performing the work. Include an estimate of how much energy modelling effort is planned compared to other methods of arriving at technical recommendations (e.g. past project experience, etc.). Provide an indication of the number, types and sizes of building designs that the proponent's organization has access to in carrying out this work.

Our approach to developing initial recommendations will lean on prior work to understand and quantify impacts. Following initial development of recommendations, and discussion of those recommendations with the City, we will apply the proposed changes to existing project energy models to quantify overall impacts under a limited number of carefully selected scenarios.

We see the project being carried out in four main phases (with some iteration and overlap):

Initial Recommendations

Our early focus will be on developing well-supported technical recommendations, based on the following sources.

1) Previous modelling or research by our team members

- a. Project modelling or project experience – e.g. Evoke has available existing modelling comparing CWEC2016 and 2020 weather files from previous project work. We have experience with applications of the modeled floor area over various space types, application of the corridor pressurization adjustment, impacts of GHG reduction modelling compared with ASHRAE and NECB, and have ready access to a variety of energy models across a number of building types, including low- and high-rise MURBs, mixed-use buildings, offices, and others (e.g. schools, institutional buildings) both in the City of Vancouver and across the Lower Mainland (targeting Step Code and modeled based on the EMG v2.0).

As indicated in the RFP, recommendations for the refrigerant methodology will be based on existing available resources and reports, with consideration to other relevant standards or regulations. AME will also review and make recommendation on whether GHGI-R reporting should be limited to mechanical cooling equipment containing more than a specified volume or cooling capacity. AME has access to refrigerant information from a variety of projects and system types, and can refer to this information if required.

- b. Previous design guides – e.g. RDH developed UBC's Design for Climate Resilient Buildings document, as well as the Climate Resilience Framework and Standards for Public Sector Buildings, which they will draw on to develop strategies around overheating analysis, CEDI, and resilience. AME developed a ZEBx Playbook, "Ventilation Strategies for High-Performance Multi-Unit Residential Building", which will contribute background to discussions of both ventilation rate standard and corridor pressurization.
- c. A member of our team was on the CSA Z5020 committee, allowing us to draw readily on his existing knowledge of the standard.

2) Previous modelling or research by others

- a. Research by others will inform some recommendations, for example the DHW recommendations have been explored in depth previously. In these cases, we will focus on impact on overall TEUI, TEDI, and GHGI based on existing project examples and basic calculations. Our approach for appliances, laundry, lighting, and elevators will similarly draw on existing information, supplemented by our project experience of how these items impact model and design outcomes.
- b. To consider form factor recommendations, we intend to leverage Building Pathfinder to quantify impacts of VFAR; this will allow for a replicable and transparent factor development and allow fast comparison of a number of possible options.

Validation via Energy Modelling

Once we have developed preliminary recommendations and discussed our initial proposals and reasoning with the City, we will test the recommendations against the v3.0 guidelines using whole building energy modelling. Modelling will be done by Evoke using our existing project models. We anticipate using a wood-framed low-rise MURB (6 storeys), and a high-rise MURB, both of which are either in detailed design or past the building permit phase, and are located in the Lower Mainland and modeled to v2.0 of the EMG.

We anticipate developing several iterations of these models, in particular to analyze with and without mechanical cooling scenarios and compliance paths. Our main focus will be to analyze the overall combined impact of the recommended changes. We anticipate that the impacts of many of the proposed changes will be readily apparent and will not require separate analysis; e.g. the DHW changes will only impact DHW end use, which will be shown as an outcome of the modelling. Where impacts are both substantial and not immediately apparent, e.g. ventilation standards, we have allowed for a small number of dedicated iterations to isolate and illustrate individual impacts.

It is possible that certain of these isolated iterations may need to be done during the initial recommendation development; this is easy to do using the same models and methods and can be carried forward into this validation analysis.

We do not anticipate that there will be sufficiently broad changes to the non-residential modelling guidelines to require a re-modelling, however we do have access to existing office and retail building models and can readily run one or two basic items (e.g. a change to ventilation rates).

We expect that the biggest goal of the energy models will be to confirm, consolidate, and communicate impacts, which will be used during the consultations described below.

Consultation

We will lead two 1.5–2 hour virtual workshops, and will conduct an online survey.

Workshop 1 will be focussed on relevant code compliance professionals, while workshop 2 will focus on local energy modelling professionals.

We will work with the City to develop the invitation lists. The first workshop will be invitation only and will include stakeholders throughout the province. We anticipate that this will be a

smaller group (10-20 as noted in the RFP) and will allow for more open discussion time. We note that the upcoming version of the BC Energy Step Code will specifically reference v2.0 of the EMG, but that future versions may be adopted at some point and will certainly have an impact beyond Vancouver. We have not allowed for additional exploration of impacts outside of Vancouver but will provide the information and background we can based on our experience.

The second workshop will be open invitation and will be distributed to our and the City's networks. The RFP anticipates approximately 25-50 individuals. In this larger workshop, we anticipate a more structured and time-bounded format for feedback to allow for the larger group format.

A survey will be developed in time to be distributed during the workshops, with additional distribution within our and the City's networks. We anticipate that the survey will be primarily multiple choice, with limited open feedback options, to allow us to collect, analyze, and incorporate feedback within the project timelines.

Finalizing the Report and Guidelines

Once feedback from the draft report, workshops, and survey are collected, we will update and finalize our report and the EMG v3.0 with tracked changes.

Key Personnel

Identify and provide professional biographical information for the key personnel that would perform the required services. Indicate the level of experience key personnel have in reviewing energy modelling work by others outside of the proponent's organization or exposure to challenges experienced by modellers outside their organization, and depth of experience on policy and code recommendations.

EVOKE BUILDINGS ENGINEERING INC.

Alex Blue, P.Eng., BEMP, LEED AP BD+C – Principal, Building Energy Specialist

Project Lead

s.22(3)(d)



Grace Suri, LEED AP BD+C – Building Energy Specialist

Building energy modelling, technical input

s.22(3)(d)



s.22(3)(d)

RDH BUILDING SCIENCE

Brittany Coughlin, M.A.Sc., P.Eng., BEMP, CPHC, LEED AP – Principal, Energy + Sustainability Specialist

RDH project lead, overheating, CEDI, and resilience focus

s.22(3)(d)

Eric Catania, M.Eng., P.Eng., BEMP, CPHD, LEED AP BD+C – Associate, Senior Energy and Sustainability Analyst

Technical input, expertise with numerous software types

s.22(3)(d)

s.22(3)(d)

Neil Norris, M.A.Sc., P.Eng., CPHD – Associate, Building Science Specialist
Technical input, CSA Z5020, survey development and analysis

s.22(3)(d)

The AME Consulting Group Ltd.

Marc Trudeau, P.Eng., Architect AIBC, BEMP, CPHD, LEED AP BD+C
AME project lead, refrigerant GHGI-R focus

s.22(3)(d)

Patrick Stewart, P.Eng. CPHD, LEED Green Assoc.
Mechanical design engineer, technical input

s.22(3)(d)

**REQUEST FOR PROPOSAL NO. PS20230002
CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE**

s.22(3)(d)

References	
Client Name # 1	Province of BC, Building and Safety Standards Branch, Ministry of Housing
Address (City and Country)	PO Box 9844 Stn Prov Govt Victoria, BC, Canada
Contact Name	Scott Williams
Title of Contact	Senior Codes Engineer
Telephone No.	236-478-2043
E-mail Address	Scott.B.Williams@gov.bc.ca
Length of Relationship	s.22(3)(d)
Type of Goods and/or Services provided to this Client	
Client Name # 2	Jameson Development Corp
Address (City and Country)	670 – 1655 West Broadway Vancouver, BC
Contact Name	Tom Pappajohn
Title of Contact	VP
Telephone No.	Office: 604-732-7122
E-mail Address	tom@jamesoncorp.ca
Length of Relationship	s.22(3)(d)
Type of Goods and/or Services provided to this Client	

**REQUEST FOR PROPOSAL NO. PS20230002
CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE**

Client Name # 3	University of British Columbia Properties Trust
Address (City and Country)	Suite 200 – 3313 Shrum Lane Vancouver, British Columbia Canada V6S 0C8
Contact Name	Shawn Rodgers
Title of Contact	Development Manager
Telephone No.	C: 778-987-8965
E-mail Address	SRodgers@ubcproperties.com
Length of Relationship	s.22(3)(d)
Type of Goods and/or Services provided to this Client	
**Additional RDH Reference **	
Client Name # 4 - RDH Reference	University of British Columbia, Sustainability and Engineering, Campus and Community Planning
Address (City and Country)	Centre for Interactive Research on Sustainability, 2210 West Mall, Vancouver, BC V6T 1Z4
Contact Name	Ralph Wells
Title of Contact	Community Climate and Energy Manager
Telephone No.	(604) 827-1838
E-mail Address	ralph.wells@ubc.ca
Length of Relationship	s.22(3)(d)
Type of Goods and/or Services provided to this Client	

Subcontractors

List all of the subcontractors that the Proponent proposes to use in carrying out the required services and described the scope of subcontracted work (or write "None" if no subcontractors are proposed).

RDH BUILDING SCIENCE

Scope subcontracted: Development of recommendations and reporting for overheating, resilience, CEDI, future climate weather files, and assist with review of CSA Z5020. Assist with workshops (led by Evoke) and lead survey development and analysis (with input from Evoke).

The AME Consulting Group Ltd.

Scope subcontracted: Development of recommendations and reporting for refrigerant impact, with input and coordination from Evoke. Provide brief input from a mechanical design perspective on compliance for actively cooled buildings. Be present for workshops to answer questions and be available to respond to input from City staff and consultation.

Declaration of Supplier Code of Conduct

The City of Vancouver expects each supplier of goods and services to the City to comply with the supplier performance standards set out in the City's Supplier Code of Conduct ("SCC") <<https://policy.vancouver.ca/AF01401P1.pdf>>, which defines minimum labour and environmental standards for City suppliers and their subcontractors. To give effect to these requirements, an authorized signatory of each proposed vendor must complete the following declaration.

As an authorized signatory of Evoke Buildings Engineering Inc. (*vendor name*), I declare that I have reviewed the SCC and to the best of my knowledge, Evoke Buildings Engineering Inc. (*vendor name*) and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted below (include all violations/convictions that have occurred in the past three years as well as plans for corrective action). I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of Evoke Buildings Engineering Inc. (*vendor name*). s.15(1), s.22(1)

Signature: _____

Name and Title: Alex Blue, Principal, Building Energy Specialist

Exceptions to Declaration: None.

REQUEST FOR PROPOSAL NO. PS20230002
CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE

Conflicts, Collusion, Lobbying
See Article 9 of Appendix 2 for instructions.
Evoked Buildings Engineering Inc. confirms and warrants there is no Conflict of Interest / Collusion / Lobbying as per Article 9 of Appendix 2 of the RFP.

Table 1 – Commercial Table – Project Fees (please complete as stated in Part B – Deliverables Work Scope).

	Description by Activities	Estimated Hours	Total Est. Fee
1	Meetings with City staff, including review of preliminary findings, workshops with stakeholders and online survey for feedback:	75	
2	A preliminary draft of changes to the Energy Modelling Guidelines detailing initial recommendations and questions to be resolved	150	
3	A final report outlining the methodology taken to arrive at the recommended changes, including a table listing the impacts of major recommended change on TEDI, TEUI, GHGI and CEDI	100	
4	A final electronic version of the Energy Modelling Guidelines v3.0 with tracked changes, which incorporates the feedback from stakeholders and discussions with the project team.	112.5	
Totals (fees should include PST but exclude GST)			

Table 2 – Commercial Table – Schedule of Hourly Rates (for additional services if required)

Team Members	Activity/Role	Regular Rate
Alex Blue	Principal, Project Lead	
Grace Suri	Building Energy Consultant	
Brittany Coughlin	Principal, Energy and Sustainability Specialist	
Eric Catania	Associate, Energy and Sustainability Specialist	
Neil Norris	Associate, Building Science Specialist	
Patrick Stewart	Principal, Mechanical Advisory Services	
Marc Trudeau	Principal, Mechanical Advisory Services	
Energy Engineer	Additional support	

Supplier Diversity

Please note that these Supplier Diversity questions are optional but may form part of the evaluation of this RFP. Proponent answers to Supplier Diversity questions are for information gathering purposes only and will be kept confidential in accordance with the Legal Terms and Conditions of this RFP.

In the space below, indicate the Proponent's company profile with regards to social value and economic inclusion supporting equity, diversity, inclusion and reconciliation, including social/environmental certifications, workforce diversity and/or if owned/controlled by an equity-seeking demographic (including but not limited to non-profit, cooperative, Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ+ people).

<p>Majority owned/controlled/ by:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Women <input type="checkbox"/> Indigenous Peoples <input type="checkbox"/> Non-Profit/Charity (Social Enterprise) <input type="checkbox"/> Coop <input type="checkbox"/> Community Contribution Corporation (3C/CCC) <input type="checkbox"/> Ethno-cultural Persons <input type="checkbox"/> People with Disabilities <input type="checkbox"/> LGBTQ+ <input type="checkbox"/> Other: please indicate 	<p>Workforce Diversity:</p> <p>60% Women</p> <p>% Indigenous Peoples</p> <p>% Ethno-cultural People</p> <p>% People with Disabilities</p> <p>% LGBTQ+</p> <p>% Other: please indicate</p>	<p>Social / Environmental Certifications</p> <ul style="list-style-type: none"> <input type="checkbox"/> BCorp <input type="checkbox"/> BuySocial <input type="checkbox"/> Supplier Diversity Certification <input type="checkbox"/> Fairtrade <input type="checkbox"/> Green Business Certification (ie. LEED, ClimateSmart) <input type="checkbox"/> Other: please indicate
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s.22(1)

Alex Blue, P.Eng., BEMP, LEED AP BD+C
Principal, Building Energy Specialist

s.22(3)(d)

s.22(3)(d)

Alex Blue, P.Eng. BEMP, LEED AP BD+C
Principal, Building Energy Specialist

s.22(3)(d)



s.22(3)(d)



PERSONAL INFORMATION CONSENT FORM(S)

Complete one copy of this Personal Information Consent Form(s), in the form set out below, for each key personnel for whom a CV or other information regarding employment history and qualifications has been included in the Proposal.

PERSONAL INFORMATION CONSENT FORM

Reference #PS20230002

Title: Consultant Services - 2023 Energy Modelling Guidelines Update

With the provision of my signature at the foot of this statement I, Alex Blue

(Print Name)

consent to the indirect collection from Evoke Buildings Engineering Inc.

(Print Name of Proponent) of my

personal information in the form of a work history, resume or summary of qualifications.

In consenting to this indirect collection, I understand that my personal information, so collected, will be stored on servers located in the United States and will be used by the City for the sole purpose of evaluating the submitted response to the above-noted procurement process. I understand further that my personal information, once collected by the City, will be handled by the City in accordance with the provisions of the (BC) *Freedom of Information and Protection of Privacy Act*.

s.15(1), s.22(1)

Signature

January 3, 2023

Date

s.22(1)

Grace Suri, LEED AP BD+C
Building Energy Specialist

s.22(3)(d)

s.22(3)(d)

Grace Suri, LEED AP BD+C
Building Energy Specialist

s.22(3)(d)

s.22(3)(d)

s.22(3)(d)

PERSONAL INFORMATION CONSENT FORM(S)

Complete one copy of this Personal Information Consent Form(s), in the form set out below, for each key personnel for whom a CV or other information regarding employment history and qualifications has been included in the Proposal.

PERSONAL INFORMATION CONSENT FORM

Reference #PS20230002

Title: Consultant Services - 2023 Energy Modelling Guidelines Update

With the provision of my signature at the foot of this statement I, Grace Suri

(Print Name)

consent to the indirect collection from Evoke Buildings Engineering Inc.

(Print Name of Proponent) of my

personal information in the form of a work history, resume or summary of qualifications.

In consenting to this indirect collection, I understand that my personal information, so collected, will be stored on servers located in the United States and will be used by the City for the sole purpose of evaluating the submitted response to the above-noted procurement process. I understand further that my personal information, once collected by the City, will be handled by the City in accordance with the provisions of the (BC) *Freedom of Information and Protection of Privacy Act*.


Signature

February 3, 2023
Date

s.22(1)

Brittany Coughlin | M.A.Sc., P.Eng., BEMP, CPHC, LEED® AP
Principal, Energy + Sustainability Specialist

s.22(3)(d)

s.22(3)(d)



Brittany Coughlin | P.Eng., BEMP, CPHC, LEED® AP
Principal, Energy + Sustainability Specialist

s.22(3)(d)



s.22(3)(d)

Selected Publications

- Coughlin, Brittany, Christy Love, and Robert Lepage. "Passive House in Canada: Case Studies on a Near EnerPHit Retrofit and Post-Occupancy Research." Paper presented at 21st International Passive House Conference, Vienna, Austria, April 2017.
- Coughlin, Brittany. "Measured Performance: The Importance of Assessing Building Energy Consumption." *Construction Business Magazine*, 2015.
- Hanam, Brittany and Graham Finch. "Evaluating the Energy Savings of High-Performance Building Enclosure Retrofits." Paper presented at 14th Canadian Conference on Building Science and Technology, Toronto, ON, 2014.
- Hanam, Brittany, Al Jaugelis, and Graham Finch. "Energy Performance of Windows: Navigating North American and European Window Standards." Paper presented at 14th Canadian Conference on Building Science and Technology, Toronto, ON, 2014.
- Hanam, Brittany, Graham Finch, and Dave Ricketts. "Deep Energy Retrofits of High-Rise Multi-Unit Residential Buildings." Paper presented at ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA, 2014.
- Finch, Graham and Brittany Hanam. "Net Zero Building Enclosure Retrofits for Houses: An Analysis of Retrofit Strategies." Paper presented at ASHRAE Buildings XII, Clearwater Beach, FL, 2013.
- Hanam, Brittany, Graham Finch, and Susan Hayes. "Energy Ratings for Windows: Balancing Energy Consumption and Thermal Comfort." Paper presented at ASHRAE Buildings XII, Clearwater Beach, FL, 2013.
- Hanam, Brittany, Graham Finch, and Dave Ricketts. "Thermal Importance of Windows: The Focal Point for Building Enclosure Energy Savings." *Construction Canada*, 24-30, 2012.
- Hanam, Brittany, Graham Finch, and Curt Hepting. "Meter Calibrated Energy Simulation of High-Rise Residential Buildings: Lessons Learned." Paper presented at 13th Canadian Conference on Building Science and Technology, Winnipeg, MB, 2011.

Selected Presentations

- "Passive House in Canada: Case Studies on a Near EnerPHit Retrofit and Post-Occupancy Research." Presented at 21st International Passive House Conference, Vienna, Austria, April 2017.
- "Deep Energy Retrofits of High-Rise Multi-Unit Residential Buildings." Presented at ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA, August 2014.
- "Thermal Performance of Exterior Insulated Wall Assemblies: Why this is the new norm." Presented at RCI Western Canada Chapter Seminar: Walls and Roofs, Vancouver, BC, June 2014.
- "Deep Energy Retrofits of High-Rise Multi-Unit Residential Buildings." Presented at ASHRAE High Performance Buildings Conference, San Francisco, CA, April 2014.
- "Window Standards Compared: NFRC vs. ISO vs. PHI." Presented at Passive House North West (PHNW) 5 Conference, Portland, OR, March 2014.
- "Energy Ratings for Windows: Balancing Energy Consumption and Thermal Comfort." Presented at ASHRAE Buildings XII Conference, Clearwater Beach, FL, December 2013.
- "Window Standards Compared: NFRC vs. ISO vs. PHI." Presented at Passive House North 2013, Vancouver, BC, September 2013.
- "Energy Modeling of Existing Mid- and High-Rise Multi-Unit Residential Buildings To Predict Energy Savings of Building Enclosure Retrofits." Presented at ASHRAE Energy Modeling Conference: Tools for Designing High Performance Buildings, Atlanta, GA, October 2012.
- "Choosing Windows: Balancing U-Value, Solar Heat Gain, Comfort and Energy." Presented at the 2012 BC Building Enclosure Council Annual Conference and AGM, Vancouver, BC, September 2012.
- "Near Net Zero Building Enclosure Retrofits for Houses." Presented at the 2012 AIBC Annual Conference, Vancouver, BC, May 2012.

PERSONAL INFORMATION CONSENT FORM(S)

Complete one copy of this Personal Information Consent Form(s), in the form set out below, for each key personnel for whom a CV or other information regarding employment history and qualifications has been included in the Proposal.

PERSONAL INFORMATION CONSENT FORM

Reference #PS20230002

Title: Consultant Services - 2023 Energy Modelling Guidelines Update

With the provision of my signature at the foot of this statement I, Brittany Coughlin
_____(Print Name)

consent to the indirect collection from RDH Building Science Inc _____
_____(Print Name of Proponent) of my
personal information in the form of a work history, resume or summary of qualifications.

In consenting to this indirect collection, I understand that my personal information, so collected, will be stored on servers located in the United States and will be used by the City for the sole purpose of evaluating the submitted response to the above-noted procurement process. I understand further that my personal information, once collected by the City, will be handled by the City in accordance with the provisions of the (BC) *Freedom of Information and Protection of Privacy Act*.

s.15(1), s.22(1)


February 3, 2023

Signature

Date

s.22(1)

Eric Catania

M.Eng., P.Eng., BEMP, CPHD, LEED AP BD+C,
PHI Accredited Passive House Certifier

**Associate, Senior Energy and Sustainability
Analyst**

s.22(3)(d)

s.22(3)(d)

Eric Catania

M.Eng., P.Eng., BEMP, CPHD, LEED AP BD+C,
PHI Accredited Building Certifier

**Associate, Senior Energy and Sustainability
Analyst**

s.22(3)(d)

s.22(3)(d)

Publications + Presentations

- Chidiac, SE, et al., "Computation tools for selecting energy conservation measures for retrofitting existing office buildings." *Canadian Journal of Civil Engineering* 40 (2013): 445-459.
- Chidiac, SE, Catania, EJC, Morofsky, E., Foo, S. "Effectiveness of single and multiple energy retrofit measures on the energy consumption of office buildings." *Energy* 36, no. 8 (2011): 5037-5052.
- Chidiac, SE, Catania EJC, Morofsky, E., Foo, S. "A screening methodology for implementing cost effective energy retrofit measures in Canadian office buildings." *Energy and Buildings* 43, no. 2-3 (2011):614-620.
- Catania, EJC, Chidiac, SE, Morofsky, E, Foo, S. "Comparative analysis of energy simulation programs, EnergyPlus and FEDS, using energy data from nine office buildings." Presented at



Eric Catania

M.Eng., P.Eng., BEMP, CPHD, LEED AP BD+C,
PHI Accredited Building Certifier

**Associate, Senior Energy and Sustainability
Analyst**

the 2nd Canadian Conference on Effective
Design of Structures, Hamilton, ON, 2008.

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Reference #PS20230002

Title: Consultant Services - 2023 Energy Modelling Guidelines Update

With the provision of my signature at the foot of this statement I, Eric Catania

(Print Name)

consent to the indirect collection from RDH Building Science Inc _____

(Print Name of Proponent) of my
personal information in the form of a work history, resume or summary of qualifications.

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s.15(1), s.22(1)

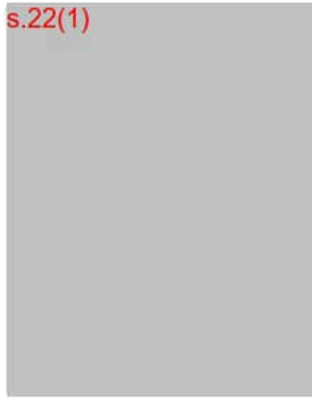


February 3, 2023

Signature

Date

s.22(1)



Neil Norris | M.A.Sc., P.Eng., CPHD
Associate, Building Science Specialist

s.22(3)(d)



s.22(3)(d)





s.22(3)(d)



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PERSONAL INFORMATION CONSENT FORM

Reference #PS20230002

Title: Consultant Services - 2023 Energy Modelling Guidelines Update

With the provision of my signature at the foot of this statement I, Neil Norris

(Print Name)

consent to the indirect collection from RDH Building Science Inc _____

(Print Name of Proponent) of my
personal information in the form of a work history, resume or summary of qualifications.

In consenting to this indirect collection, I understand that my personal information, so collected, will be stored on servers located in the United States and will be used by the City for the sole purpose of evaluating the submitted response to the above-noted procurement process. I understand further that my personal information, once collected by the City, will be handled by the City in accordance with the provisions of the (BC) *Freedom of Information and Protection of Privacy Act*.

s.15(1), s.22(1)



February 3, 2023

Signature

Date

s.22(1)

Patrick Stewart

P.Eng., CPHD, LEED Green Assoc.

PRINCIPAL

s.22(3)(d)

s.22(3)(d)



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PERSONAL INFORMATION CONSENT FORM

Reference #PS20230002

Title: Consultant Services - 2023 Energy Modelling Guidelines Update

With the provision of my signature at the foot of this statement I, PATRICK STEWART
_____ (Print Name)

consent to the indirect collection from ALEX BLUE
_____ (Print Name of Proponent) of my

personal information in the form of a work history, resume or summary of qualifications.

In consenting to this indirect collection, I understand that my personal information, so collected, will be stored on servers located in the United States and will be used by the City for the sole purpose of evaluating the submitted response to the above-noted procurement process. I understand further that my personal information, once collected by the City, will be handled by the City in accordance with the provisions of the (BC) *Freedom of Information and Protection of Privacy Act*.

s.15(1), s.22(1)



Signature

FEB 6 2023

Date

s.22(1)

Marc Trudeau

P.Eng., Architect AIBC, BEMP, CPHD, LEED AP
BD+C.

PRINCIPAL

s.22(3)(d)

s.22(3)(d)



PERSONAL INFORMATION CONSENT FORM(S)

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PERSONAL INFORMATION CONSENT FORM

Reference #PS20230002

Title: Consultant Services - 2023 Energy Modelling Guidelines Update

With the provision of my signature at the foot of this statement I, _____

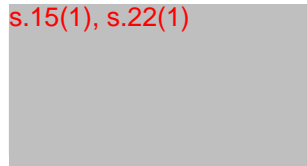
Marc Trudeau (Print Name)

consent to the indirect collection from _____

Evoke Buildings Engineering Inc (Print Name of Proponent) of my

personal information in the form of a work history, resume or summary of qualifications.

In consenting to this indirect collection, I understand that my personal information, so collected, will be stored on servers located in the United States and will be used by the City for the sole purpose of evaluating the submitted response to the above-noted procurement process. I understand further that my personal information, once collected by the City, will be handled by the City in accordance with the provisions of the (BC) *Freedom of Information and Protection of Privacy Act*.

s.15(1), s.22(1)


February 2, 2023

Signature

Date

Executive Summary

Provide a brief executive summary of your Proposal.

We are pleased to provide a response to the City of Vancouver RFP No. PS20230002 for updating the Energy Modelling Guidelines v2.0 (CoV EMG) to v3.0.

Proposal Overview

Our proposed approach uses 4 phases (1- Kick Off, 2- Draft Updates, 3- Public Engagement, 4- Finalize) to address the project in an efficient and timely manner. Our methodology for the most significant step (#2) is to address related updates in groups, over a semi-monthly meeting schedule with the City. This will allow for consistent feedback from and engagement with the City, reducing the need for a lengthy review/ update period at the end of the draft updates.

This approach is outlined in greater detail in the next section of the proposal, which describes the proposed schedule, deliverables and suggested methodology for each update.

Why Focal

Focal's extensive use of these guidelines over the past 6 years means that our team is intimately familiar with them. We have previously suggested some update areas to the CoV and are pleased to see several mentioned in the RFP. Our experience is acknowledged by others; for example, since 2018 BC Housing has asked us to review 30 Step Code energy model reports by others (which also use these guidelines). We have also been retained by the Building and Safety Standards Branch (BSSB) to update the province-wide Step Code Part 3 and 9 compliance tools, a project currently underway.

Focal is experienced in guideline development. We co-developed the FortisBC Commercial New Construction energy modelling program and associated guidelines and have been providing technical reviews for that program since 2018 and administering it for over a year. The majority of these energy model submissions use the CoV EMG.

In addition, we believe that our extensive experience with codes and committees, including: the BC Energy Step Code, having participated on the technical sub-committee since before the code was enacted; the CSA Z5020 committee; the EGBC Professional Practice Guidelines reviews, and others, positions us well to provide these kinds of updates.

We would value the opportunity to contribute to updating these guidelines and helping move the industry forward.

Background

Focal Engineering Incorporated was established in 2015 in beautiful British Columbia. Headquartered in Victoria, we provide engineering consulting services to the building industry across Canada, with a focus on energy efficiency and sustainability for new and existing buildings. We are "energy engineers" with a whole-building approach and understand the relationship between building systems, their impact on energy performance and emissions, and the health and comfort of occupants. Our philosophy is to produce results that benefit our clients, our community, and the environment.

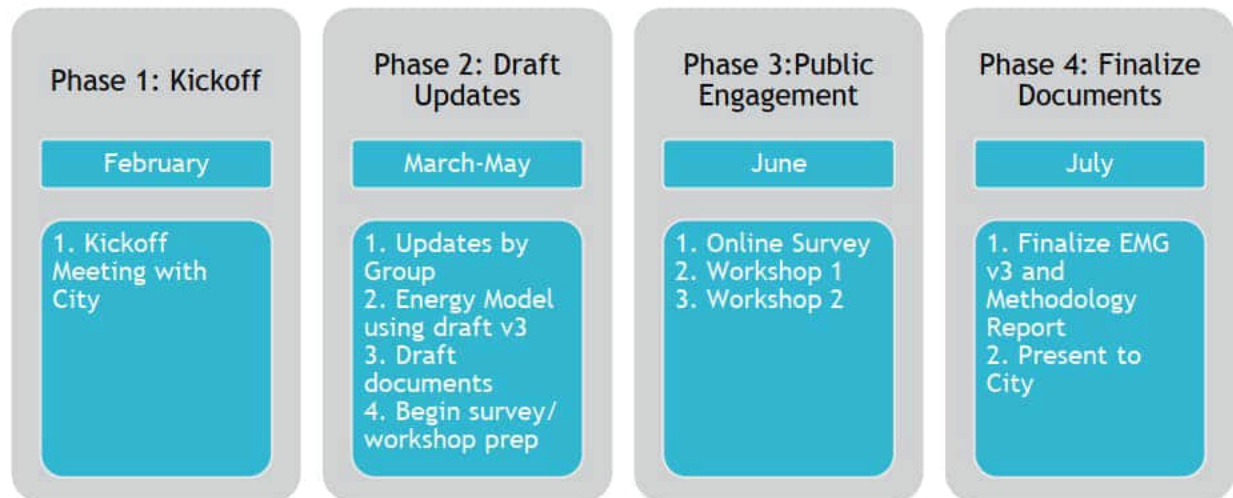
Focal Engineering is owned by Susan MacDougall and Riley Beise, who together have over 30 years of energy modelling and design experience. The two principals are supported by two seniors and a team of dedicated energy modellers and administrators.

Approach to Performing Scope of Work

Clearly describe the methodology and project work plan for performing the work. Include an estimate of how much energy modelling effort is planned compared to other methods of arriving at technical recommendations (e.g. past project experience, etc.). Provide an indication of the number, types and sizes of building designs that the proponent's organization has access to in carrying out this work.

Proposed Approach

Our team proposes the following approach which uses project phases and associated sub-tasks to address RFP scope items 1) through 15).



Deliverables

The major deliverables identified for this project include:

- Documentation
 - City of Vancouver Energy Modelling Guidelines v3.0
 - Methodology Report
- Meetings
 - Seven 1-hr, semi-monthly meetings with the City, plus kickoff and wrap up; all online
- Public Engagement
 - Two workshops
 - Online survey

These phases, tasks and associated deliverables are described in more detail in the Detailed Methodology section.

Analysis Approach

To avoid extensive use of modelling, per the RFP, we propose addressing these updates using analysis, tools, and references such as:

- Excel analysis
- Tools such as Building Pathfinder, where relevant

- Literature Review of other published materials from reputable sources
 - [NRC's Climate Resilience Buildings: guideline for management of overheating risk in residential buildings](#)
 - [BC Housing's Overheating & IAQ Design Guide Supplement](#)
 - [BC Energy Step Code Metrics Report](#)
 - [Step Code Part 3 Analysis for Public Review](#)
 - [Step Code Public Sector Building Report v2](#)
 - [Fraser Health Authority's Establishing Design Conditions for Climate Resilient Planning and Design of Health Facilities in British Columbia](#)
- Focal database
 - Focal has a data set of dozens of Step Code projects that use the CoV EMG v2 (note that not all of our 100+ models are in the database yet). We will use some of the anonymized data to provide recommendations, as relevant and permissible.
 - We could consider asking whether FortisBC would allow some of the 50(ish) energy model submissions that have been reviewed through their program to be anonymized and used in this analysis.
 - For the projects that require energy modelling, per RFP scope item 14, we recommend obtaining permission from BC Housing to use some of their models early in Phase 2.
- City Data Set
 - Ideally, if a data set summarizing key attributes from ZEBP applications could be provided by the City, this would be a great supplement to any data provided by Focal.

Other Considerations

Our team realizes that updates to these guidelines could have implications to future versions of the British Columbia Building Code (BCBC) and will keep this in mind throughout the project. For example, the rest of BC includes climate zones different to Vancouver's, that may require separate considerations.

The RFP also requested considering constraints on common energy modelling software. This can be considered as part of the overall guideline update, and might fit naturally into the assessment of the EGBC/ AIBC PPG.

Detailed Methodology

Phase 1: Kickoff (February)

Our team will prepare for and attend the kickoff meeting. We anticipate this will be used to review scope, finalize the workplan, clarify assumptions, and coordinate other such project details. Suggested topics include:

- Discuss and finalize scope (e.g. additional items suggested, number of meetings proposed, etc.). Our team adjusted the hours/ fees to match as closely as possible the desired budget however, we would be happy to, for example, alter the number of meetings and shift that time to analysis if preferred by the City.
- Finalize which updates to be grouped together in Phase 2 Task 1, per proposed methodology.
- Discuss potential data set from Focal and City (if possible); more information described in Phase 2.
- Discuss potential projects to test the Draft EMG on, so that we can reach out to the original client to receive approval.
- Set placeholders for the meetings and workshops with the City and potential invitees for Workshop 1.

If the kickoff occurs in early February, we will begin subsequent tasks at an earlier date.

Phase Deliverables

- Kickoff meeting with the City of Vancouver (1-hr)

Phase 2: Draft Guidelines (March-May)

Task 1: Address Updates by Group

Our team proposes dividing RFP scope items 1) to 13) into groups of related topics, presenting proposed updates for each at semi-monthly progress update meetings, which are each assumed to be one hour long. The intent is to allow adequate time to address each item mentioned in the RFP and reduce feedback and update time at the end of the draft process. We would finalize the groupings with the City during the kickoff.

We propose presenting draft guideline updates at each meeting for the City’s review. We plan to work on the Methodology Report as we prepare the draft guidelines and present associated draft report sections alongside the updates, as reasonable.

The proposed grouping for the first 13 RFP scope items is shown in the figure below.

Group 1: Passive Design Elements	<ul style="list-style-type: none">• 1. Weather Files• 4. Overheating Analysis for Passively Cooled Buildings• 5. Resilience to Future Climate and Shock Events• 9. Form Factor for Slim Buildings’ TEDI Targets
Group 2: Mechanical Design Elements	<ul style="list-style-type: none">• 2. DHW• 3. Ventilation Standard• 6. Cooling Energy Demand Intensity• 7. Refrigerant Impact - GHGI-R• 8. Compliance for Actively Cooled Buildings
Group 3: Other	<ul style="list-style-type: none">• 10. Energy Efficiency Recommendations• 11. Miscellaneous Recommendations• 12. GHG Reduction Methodology for Groups A/B/F MOs• 13. Review CSA Z5020 Standard

Our proposed grouping scheme and methodology for each update is outlined below.

Group 1 (Meeting: mid March)

The updates within the first group all relate to passive building design and are significant in determining TEDI and overheating compliance. While *a full methodology will be developed during the project*, our initial thoughts are noted below.

- **Weather files:** We propose referencing some of our previous work for BC Housing on the Step Code Overheating Design Guide Supplement, and other published documents such as the NRC Climate Resilience document, to recommend standard weather files for analysis under current and future conditions.

- **Overheating:** We propose a literature review (similar to the previous point) of published documents to summarize standard practice. We will combine these findings with our project experience and recommend a reasonable approach to standardizing assumptions. We will aim to data mine our existing projects to understand the impact on changing the limits (i.e. how many projects would still pass/ fail).
- **Future Resilience:** Similar to previous two items, we propose beginning by looking at published documents for addressing resilience during shocks such as power outages. We are aware of other research that has looked at assessing models with mechanical systems turned off for periods of time, so will build from previous work to develop a recommended strategy.
- **Form Factors:** We suggest using Building PathFinder to examine the relationship between TEDI (commonly the hardest metric to meet) and form factor, to come up with limit. Outcomes could include a “slim factor” at which point absolute heat loss is evaluated over the TEDI.
 - Time permitting, we propose expanding this topic from “slim buildings” to smaller buildings, such as standalone retail, as we have had recent conversations with several AHJs that struggle with these types of buildings with a small footprint. This effect was examined in a study we completed in 2022 for the BSSB looking at small homes in cold climates; work that could be built upon here.

Our findings and proposed approach will be brought to the Group 1 meeting. After receiving feedback from the City, we will update the draft guidelines and methodology sections for the end of April.

Group 2 (Meeting: end March)

The second group of updates generally relate to mechanical systems and focus more on the TEUI side of things (with the addition of the GHGI-R element). While a *full methodology will be developed during the project*, our initial thoughts are noted below.

- **DHW:** We propose an Excel analysis to assess the impact of the various modifications to the standard DHW load.
- **Ventilation:** We will provide a high-level review of the key differences in ventilation between ASHRAE 62.1-2001 and 2016, and the impact on metrics (TEDI, TEUI, GHGI and CEDI) for the most relevant major occupancies.
- **Cooling Energy Demand Intensity (CEDI):** We will provide a recommendation on a standard methodology for calculating cooling energy demand intensity, applicable to all building designs. We propose to use a similar methodology to that of calculating TEDI.
- **GHGI-R:** We propose a search for other jurisdictions/ programs that require refrigerant reporting, which we will summarize with key features (e.g. if there is a limit in size, as noted in the RFP), pros and cons, and present to the City for discussion. We will then review the existing GHGI-R methodology from Vancouver’s Green Buildings Policy for Rezoning and recommend updates to this methodology based on findings.
- **Compliance for Actively Cooled Buildings:** We understand that new Part 3 dwelling units in Vancouver will soon be required to have active mechanical cooling capable of maintaining an indoor temperature of 26°C with windows closed. We will provide a recommendation of how to demonstrate compliance with this requirement through energy modelling. We propose exploring the current cooling design temperatures and peak cooling loads, and potentially investigating the impact of extreme heat events, such as the 2021 heat dome, on achieving compliance. We are aware of the research performed for the Fraser Health Authority looking into designing for future climate scenarios for resilience, and review and build on this and other published documentation.

Our findings and proposed approach will be brought to the Group 2 meeting. After receiving feedback from the City, we will update the draft guidelines and methodology sections for the end of April.

Group 3 (Meeting: mid April)

The final group of updates includes a miscellany of updates.

- **Energy Efficiency Recommendations:** We will provide insight on the appliance/ lighting/ elevator and laundry values currently in the model, and whether they remain current or are recommended for updating. We will aim to reference 2-3 other sources for comparison with the CoV EMG values.
- **Miscellaneous Recommendations:** We will use the available data set to assess the impact of modifying the corridor pressurization adjustment, spaces that are included in the MFA, and the sub-metering adjustment, and understand how many projects would still pass/ fail. We will also consider whether possible changes to the EGBC & AIBC PPG would be beneficial and provide recommendations to the City. Our current work with the BSSB on updating the Part 3 compliance tool will be helpful in this regard, as many of the discussions with the Advisory Group focus on compliance.
- **GHG Groups A, B, and F Major Occupancies:** We propose starting with the Step Code Public Sector Building Metrics report, which looks at Step Code for these occupancies (possibly excluding F) and assessing the impact of applying the current CoV EMG emissions factors (EFs) to evaluate whether a straightforward methodology for % savings can be developed, considering NECB and ASHRAE.
- **Review CSA Z5020:** Building on Susan MacDougall's participation in the CSA Z5020 Standard committee, we will do a high-level comparison of the standard vs. the current EMG, and note key differences and potential implications, for discussion with the City.
- **Other Suggestions:** We wish to propose a few other updates for consideration, based on our project experience. Note that these could be moved to earlier groups where reasonable.
 - **Modelled infiltration rate (possibly Group 1):** The current "default" modelled infiltration rate of 0.2 L/s/m² façade can be difficult to achieve, depending on building geometry and the air barrier design. For example, a typical reasonable target tested leakage rate (EALR @75 Pa) for a building using self-adhered membrane (considered to be a high-performance air barrier strategy), is approximately 1.0 L/s/m². Depending on the building geometry, the conversion to a modelled infiltration rate with this target in mind could yield a value above 0.2 L/s/m², meaning this default rate alone can be optimistic in some cases where an excellent air barrier strategy is already included in the design. Buildings with a lesser performing system would have even worse results. We propose an update/ clarification to section 2.4 of the EMG, recommending that the actual air barrier design play a part in selecting the modelled infiltration rate.
 - **Heat or Energy Recovery Ventilators:** We propose a clarification to section 2.6.1 of the EMG for instances where a frost control strategy is required in the design. In our experience reviewing models, this requirement appears to be often overlooked or misunderstood, so we proposed updating this language to better illustrate the required model input and intent.

Our findings and proposed approach will be brought to the Group 3 meeting. After receiving feedback from the City, we will update the draft guidelines and methodology sections for the next meeting.

Finalize Drafts (Meeting: end April)

We have built in a buffer to wrap up RFP scope items by the end of April, so the latter half of April is intended for Focal to finalize any updates to the draft guideline and methodology report based on feedback from the City. If all updates went smoothly, we will use the additional time to work on the Report Methodology and begin on the next task.

Task Deliverables

- Semi-monthly meetings (total of 4, 1-hr each)
- Draft guideline updates and report methodology for each meeting

Task 2: Energy Modelling (Meeting: mid May)

To address RFP scope item 14, a minimum of two archetype buildings (as noted in the RFP) which were modelled using the CoV EMG v2.0 will be used for comparison with the proposed updated guidelines. These models will be updated to reflect the proposed EMG updates. Focal has access to a wealth of recent energy models which will satisfy this requirement.

The results from this analysis will be compared with the original results, with a focus on the impacts from major updates on TEDI, TEUI, GHGI, CEDI, and overheating. Each of the items will be addressed in isolation (where reasonable), and the whole bundle of updates will be run together to understand the combined impact of the proposed EMG v3.

Because the intent of this analysis is not to be an intensive energy modelling exercise, but rather to illustrate the impacts of the proposed updates on multiple building archetypes, we understand that two MURB archetypes will be the main focus. However, additional archetypes may be considered during this analysis, time permitting.

The results from this energy modelling analysis will be included in the Methodology Report.

Task Deliverables

- Energy modelling comparison summary
- Update to Methodology Report

Task 3: Draft Guidelines & Report (Meeting: end of May)

Based on the findings from Task 2, and feedback from the City, we will make any necessary updates to the Guidelines and associated Methodology Report.

Focal will issue a draft version of both documents to be used for the public engagement phase. This report will also detail the impacts of the proposed updates found in the aforementioned energy modelling comparison described by scope item 14) in the RFP.

In May we will also begin preparing the survey and setting up attendance for the workshops, which will be ready in June. Several of these coordination tasks will be handled by our administrative team, while the technical team finalizes the draft documentation.

Task Deliverables

- Semi-monthly meetings (total of 2, 1-hr each)
- Draft CoV EMG v3 for public engagement
- Draft Methodology Report for public engagement

Phase 3: Public Engagement (June)

Note: The survey will be prepared and workshop planning will begin in May (during the previous phase).

Task 1: Create and send out Survey

Focal will develop and make available an online survey to gather feedback, which will be accessible for the month of June. This survey will be open prior to the virtual workshops. We propose using a free tool such as Survey Monkey, or one provided by the City.

Task 2: Workshop 1

Focal will organize and facilitate a virtual workshop to share proposed changes to the Energy Modelling Guideline for code compliance professionals. We understand that this workshop will be invitation-based with approximately 10-20 attendees, last 1.5-2 hours, and scheduled for early June. We propose a short presentation for the workshop, to outline key updates to the guidelines, followed by time for discussion, Q&A and feedback from the participants.

Task 3: Workshop 2

Focal will organize and facilitate a second virtual workshop to share proposed changes to the Energy Modelling Guideline, open to any interested attendees. We understand that this workshop will also last 1.5-2 hours and will be scheduled for early June. We propose using the same presentation outlining key updates, followed by time for Q&A and participant feedback.

After both workshops are complete and the survey has been wrapped up, we will meet with the City to discuss the feedback and any potential updates.

Phase Deliverables

- Online Survey
- Two Workshops
- Meeting

Phase 4: Finalize Documents (July 10)

Based on the meeting with the City, Focal will produce a final electronic version of the proposed CoV EMG v3.0, with tracked changes. A clean version will also be available for distribution. A final copy of the Methodology Report will also be provided. Focal will attend a wrap-up meeting with the City to present the final deliverables, and complete the project.

Please note that while the final product has been requested by July 10th, if the survey closes at the end of June, more time may be requested to meet, then finalize the documents, depending on the level of updates required.

Phase Deliverables

- Final documents: CoV EMG v3.0 & Methodology Report
- Wrap-up meeting

Assumptions

Our proposal is based on the following assumptions:

- All meetings can be virtual and are generally 1hr or less.
- All information will be delivered to Focal in a timely manner.
- Where comparisons are requested; 2-3 sources of published information will be considered sufficient.
- Any documents that require purchasing will be provided by the City at no cost to the consultant.
- Because a budget was provided, we assume that a commensurate level of effort will be considered reasonable for addressing the RFP.

Project Experience

RFP Specific

A sample of Focal's modelled projects that meet the size requirements outlined in the RFP and use past versions of the CoV EMG are listed below. While most are within Climate Zone 4, we have also provided some that range across BC, and experience difference CZs.

7+ Storey MURB

- 1st and Clark Residence & Clinic | Ongoing | BC Housing | Vancouver, BC
- Fraser Mills Lot 13 | Ongoing | Beedie Development Group | Coquitlam, BC
- Fraser Mills Lot 15 | Ongoing | Beedie Development Group | Coquitlam, BC
- Victoria Park | Ongoing | Well Grounded Real Estate | Toronto, ON
- 722 Discovery | Ongoing | BC Housing | Victoria, BC
- Firehall No. 1 | 2022 | Jawl Residential | Victoria, BC
- 1400 Quadra | 2019 | Alpha Developments | Victoria, BC

6-Storey MURB

- Three Summits | Ongoing | Polygon Developments | Squamish, BC
- Glacier 8 Housing | Ongoing | Vail Resorts | Whistler, BC
- Quinn Apartments | Ongoing | Porte Communities | Surrey, BC
- Trackside | Ongoing | Ballenas Housing Society | Nanaimo, BC
- Campus View SD | 2022 | CRHC | Saanich, BC
- 420 Hawks | 2021 | Atira | Vancouver, BC
- Station Avenue Phases 1&2 | 2018 7 2020 | M'akola Development Society | Langford, BC

<6-Storey MURB

- 210 Gorge Road | Ongoing | Cool Aid Society | Victoria, BC
- Ksan Second Stage Housing | Ongoing | Ksan Society | Terrace, BC
- M'akola Housing | Ongoing | M'akola Developments | Terrace, BC
- Whistler Parcel A | Ongoing | Whistler Housing Authority | Whistler, BC
- 130 McCurdy | 2021 | Culos Group | Kelowna, BC
- 5th Avenue | 2021 | CMHA Association | Salmon Arm, BC
- Hall Street | 2021 | Culos Group | Nelson, BC
- Alto on Capitol Hill | 2020 | Vivid Green Arch | Burnaby, BC
- 10 Buttertubs Dr Phases 1&2 | 2018 | Nanaimo Affordable Housing Society | Nanaimo, BC
- VIMH Society Rosehill | 2018 | M'akola Development Society | Nanaimo, BC
- Haisla Nation MURB | 2018 | Haisla Nation Council | Haisla Nation

Other Related Project Experience

Focal has modelled over 100 Step Code models using the CoV EMG. Examples outside the RFP archetypes are noted below, along with some of our industry leadership and technical committee experience. More information is available upon request.

Step Code Projects

- 75+ Modular Housing Projects | Ongoing | NRB Modular Solutions | Across BC
- JHS Princess Ave | Ongoing | John Howard Society | Victoria, BC
- 1st Avenue Clinic & Residence | 2022 | CTAN | Prince George, BC
- St Peter's & St Paul's Housing and Ministry Centre | 2021 | Victoria, BC
- 1330 Cloudburst | 2020 | Whistler Housing Authority | Whistler, BC

Energy Modelling Industry Leadership

- Part 3 Energy Design Report Training Webinars | Province of BC - BSSB | 2020
- Energy Specialist Training Workshop | FortisBC | 2020
- Commercial New Construction Program Development & Reviews | FortisBC | Ongoing
- Builder Forum Series Webinar: Ventilation & Step Code | Township of Langley | Jan 2021
- Thermal Comfort Monitoring for Overheating Analysis | BC Housing | Ongoing
- Building Officials of BC Step Code Training Development | Sub to PH Canada | 2018-20
- Part 3 Report Webinars | Building Safety & Standards Branch | Jul - Sep 2020
- Thermal Comfort & Climate Resilience Workshop | UBC | 2020
- Future Climate Analysis Energy Modelling Guidelines | BC Housing | 2020
- Step Code & Public Sector Buildings Workshop | Province of BC, BSSB | 2020
- Step Code Train the Trainer Future Climate Video | BC Housing | July 2020
- Adopting Public Sector Archetypes in BC Energy Step Code BSSB | Mar 2020
- Step Code Overheating & Future Climate Analysis Design Guide | BC Housing | 2018-20
- Step Code Energy Modelling & Metrics Presentation | BOABC | Nov 2019
- Study on R-value and Airtightness impact of PTACs | BC Housing | 2019
- Energy Step Code Sample Report & RFP Development | BC Housing | 2018
- Energy Modelling & the Step Code | Presentation, AIBC Conference | May 2018
- Multiple Step Code Reviews | BC Housing | 2018 & 2021
- DOE Asset Score Tool Pilot Study | BC Hydro | 2016

Related Technical Committee Experience

In addition to our project experience, members of our team sit on several committees that are assisting in development of new energy and climate analyses parameters:

- BCBC Step Code Technical Sub-Committee | Susan MacDougall | Participant | 2017-present
- CSA Z2050 Standard | Susan MacDougall | Committee Member | 2019-2021
- Step Code Metrics Subcommittee | Susan MacDougall | Committee Member | 2021
- Step Code Overheating Subcommittee | Susan MacDougall | Committee Member | 2021
- Designing Climate Resilient MURBs | Riley Beise | Committee Member | 2018
- EGBC & AIBC Energy Modelling Professional Practice Guidelines | Susan MacDougall | Reviewer | 2016-2017

Key Personnel

Identify and provide professional biographical information for the key personnel that would perform the required services. Indicate the level of experience key personnel have in reviewing energy modelling work by others outside of the proponent's organization or exposure to challenges experienced by modellers outside their organization, and depth of experience on policy and code recommendations.

Susan MacDougall

P.Eng., FEC, LEED AP BD+C, CPHC | Principal

s.22(3)(d)

Riley Beise

P.Eng., BEMP | Principal

s.22(3)(d)

Danny Taylor

CPHD | Associate

s.22(3)(d)

Kristian Storgard

E.I.T. | Energy Modeller

s.22(3)(d)

Jennifer Blagborne

Administrator

s.22(3)(d)

References	
Client Name # 1	Building and Safety Standards Branch (BSSB) Ministry of Housing
Address (City and Country)	Victoria, BC, Canada
Contact Name	Scott Williams
Title of Contact	Senior Codes Engineer
Telephone No.	236.478.2043
E-mail Address	Scott.B.Williams@gov.bc.ca
Length of Relationship	s.22(3)(d)
Type of Goods and/or Services provided to this Client	

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	s.22(3)(d)
Client Name # 2	BC Housing
Address (City and Country)	Vancouver, BC, Canada
Contact Name	Wilma Leung
Title of Contact	Senior Manager, Technical Research and Education
Telephone No.	778.452.6444
E-mail Address	wileung@bchousing.org
Length of Relationship	s.22(3)(d)
Type of Goods and/or Services provided to this Client	
Client Name # 3	s.22(3)(d)
Address (City and Country)	
Contact Name	

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Title of Contact	Green Buildings Manager
Telephone No.	604.533.6119
E-mail Address	kramlu@tol.ca
Length of Relationship	s.22(3)(d)
Type of Goods and/or Services provided to this Client	

Subcontractors

List all of the subcontractors that the Proponent proposes to use in carrying out the required services and described the scope of subcontracted work (or write "None" if no subcontractors are proposed).

None proposed

Declaration of Supplier Code of Conduct

The City of Vancouver expects each supplier of goods and services to the City to comply with the supplier performance standards set out in the City's Supplier Code of Conduct ("SCC") < >, which defines minimum labour and environmental standards for City suppliers and their subcontractors. To give effect to these requirements, an authorized signatory of each proposed vendor must complete the following declaration.

As an authorized signatory of Focal Engineering (vendor name), I declare that I have reviewed the SCC and to the best of my knowledge, Focal Engineering (vendor name) and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted below (include all violations/convictions that have occurred in the past three years as well as plans for corrective action). I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of Focal Engineering (vendor name).

s.15(1), s.22(1)

Signature: _____

**REQUEST FOR PROPOSAL NO. PS20230002
CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE**

Name and Title:	Susan MacDougall, Principal
Exceptions to Declaration:	
None	

Conflicts, Collusion, Lobbying
See Article 9 of Appendix 2 for instructions.
Declare no conflicts, collusion or lobbying per Article 9 of Appendix 2.

Table 1 – Commercial Table – Project Fees (please complete as stated in Part B – Deliverables Work Scope).

	Description by Activities	Estimated Hours	Total Estimated Fee
1	Meetings with City staff, including review of preliminary findings, workshops with stakeholders and online survey for feedback:	s.21(1)	
2	A preliminary draft of changes to the Energy Modelling Guidelines detailing initial recommendations and questions to be resolved		
3	A final report outlining the methodology taken to arrive at the recommended changes, including a table listing the impacts of major recommended change on TEDI, TEUI, GHGI and CEDI		
4	A final electronic version of the Energy Modelling Guidelines v3.0 with tracked changes, which incorporates the feedback from stakeholders and discussions with the project team.		
Totals (fees should include PST but exclude GST)			

Table 2 – Commercial Table – Schedule of Hourly Rates (for additional services if required)

Team Members	Activity/Role	Regular Rate
Susan MacDougall	Project lead, policy expertise	
Riley Beise	Energy modelling & EMG expertise	
Danny Taylor	Energy modelling	
Kristian Storgard	Energy modelling	
Jennifer Blagborne	Project management (coordination, workshop & survey)	

Supplier Diversity

Please note that these Supplier Diversity questions are optional but may form part of the evaluation of this RFP. Proponent answers to Supplier Diversity questions are for information gathering purposes only and will be kept confidential in accordance with the Legal Terms and Conditions of this RFP.

In the space below, indicate the Proponent's company profile with regards to social value and economic inclusion supporting equity, diversity, inclusion and reconciliation, including social/environmental certifications, workforce diversity and/or if owned/controlled by an equity-seeking demographic (including but not limited to non-profit, cooperative, Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ+ people).

Majority owned/controlled/ by:	Workforce Diversity:	Social / Environmental Certifications
s.21 (1)	45% Women	s.21 (1)
Women (50%)	% Indigenous Peoples	BCorp
Indigenous Peoples	% Ethno-cultural People	BuySocial
Non-Profit/Charity Social Enterprise)	% People with Disabilities	Supplier Diversity Certification
Coop	% LGBTQ+	Fairtrade
Community Contribution Corporation (3C/CCC)	% Other: please indicate	Green Business Certification (ie. LEED, ClimateSmart)
Ethno-cultural Persons		s.21(1)
People with Disabilities		
LGBTQ+		
Other: please indicate		



EVALUATOR'S GUIDELINES AND SCORING MANUAL

REQUEST FOR PROPOPAL PS20230002

CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE

February 7, 2023

Dino Goundouvas
Supply Chain Management

1. Introduction

Thank you for your participation in the evaluation of this request for proposals (RFP).

These guidelines are provided to:

- 1) assist you with your evaluation
- 2) maintain consistency amongst evaluation team members in the determination of a successful proponent
- 3) ensure that there is no conflict of interest in your participation in this evaluation. In accordance with the policies prescribed by the City of Vancouver.

Proponents spend a significant amount of time and resources preparing and supporting the offers they submit to provide products and professional and technical services to the City. The City benefits from this investment since it contributes both quality and choice to the City's strategic plans. In return for this effort, proponents are entitled to a full and fair evaluation.

This document is designed to assist evaluators in their evaluation of proponents' submissions and to help ensure the establishment of a clear record for the rationale used in assigning scores against the stated evaluation criteria. The City must be prepared to provide all proponents with feedback on a criterion-by-criterion basis and be able to support the reasons for the scores assigned by the evaluation committee.

2. Conflict of Interest

Any member of the evaluation committee who feels that they are, or may be, in a conflict of interest must declare this fact to the RFP Facilitator. If a potential conflict is disclosed, the RFP Facilitator will need to decide whether the member will be permitted to remain as an Evaluator. The Standards of Conduct for Public Service Employees Engaged in Government Procurement Processes provide a number of examples of conflict of interest. A conflict could exist if the individual:

- (i) has a friendship or familiar relationship with one of the proponents; or
- (ii) works for a company that is submitting a response; or
- (iii) has a strong bias for, or against, one of the proponents; or
- (iv) has a significant interest in a company submitting a response; or
- (v) has a direct or indirect financial interest in a proponent's business; or
- (vi) has an immediate family member who has input into a proponent's proposal; or
- (vii) has assisted in the preparation of a proposal; or
- (viii) has received a gift from one of the proponents.

All Evaluators are required to sign Non-disclosure and Conflict of Interest declaration forms which state the terms and conditions of conduct for the evaluation process. **Please**

be aware that all documents are subject to disclosure under the Freedom of Information and Protection of Privacy Act of British Columbia.

3. General

During the evaluation process, it is important to treat all proponents fairly and equally, and to evaluate their bids in accordance with the process described in the RFP. Care must be taken throughout the process not to take any actions or make any decisions that could be construed as providing an unfair advantage to any proponent.

Therefore:

- Each evaluator must act independently and be free from bias and conflict of interest, act objectively and consider only the information received via the RFP process. This means that the scoring must be based strictly on the merits of the proposal.
- It is each evaluator's responsibility to ensure all documentation related to the evaluation process is kept secure at all times;
- Evaluators are not to discuss the evaluation, scores or any issues of the RFP with any of the proponents or vendors;
- Evaluators should avoid discussing any aspect of the evaluation or share any information submitted, including submissions or other related documents with anyone INCLUDING other members of the evaluation committee (unless this discussion is being facilitated by the RFP Facilitator); and
- All questions should be directed to the RFP Facilitator.

4. Evaluation Procedure

Prior to reading or scoring the Proposals, the evaluator should read the RFP document, Questions and Answers, and any amendments or addenda. Copies of these documents will be provided by the RFP Facilitator.

- a. Accompanying this evaluation guidelines document is the RFP Evaluation Form for each proposal. The evaluator is required to write his/her name on each RFP Evaluation Form.
- b. Proposals must be evaluated on their individual merits against the evaluation criteria stated in the RFP PS20230002 and awarded scores using the scoring guidelines provided.
- c. Scores must not be awarded by comparing proposals against each other.
- d. Only information enclosed in the proposals may be used during the evaluation process. Information about or knowledge of the proponents that are external to the proposals must not be used in the assessment of proposals.
- e. On the RFP Evaluation Form, the scoring scale (0 to 5) is located at the bottom of each page and explained in more detail in the following Section 5. Each evaluator is to enter, in his/her opinion, the most applicable level as judged in meeting the requirement, and provide a brief explanation substantiating the score. For example, is there anything lacking or outstanding in the Proponent's response. Also, comments should be provided if an item receives a score of 0, 1, 4, or 5.

- f. At the end of the scoring section, a general comments section has been provided where the evaluator has an opportunity to provide further comments with respect to the proposal. *These comments are important for debriefing unsuccessful proponents.*
- g. Each category has been assigned a weighting value. The combination of the weights and all scores will be calculated to determine the highest rated proponent(s). This may provide the basis for determining a short-list of proponents or a successful proponent, if any, after all factors have been considered.
- h. When evaluating the proposals, the following procedure is recommended:
 - (i) Read the proposal in its entirety before making any notes or assessing any scores. This will provide you with an overview of what is being proposed.
 - (ii) Go to the sections in the proposal you have been asked to evaluate, and read through the entire section(s). Make notes where applicable.
 - (iii) Read the section again, assess and provide a score for each criterion and include brief comments that substantiate your decision. The comments may be referred to in any post assessment evaluators meeting; they are also beneficial for preparing any debriefing reports or meetings.
- i. When all proposals have been evaluated, check to ensure that all items have been addressed and that there are no omissions. Return the RFP Evaluation Form to SCM to compile and summarize the scores.

5. Evaluation Assessment Guidelines

Note: In the absence of any additional instructions provided by SCM to the team, please consider the following as the guideline for assessment.

Following are the assessment guidelines for scoring the proposals:

- 0 = Unsatisfactory:** The proposal is unsatisfactory, with the proponent having failed to meet the essential criteria and is extremely unlikely to meet the requirement.
- 1 = Poor:** The proponent barely satisfies the criteria. Significant risk may exist if proceeding with the proponent, requiring significant effort to develop a satisfactory performance level.
- 2 = Average:** The proponent is able to satisfy the criteria but further information is required to substantiate the proponent's claims of compliance with the particular requirement.
- 3 = Good:** The proponent has demonstrated that the requirement has been clearly satisfied and a sound understanding of the particular requirement, substantiated by detailed explanation and other supportive evidence. Related experience may be limited in some areas.
- 4 = Very Good:** The proponent has clearly demonstrated that the requirement has been satisfied, substantiated by a strong level of related

experience and in providing a significant level of beneficial insight and knowledge in the proposed solution.

5 = Excellent: The proponent has clearly demonstrated that they exceed the requirements by proposing an exceptional solution, substantiated with a strong level of understanding of the City's requirements plus related experience, resources, knowledge, skills and references.

All criteria will be assessed using the scoring guidelines outlined above.

The score for 'Price' will be determined by SCM using a formula outlined below whereby the lowest price for the complete package requested gets the full points available and the other pricing proposals are rated in relation to the lowest price.

The following formula will be used:

$$S = ((Lp / P) * W) * 100 \text{ where:}$$

S = Weighted percentage score
 Lp = Lowest priced bid
 P = Price
 W = percentage weight

These calculations will be done by SCM and will be shared with the evaluation committee at the evaluation meeting once the management; technical and financial scoring has been completed.

6. Evaluation Responsibilities

Category	Supply Chain Management	Evaluation Team
Terms and conditions, and high level mandatory requirements	X	
RFP administrative compliance	X	
Proponent information, references	With direction from Evaluation Team	X (references)
Business requirements		X
Other: Value-added services		X
Pricing/cost	X	
Sustainability	X	

Evaluator's Non-disclosure and Conflict of Interest Form

Date:	
Employee Name:	
Project No.:	PS20230002
Project Title:	CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE

Please sign below after completing the following:

1. I understand my role in ensuring that I do not discuss or disclose any information while evaluating this proposal. <i>(See item 3 under General on page two of these Guidelines)</i>	Yes <input type="checkbox"/> No <input type="checkbox"/>
2. I understand my role in ensuring that a conflict of interest does not occur. <i>(See item 2 under Conflict of Interest on page two of these Guidelines)</i>	Yes <input type="checkbox"/> No <input type="checkbox"/>
3. I believe that I might have a conflict of interest.	Yes <input type="checkbox"/> No <input type="checkbox"/>

If Yes has been chosen for Item 3, please explain reason for potential conflict of interest.
I have a relationship with:

Company Name: _____

Name: _____ Relationship: _____

Details: _____

Employee's signature

Date

Print Name

RFP PS20230002 - CONSULTANT SERVICES – 2023 ENERGY MODELLING GUIDELINES UPDATE

Evaluation Guide: 0 = Unsatisfactory 1 = Poor 2 = Average 3 = Good 4 = Very Good 5 = Excellent

- 0 = Unsatisfactory** The Submission is Unsatisfactory with the Proponent having failed to meet the essential criteria and is extremely unlikely to meet the requirement.
- 1 = Poor** The Proponent barely satisfies the criteria. Significant risk may exist if proceeding with the supplier and would require major effort to develop a satisfactory performance level.
- 2 = Average** The Proponent is able to satisfy the criteria but further evidence and information is required to test and substantiate performance level claims.
- 3 = Good** The Proponent has demonstrated that the criteria have been clearly satisfied and that they understand the requirements substantiated by detailed explanation. Actual experience may be limited in some areas.
- 4 = Very Good** The Proponent has demonstrated that the criteria have been clearly satisfied and substantiated by experience in providing a significant level of beneficial insight and knowledge in the proposed solution.
- 5 = Excellent** The Proponent has clearly demonstrated that they satisfy or exceed the criteria by proposing a superior solution, substantiated with experience, knowledge and references.

Evaluation - Technical Proposal (Dept. to review)																
Evaluation Criteria	Weight	Evaluator Remarks	Score (0-5)	Weighted Score	Evaluator Remarks	Score (0-5)	Weighted Score	Evaluator Remarks	Score (0-5)	Weighted Score	Evaluator Remarks	Score (0-5)	Weighted Score	Evaluator Remarks	Score (0-5)	Weighted Score
Key Personnel Did the proponent demonstrate their level of experience key personnel have in reviewing energy modelling work by others outside of the proponent's organization or exposure to challenges experienced by modellers outside their organization, and depth of experience on policy and code recommendations.	25%			0.0%			0.0%			0.0%			0.0%			0.0%
Executive Summary Provide a brief executive summary of your Proposal.	5%			0.0%			0.0%			0.0%			0.0%			0.0%
Approach to Performing Scope of Work Clearly describe the methodology and project work plan for performing the work. Include an estimate of how much energy modelling effort is planned compared to other methods of arriving at technical recommendations (e.g. past project experience, etc.). Provide an indication of the number, types and sizes of building designs that the proponent's organization has access to in carrying out this work.	50%			0.0%			0.0%			0.0%			0.0%			0.0%
Sustainability (Environmental and/or Social) - See Response to Supplier Diversity section/checklist to be completed by SCM.	5%			0.0%			0.0%			0.0%			0.0%			0.0%
SUBTOTAL OF TECHNICAL SCORES				0.0%			0.0%			0.0%			0.0%			0.0%
General Remarks (MANDATORY)																



REQUEST FOR PROPOSALS

CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE

RFP No. PS20230002

Issue Date: January 17, 2023

Issued by: City of Vancouver (the "City")

SUMMARY

The intent of this RFP is to update the City of Vancouver's Energy Modelling Guidelines to version 3, for new changes to take into effect in alignment with VBBL Sections 6.6.2 and 10.2 changes in July 2023 and January 2025

PART A INSTRUCTIONS AND INFORMATION

1.0 INSTRUCTIONS

1.1 The City is interested in selecting an entity (each, a “**Proponent**”) that submits a proposal (each, a “**Proposal**”) with the capability and experience to efficiently and cost-effectively meet the requirements described in this RFP. The City expects to select a Proponent to enter into contract negotiations. The term of any agreement is expected to be approximately Six months with possible extensions to complete the work.

However, the City may: (i) decline to select any Proponent; (ii) decline to enter into any agreement; (iii) select multiple Proponents for negotiation; or (iv) enter into one or more agreements respecting the subject matter of the RFP with one or more Proponents or other entities at any time. The City may also terminate the RFP at any time.

1.2 Proponents should submit their proposals on or before 3:00pm on the 6th day of February, 2023 (the “**Closing Time**”) by email in accordance with the following:

- Subject of the file to be: PS# - Title - Vendor name.
- Document format for submissions:
 - RFP Appendix 1 in PDF format - 1 combined PDF file,
 - Any other attachments if necessary
- Zip the files to reduce the size or email separately if needed.
- Send your submissions to dino.goundouvas@vancouver.ca; do not deliver a physical copy to the City of Vancouver.
- Submitting the files via Drop box, FTP, or similar programs, is not acceptable.
- Inquiries related to this RFP must be sent to dino.goundouvas@vancouver.ca by 12pm, February 1, 2023
- Due to cybersecurity concerns, the City of Vancouver will quarantine any inbound email with attachments not in PDF or Microsoft Office formats which will result in non-delivery to Supply Chain Management and will be deemed not submitted. Non-compliant file formats will be detected and quarantined even if they are compressed, zipped, renamed, and include password protected zipped files.
- The maximum number of attachments allowed in an email message is 10 attachments.
- The maximum size limit for an email message, including all attachments, is 10MB per message.

- 1.3 To be considered by the City, a Proposal must be submitted in the form set out in Appendix 1 (the "Proposal Form"), completed and duly executed by the relevant Proponent.
- 1.4 Amendments to a Proposal may be submitted via the same methods, at any time prior to the Closing Time. Proposals are revocable and may be withdrawn at any time before or after the Closing Time.
- 1.5 Proposals that are submitted after the Closing Time or that otherwise do not comply in full with the terms hereof may or may not be considered by the City and may or may not be returned to the Proponent, in the City's sole discretion.
- 1.6 All enquiries must be made in writing and are to be directed only to the above contact person. In-person or telephone enquiries are not permitted. Any communication from potential Proponents to City staff other than the contact person regarding the content of this RFP may lead to disqualification of the Proponent from this RFP process, at the City's sole discretion.

2.0 THIS SECTION HAS BEEN INTENTIONALLY DELETED

3.0 EVALUATION OF PROPOSALS

- 3.1 The City currently intends that all Proposals submitted to it in accordance with the RFP will be evaluated by City representatives, using quantitative and qualitative tools and assessments, as appropriate, to determine which Proposal or Proposals offer the overall best value to the City. In so doing, the City expects to examine:

Evaluation Criteria	Evaluation Weighting
Technical	65%
Financial	30%
Sustainability (Environmental and/or Social)	5%
Total	100%

4.0 CITY'S DISCRETION

- 4.1 For the avoidance of doubt, notwithstanding any other provision in the RFP, the City has in its sole discretion, the unfettered right to: (a) accept any Proposal; (b) reject any Proposal; (c) reject all Proposals; (d) accept a Proposal which is not the lowest-price proposal; (e) accept a Proposal that deviates from the Scope of Work or the conditions specified in the RFP; (f) reject a Proposal even if it is the only Proposal received by the City; (g) accept all or any part of a Proposal; (h) split the Scope of Work between one or more Proponents; and (i) enter into one or more agreements respecting the subject matter of the RFP with any entity or entities at any time. Without limiting the foregoing, the City may reject any Proposal by a Proponent that has a conflict of interest, has engaged in collusion with another Proponent or has otherwise attempted to influence the outcome of the RFP other than through the submission of its Proposal.

5.0 LEGAL TERMS AND CONDITIONS

- 5.1 The legal obligations of a Proponent that will arise upon the submission of its Proposal are stated in Appendix 2. Except where expressly stated in these Legal Terms and Conditions:

(i) no part of the RFP consists of an offer by the City to enter into any contractual relationship; and (ii) no part of the RFP is legally binding on the City. EXCEPT WHERE EXPRESSLY STATED OTHERWISE IN APPENDIX 2: (I) NO PART OF THE RFP CONSISTS OF AN OFFER BY THE CITY TO ENTER INTO ANY CONTRACTUAL RELATIONSHIP; AND (II) NO PART OF THE RFP IS LEGALLY BINDING ON THE CITY.

POTENTIAL PROPONENTS MUST REVIEW THESE LEGAL TERMS AND CONDITIONS CAREFULLY BEFORE SUBMITTING A PROPOSAL.

PART B SCOPE OF WORK

The scope of work stated in this Part B (collectively, the “Scope of Work”) IS current as of the date hereof, but may change or be refined in the course of the evaluation of Proposals or otherwise.

2023 Energy Modelling Guidelines Update

Request for Proposals: Scope of Work

Schedule

The anticipated delivery date of draft results is: Monday, May 15th, 2023

The anticipated dates of 2 proposed workshops are: Week of June 5th, 2023

The anticipated delivery date of final results is: Monday July 10th, 2023

Background

The Zero Emissions Building Plan (ZEBP¹) seeks to reduce the operational emissions of new construction in Vancouver to zero by 2030. Changes to the Vancouver Building By-law (VBBL) were approved in May 2022 to reduce greenhouse gas intensity (GHGI) targets consistent with zero emissions heating and hot water equipment for Part 3 new construction, as well as more stringent targets on climate resilience. The City of Vancouver’s Energy Modelling Guidelines (EMGs) version 2.0 needs to be updated to consolidate feedback and new knowledge that has emerged since the release of version 2.0 in July 2018.

The EMGs are used by projects to demonstrate compliance to the energy and emissions limits in the Vancouver Building By-law and is also referenced by the BC Building Code in the application of the Energy Step Code (ESC) for Part 3 buildings. While the focus of the update will be to reflect Vancouver’s context, proponents are encouraged to consider the implications of these updates to users of the provincial ESC and lead discussions on these implications at the stakeholder workshops (see Deliverables).

Intent

The intent of this scope of work is to update the City of Vancouver’s Energy Modelling Guidelines to version 3, for new changes to take into effect in alignment with VBBL Sections 6.6.2 and 10.2 changes in July 2023 and January 2025².

Scope

Throughout the delivery of this scope of work, the proponent should consider applicability or constraints of the common energy modelling software used by modelling professionals in BC for Part 3 large new buildings. Proposed modelling methodologies should work for these modelling software; otherwise provide a recommendation on whether specific software should no longer be used for the purposes of compliance modelling for VBBL or ESC.

¹<https://vancouver.ca/files/cov/zero-emissions-building-plan.pdf>

² <https://council.vancouver.ca/20220517/documents/R1a.pdf#page=34>

It is up to the proponent to propose the necessary methodology to arrive at and justify each recommended change to the EMGs based on the scope items outlined below. Some recommendations may be based on professional judgment and experience of the proponent, while others may require some energy modelling effort to arrive at the recommended approach.

This scope of work is not intended to be an extensive modelling exercise. The energy modelling scope item 14) is meant to provide an overall summary to understand the impact to energy and emissions metrics based on by major impacts such as updated weather files, changes in DHW assumptions, and ventilation standards, etc. Proponents are expected to have access to recent and relevant completed energy models of Part 3 new buildings of different sizes to draw from for the purposes to arriving at the recommendations.

The scope of work consists of the following needs:

1) Weather files

- a) Recommend a change to the standard weather file for demonstrating compliance to VBBL from CWEC 2016 to CWEC 2020 or to another weather file. The intent is to reflect best currently available information to demonstrate compliance to VBBL energy & emissions limits at the time of design.
- b) Recommend standard weather file(s) for completing sensitivity analysis under future climate conditions (e.g. specify climate files with time-scale and Representative Concentration Pathway, or source of climate files, etc.) or the use of Reference Summer Weather Years³. See also Section 5).

2) Domestic hot water

- a) Provide recommendations on whether to include the following changes as per the recommendations of the report “Calibrating the Zero Emissions Building Plan and BC Energy Step Code”⁴
 - increasing peak load assumption to 0.0021L/s/person (Section 3.1.4.1 of the report)
 - adopting a seasonal multiplier to DHW use (Section 3.1.4.2)
 - adopting a recirculation DHW heat loss factor (Section 3.1.4.3)
 - adopting a multiplier for non-submetered DHW (Section 3.1.4.5)
- b) Suggest any other recommendations to improve modelling of domestic hot water use, if any.

3) Ventilation Standard

Provide advice on the implications of the changes to TEDI, TEUI, GHGI and CEDI using ventilation rates in ASHRAE 62.1 -2016 Ventilation and Acceptable Indoor Air Quality as opposed to current VBBL referenced ASHRAE 62.1-2001 for ventilation.

4) Overheating analysis for Passive Cooled Buildings

³ <https://nrc-publications.canada.ca/eng/view/object/?id=abcd0186-37f3-4051-b752-688f04b7063c>

⁴ Crosby, S. 2019. “Calibrating the Zero Emissions Building Plan and BC Energy Step Code” Report for the Greenest City Scholars Program. https://www.researchgate.net/profile/Sarah-Crosby-2/publication/336654063_Calibrating_the_Zero_Emissions_Building_Plan_and_BC_Energy_Step_Code/links/5e583818a6fdccbeba079aa4/Calibrating-the-Zero-Emissions-Building-Plan-and-BC-Energy-Step-Code.pdf

Recommend standardized assumptions for estimating the number of overheating hours for passively cooled buildings (section 4 of the EMGs) for the purposes of demonstrating compliance with overheating limits within VBBL and ESC. The proposed methodology or assumptions should apply to common natural ventilation and other passive cooling strategies and be simple to apply across different project designs and conditions. Include guidance on the following:

- a) Modelling natural ventilation and shading – for example, how window/patio door opening areas are calculated, how much airflow through openings, schedules of operation, external or internal operable shading.
- b) Occupant assumptions such as clothing, metabolic rate, local airspeed, etc.
- c) Other modelling assumptions such as thermal massing
- d) Recommend whether to require the calculation of operative temperature instead of dry bulb temperature in thermal comfort/overheating analysis based on ASHRAE 55 Section 5.3. Include any technical or software constraints associated with this recommendation.
- e) Recommend changes to the values in Table 4 “Acceptability Limits for Naturally Conditions Spaces in Vancouver” in Section 4 of the EMGs to a standard minimum value across all month, with the intent to accommodate projects outside of Vancouver conducting overheating hours analysis for ESC compliance.

5) Resilience to future climate and shock events

- a) For buildings with partial cooling or no active cooling: recommend a methodology for sensitivity analysis of how the number of overheating hours will shift in the future, such as time period to be modelled, the weather files to be used, etc.
- b) For buildings with active cooling: recommend a methodology for sensitivity analysis of overheating hours in the event of a power outage. Suggest a scenario and set parameters for analysis such as the duration of the power outage, the time period to be modelled, the weather files to be used, the number of overheating hours above a thermal safety threshold temperature, etc. Suggest an approach to encourage design teams to explore additional ways to reduce overheating hours during a power outage with the intent to improve the passive survivability of the building.
- c) Recommend a standard methodology and weather files to be used to analyze and report on how peak cooling and heating loads, TEDI, TEUI, GHGI and CEDI change between current and future climate scenarios. Include recommendations on how this information may be presented in the Energy & Emissions Design Report.

6) Cooling Energy Demand Intensity

Establish a standard methodology for calculating cooling energy demand intensity applicable to all building designs including those with full, partial or no mechanical cooling systems.

7) Refrigerant impact – GHGI-R

Projects will be required to account for the greenhouse gas impacts of refrigerants (GHGI-R) in the whole-building GHGI limit as of January 2025. Draft a new guidance section in the EMGs on GHGI-R that includes the following:

- a) Provide recommendation on incorporating GHGI-R estimates in early design for whole building GHGI compliance, based on existing available resources⁵. Reference existing GHGI-R calculation methodology from the Green Buildings Policy for Rezoning – Process and Requirements (amended June 14, 2019)⁶ to the EMGs and recommend updates to the methodology as necessary.
- b) Recommend whether GHGI-R reporting should be limited to mechanical cooling equipment containing more than a specified volume of refrigerant (nominally 225g)⁷ or a specific cooling capacity (19kW)⁸, or align with any other relevant standards or regulations.
- c) Update the definition of GHGI to include refrigerant impact.

8) Compliance for actively cooled buildings

As of January 2025, dwelling units within Part 3 buildings will be required to have active mechanical cooling capable to maintaining an indoor air temperature of 26°C with windows closed. Provide a recommendation on how compliance may be demonstrated through energy modelling. For example, the weather files and/or peak design condition to be used, the time period to be modelled, any mechanical system details or other compliance information or metrics to be provided by the design and modelling team, etc. Provide insight on any changes to the design and modelling teams' workflow that may be required to demonstrate compliance.

9) Form Factor for slim buildings' TEDI targets

Propose an adjustment factor for small and/or narrow buildings where TEDI targets may be difficult to achieve due to its form factor.

10) Energy efficiency recommendations

Provide technical and policy recommendation on the following items with the intent to further encourage selection of more energy efficient options:

- a. Appliances: should the current credit for EnergyStar appliances for TEUI continue, or should the default modelling assumptions for these appliances be adjusted to Energy Star requirements?
- b. Lighting – is an update to modelling assumptions for lighting necessary and are there other mechanisms to drive better more energy efficient lighting design
- c. Elevators – propose a revision to the current assumption on elevator load or an alternative modelling method to encourage the selection of more efficient elevators
- d. Laundry appliances – does the current assumptions on modelling in-suite laundry require updating?

11) Miscellaneous recommendations

Provide technical and policy recommendations on the following items. Some questions are provided as a starting point for consideration; the proponent is encouraged to provide additional perspectives as they see fit.

- a) Clarify the application of the corridor pressurization adjustment for buildings using energy/heat recovery ventilation systems for corridor supply and return air

⁵ <https://vancouver.ca/files/cov/refrigerant-impact-ghgi-study.pdf>

⁶ <https://vancouver.ca/files/cov/bulletin-green-buildings-policy-for-rezoning-2019-june14.pdf>

⁷ Based on LEED v4 Credit Enhanced Refrigerant Management

⁸ Based on Zero Carbon Buildings v3

- b) The reduction of maximum corridor pressurization adjustment value for TEDI and TEUI to 5
 - c) The removal of the corridor pressurization adjustment for GHGI
 - d) What space uses/types should be included within the building's Modelled Floor Area and Gross Floor Area (e.g. below grade storage or bike storage), and justifications based on anticipate impact on TEDI, TEUI, GHGI, CEDI metrics, etc.
 - e) Recommend changes to the current sub-metering adjustment for hot water for space heating (see 2.7 of the EMGs), if any. Consider whether the adjustment should be removed for simplicity and/or practicality, or if the adjustment should be expanded to include TEDI and DHW heating.
 - f) Recommend whether any further clarifications are needed on the role of the energy modelling professional making reference to the Joint Professional Practice Guidelines for Whole Building Energy Modelling Services⁹
- 12) GHG reduction target methodology for Groups A, B, and F major occupancies
Draft guidance language on the modelling steps for Groups A, B and F major occupancies with GHG reduction targets in VBBL to determine the GHG reduction target based on an all fossil-fuel baseline modelled as per ASHRAE or NECB requirements. If different modelling steps are required for ASHRAE or NECB projects or for different modelling software, provide guidance for different cases.
- 13) Review CSA Z5020 Building Energy Modelling Standard
Provide a high-level review of the soon-to-be published *CSA Z5020 Building Energy Modelling Standard* to identify any significant differences to technical modelling procedures or assumptions compared to the EMGs; provide recommendations on changes to EMGs if necessary.
- 14) Energy Modelling & Report
- a) Apply at least two archetype buildings (at least one 6-storey residential, one 7+ storey residential, etc.) that include typical buildings systems meeting current VBBL requirements, modelled under the methodologies and assumptions outlined in v2.0 of the EMGs and compare the modelled results with the major recommendations from the above list. Provide comparison of how TEDI, TEUI, CEDI, GHGI and overheating hours are affected by the recommended changes. In responding to this RFP, the proponent should specify the methodology for this step.
 - b) Provide a brief report on how various components of building energy usage may be affected by the changes listed above, along with the proponent's list of recommended changes. The report should also provide brief commentary on any significant changes to energy modelling or design workflow related to the recommended changes.
- 15) Engagement with stakeholders
Organize and facilitate a minimum of 2 (two) virtual workshops to share proposed changes to the following groups and gather feedback in June 2023. Create an online survey to collect

⁹<https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories/Document/01525AMW7JPMODAJKVYBCLHGRA24FJJPH3/Whole%20Building%20Energy%20Modelling%20Services>

written feedback to a draft version of the EMG changes. The survey should be made live in time for the workshops and remain open for 4 weeks.

- a) Workshop #1 with stakeholders to include relevant code compliance professionals from BC's Climate Action Secretariat, Building & Safety Standards Branch, BC Housing, BC Hydro, local municipalities etc., with approximate 10-20 individuals
- b) Workshop #2 with local energy modelling professionals (approximately 25-50 individuals)

Deliverables

The project will result in the following deliverables to the City:

- 1) Meetings with City staff as appropriate, including at a minimum:
 - a. Kick-off meeting to review scope and clarify assumptions;
 - b. Regular progress updates, bi-weekly as needed;
 - c. Presentation and review of preliminary findings with core City staff;
 - d. Organize and facilitate two workshops to share proposed changes to industry stakeholders, and to gather input on practical, technical or software issues and opportunities
 - e. Online survey to gather feedback from draft EMG changes
- 2) A preliminary draft of changes to the Energy Modelling Guidelines detailing initial recommendations and questions to be resolved;
- 3) A final report outlining the methodology taken to arrive at the recommended changes, including a table listing the impacts of major recommended change on TEDI, TEUI, GHGI and CEDI; and
- 4) A final electronic version of the Energy Modelling Guidelines v3.0 with tracked changes, which incorporates the feedback from stakeholders and discussions with the project team.

APPENDIX 1
PROPOSAL FORM

RFP No. PS20230002, CONSULTANT SERVICES - 2023 ENERGY MODELLING GUIDELINES UPDATE (the
"RFP")

Proponent's Name: _____
"Proponent"

Address: _____

Jurisdiction of Legal Organization: _____

Date of Legal Organization: _____

Key Contact Person: _____

Telephone: _____

E-mail: _____

The Proponent, having carefully examined and read the RFP, including all amendments thereto, if any, and all other related information published on the City's website, hereby acknowledges that it has understood all of the foregoing, and in response thereto hereby submits the enclosed Proposal.

The Proponent further acknowledges that it has read and agrees to the Legal Terms & Conditions attached as Appendix 2 to the RFP.

IN WITNESS WHEREOF the Proponent has executed this Proposal Form:

Signature of Authorized Signatory for the Proponent

Date

Name and Title

Signature of Authorized Signatory for the Proponent

Date

Name and Title

Executive Summary

Provide a brief executive summary of your Proposal.

Approach to Performing Scope of Work

Clearly describe the methodology and project work plan for performing the work. Include an estimate of how much energy modelling effort is planned compared to other methods of arriving at technical recommendations (e.g. past project experience, etc.). Provide an indication of the number, types and sizes of building designs that the proponent's organization has access to in carrying out this work.

Key Personnel

Identify and provide professional biographical information for the key personnel that would perform the required services. Indicate the level of experience key personnel have in reviewing energy modelling work by others outside of the proponent's organization or exposure to challenges experienced by modellers outside their organization, and depth of experience on policy and code recommendations.

References	
Client Name # 1	
Address (City and Country)	
Contact Name	
Title of Contact	
Telephone No.	
E-mail Address	
Length of Relationship	
Type of Goods and/or Services provided to this Client	
Client Name # 2	
Address (City and Country)	
Contact Name	
Title of Contact	
Telephone No.	
E-mail Address	
Length of Relationship	
Type of Goods and/or Services provided to this Client	
Client Name # 3	
Address (City and Country)	
Contact Name	

Title of Contact	
Telephone No.	
E-mail Address	
Length of Relationship	
Type of Goods and/or Services provided to this Client	

<p>Subcontractors</p> <p>List all of the subcontractors that the Proponent proposes to use in carrying out the required services and described the scope of subcontracted work (or write "None" if no subcontractors are proposed).</p>

<p>Declaration of Supplier Code of Conduct</p> <p>The City of Vancouver expects each supplier of goods and services to the City to comply with the supplier performance standards set out in the City's Supplier Code of Conduct ("SCC") <https://policy.vancouver.ca/AF01401P1.pdf>, which defines minimum labour and environmental standards for City suppliers and their subcontractors. To give effect to these requirements, an authorized signatory of each proposed vendor must complete the following declaration.</p> <p>As an authorized signatory of _____ (<i>vendor name</i>), I declare that I have reviewed the SCC and to the best of my knowledge, _____ (<i>vendor name</i>) and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted below (include all violations/convictions that have occurred in the past three years as well as plans for corrective action). I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of _____ (<i>vendor name</i>).</p> <p>Signature: _____</p> <p>Name and Title: _____</p> <p>Exceptions to Declaration:</p>

Conflicts, Collusion, Lobbying

See Article 9 of Appendix 2 for instructions.

Table 1 – Commercial Table – Project Fees (please complete as stated in Part B – Deliverables Work Scope).

	Description by Activities	Estimated Hours	Total Estimated Fee
1	Meetings with City staff, including review of preliminary findings, workshops with stakeholders and online survey for feedback:		
2	A preliminary draft of changes to the Energy Modelling Guidelines detailing initial recommendations and questions to be resolved		
3	A final report outlining the methodology taken to arrive at the recommended changes, including a table listing the impacts of major recommended change on TEDI, TEUI, GHGI and CEDI		
4	A final electronic version of the Energy Modelling Guidelines v3.0 with tracked changes, which incorporates the feedback from stakeholders and discussions with the project team.		
Totals (fees should include PST but exclude GST)			\$

Table 2 – Commercial Table – Schedule of Hourly Rates (for additional services if required)

Team Members	Activity/Role	Regular Rate
		\$
		\$
		\$
		\$
		\$

Supplier Diversity

Please note that these Supplier Diversity questions are optional but may form part of the evaluation of this RFP. Proponent answers to Supplier Diversity questions are for information gathering purposes only and will be kept confidential in accordance with the Legal Terms and Conditions of this RFP.

In the space below, indicate the Proponent's company profile with regards to social value and economic inclusion supporting equity, diversity, inclusion and reconciliation, including social/environmental certifications, workforce diversity and/or if owned/controlled by an equity-seeking demographic (including but not limited to non-profit, cooperative, Women, Indigenous Peoples, Ethno-cultural People (minorities, newcomers, immigrants), persons with disabilities or LGBTQ+ people).

<p>Majority owned/controlled/ by:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Women <input type="checkbox"/> Indigenous Peoples <input type="checkbox"/> Non-Profit/Charity (Social Enterprise) <input type="checkbox"/> Coop <input type="checkbox"/> Community Contribution Corporation (3C/CCC) <input type="checkbox"/> Ethno-cultural Persons <input type="checkbox"/> People with Disabilities <input type="checkbox"/> LGBTQ+ <input type="checkbox"/> Other: please indicate 	<p>Workforce Diversity:</p> <ul style="list-style-type: none"> % Women % Indigenous Peoples % Ethno-cultural People % People with Disabilities % LGBTQ+ % Other: please indicate 	<p>Social / Environmental Certifications</p> <ul style="list-style-type: none"> <input type="checkbox"/> BCorp <input type="checkbox"/> BuySocial <input type="checkbox"/> Supplier Diversity Certification <input type="checkbox"/> Fairtrade <input type="checkbox"/> Green Business Certification (ie. LEED, ClimateSmart) <input type="checkbox"/> Other: please indicate
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**APPENDIX 2
LEGAL TERMS AND CONDITIONS OF RFP**

1. APPLICATION OF THESE LEGAL TERMS AND CONDITIONS

These legal terms and conditions set out the City's and the Proponent's legal rights and obligations only with respect to the RFP proposal process and any evaluation, selection, negotiation or other related process. In no event will the legal terms and conditions of this Appendix 2 apply to, or have the effect of supplementing, any Contract formed between the City and the Proponent, or otherwise apply as between the Proponent and the City following the signing of any such Contract.

2. DEFINITIONS

In this Appendix 2, the following terms have the following meanings:

- (a) "City" means the City of Vancouver, a municipal corporation continued pursuant to the Vancouver Charter.
- (b) "Contract" means a legal agreement, if any, entered into between the City and the Proponent following and as a result of the Proponent's selection by the City in the City's RFP process.
- (c) "Losses" means, in respect of any matter, all direct or indirect, as well as consequential: claims, demands, proceedings, losses, damages, liabilities, deficiencies, costs and expenses (including without limitation all legal and other professional fees and disbursements, interest, penalties and amounts paid in settlement whether from a third person or otherwise).
- (d) "Proponent" means the legal entity which has signed the Proposal Form, and "proponent" means any proponent responding to the RFP, excluding or including the Proponent, as the context requires.
- (e) "Proposal" means the package of documents consisting of the Proposal Form (including this Appendix 2), the Proponent's proposal submitted under cover of the Proposal Form, and all schedules, appendices and accompanying documents, and "proposal" means any proposal submitted by any proponent, excluding or including the Proponent, as the context requires.
- (f) "Proposal Form" means Appendix 2 of the RFP, as completed and executed by the Proponent.
- (g) "RFP" means the document issued by the City as Request for Proposals No. PS20230002, as amended from time to time and including all addenda.

3. NO LEGAL OBLIGATION ASSUMED BY THE CITY

Despite any other term of the RFP or the Proposal Form, including this Appendix 2 (except only Sections 7, 8.2 and 10 of this Appendix 2, in each case to the extent applicable), the City assumes no legal duty or obligation to the Proponent or to any proposed subcontractor in respect of the RFP, its subject matter or the Proposal unless and until the City enters into a Contract, which the City may decline to do in the City's sole discretion.

4. NO DUTY OF CARE OR FAIRNESS TO THE PROPONENT

The City is a public body required by law to act in the public interest. In no event, however, does the City owe *to the Proponent or to any of the Proponent's proposed subcontractors* (as opposed to the public) any contract or tort law duty of care, fairness, impartiality or procedural fairness in the RFP process, or any contract or tort law duty to preserve the integrity of the RFP process. The Proponent hereby waives and releases the City from any and all such duties and expressly assumes the risk of all Losses arising from participating in the RFP process on this basis.

5. EVALUATION OF PROPOSALS

5.1 Compliance / Non-Compliance

Any proposal which contains an error, omission or misstatement, which contains qualifying conditions, which does not fully address all of the requirements or expectations of the RFP, or which otherwise fails to conform to the RFP may or may not be rejected by the City at the City's sole discretion. The City may also invite a proponent to adjust its proposal to remedy any such problem, without providing the other proponents an opportunity to amend their proposals.

5.2 Reservation of Complete Control over Process

The City reserves the right to retain complete control over the RFP and proposal processes at all times. Accordingly, the City is not legally obligated to review, consider or evaluate the proposals, or any particular proposal, and need not necessarily review, consider or evaluate the proposals, or any particular proposal, in accordance with the procedures set out in the RFP, and the City reserves the right to continue, interrupt, cease or modify its review, evaluation and negotiation processes in respect of any or all proposals at any time without further explanation or notification to any proponents.

5.3 Discussions/Negotiations

The City may, at any time prior to signing a Contract, discuss or negotiate changes to the scope of the RFP, any proposal or any proposed agreement with any one or more of the proponents without having any duty or obligation to advise the Proponent or to allow the Proponent to vary its Proposal as a result of such discussions or negotiations with other proponents or changes to the RFP or such proposals or proposed agreements, and, without limiting the general scope of Section 6 of this Appendix 2, the City will have no liability to the Proponent as a result of such discussions, negotiations or changes.

5.4 Acceptance or Rejection of Proposals

The City has in its sole discretion, the unfettered right to: accept any proposal; reject any proposal; reject all proposals; accept a proposal which is not the lowest-price proposal; accept a proposal that deviates from the requirements of the RFP or the conditions specified in the RFP; reject a proposal even if it is the only proposal received by the City; accept all or any part of a proposal; enter into agreements respecting the subject matter of the RFP with one or more proponents; or enter into one or more agreements respecting the subject matter of the RFP with any other person at any time.

6. PROTECTION OF CITY AGAINST LAWSUITS

6.1 Release by the Proponent

Except only and to the extent that the City is in breach of Section 8.2 of this Appendix 2, the Proponent now releases the City, its officials, its agents and its employees from all liability for any Losses incurred in connection with the RFP or the Proposal, including any Losses in connection with:

- (a) any alleged (or judicially determined) breach by the City or its officials, agents or employees of the RFP (it being agreed that, to the best of the parties' knowledge, the City has no obligation or duty under the RFP which it could breach (other than wholly unanticipated obligations or duties merely alleged or actually imposed judicially));
- (b) any unintentional tort of the City or its officials or employees occurring in the course of conducting the RFP process,
- (c) the Proponent preparing and submitting the Proposal;
- (d) the City accepting or rejecting the Proposal or any other submission; or

- (e) the manner in which the City: reviews, considers, evaluates or negotiates any proposal; addresses or fails to address any proposal or proposals; resolves to enter into a Contract or not enter into a Contract or any similar agreement; or the identity of the proponent(s) or other persons, if any, with whom the City enters any agreement respecting the subject matter of the RFP.

6.2 Indemnity by the Proponent

Except only and to the extent that the City breaches Section 8.2 of this Appendix 2, the Proponent indemnifies and will protect, save and hold harmless the City, its officials, its agents and its employees from and against all Losses, in respect of any claim or threatened claim by the Proponent or any of its proposed subcontractors or agents alleging or pleading:

- (a) any alleged (or judicially determined) breach by the City or its officials or employees of the RFP (it being agreed that, to the best of the parties' knowledge, the City has no obligation or duty under the RFP which it could breach (other than wholly unanticipated obligations or duties merely alleged or actually imposed judicially));
- (b) any unintentional tort of the City or its officials or employees occurring in the course of conducting the RFP process, or
- (c) liability on any other basis related to the RFP or the proposal process.

6.3 Limitation of City Liability

In the event that, with respect to anything relating to the RFP or this proposal process (except only and to the extent that the City breaches Section 8.2 of this Appendix 2), the City or its officials, agents or employees are found to have breached (including fundamentally breached) any duty or obligation of any kind to the Proponent or its subcontractors or agents whether at law or in equity or in contract or in tort, or are found liable to the Proponent or its subcontractors or agents on any basis or legal principle of any kind, the City's liability is limited to a maximum of \$100, despite any other term or agreement to the contrary.

7. DISPUTE RESOLUTION

Any dispute relating in any manner to the RFP or the proposal process (except to the extent that the City breaches this Section 7 or Section 8.2 of this Appendix 2, and also excepting any disputes arising between the City and the Proponent under a Contract (or a similar contract between the City and a proponent other than the Proponent)) will be resolved by arbitration in accordance with the *Commercial Arbitration Act* (British Columbia), amended as follows:

- (a) The arbitrator will be selected by the City's Director of Legal Services;
- (b) Section 6 of this Appendix 2 will: (i) bind the City, the Proponent and the arbitrator; and (ii) survive any and all awards made by the arbitrator; and
- (c) The Proponent will bear all costs of the arbitration.

8. PROTECTION AND OWNERSHIP OF INFORMATION

8.1 RFP and Proposal Documents City's Property

- (a) All RFP-related documents provided to the Proponent by the City remain the property of the City and must be returned to the City, or destroyed, upon request by the City.

- (b) The documentation containing the Proposal, once submitted to the City, becomes the property of the City, and the City is under no obligation to return the Proposal to the Proponent.

8.2 Proponent's Submission Confidential

Subject to the applicable provisions of the *Freedom of Information and Protection of Privacy Act* (British Columbia), other applicable legal requirements, and the City's right to publicly disclose information about or from the Proposal, including without limitation names and prices, in the course of publicly reporting to the Vancouver City Council about the RFP, the City will treat the Proposal (and the City's evaluation of it), in confidence in substantially the same manner as it treats its own confidential material and information.

8.3 All City Information Confidential

- (a) The Proponent will not divulge or disclose to any third parties any non-public documents or information concerning the affairs of the City which have been or are in the future provided or communicated to the Proponent at any time (whether before, during or after the RFP process). Furthermore, the Proponent agrees that it has not and must not use or exploit any such non-public documents or information in any manner, including in submitting its Proposal.
- (b) The Proponent now irrevocably waives all rights it may have by statute, at law or in equity, to obtain any records produced or kept by the City in evaluating its Proposal (and any other submissions) and now agrees that under no circumstances will it make any application to the City or any court for disclosure of any records pertaining to the receipt, evaluation or selection of its Proposal (or any other submissions) including, without limitation, records relating only to the Proponent.

9. NO CONFLICT OF INTEREST / NO COLLUSION / NO LOBBYING

9.1 Declaration as to no Conflict of Interest in RFP Process

- (a) The Proponent confirms and warrants that there is no officer, director, shareholder, partner, employee or contractor of the Proponent or of any of its proposed subcontractors, or any other person related to the Proponent's or any proposed subcontractor's organization (a "person having an interest") or any spouse, business associate, friend or relative of a person having an interest who is: (i) an official or employee of the City; or (ii) related to or has any business or family relationship with an elected official or employee of the City, in each case, such that there could be any conflict of interest or any appearance of conflict of interest in the evaluation or consideration of the Proposal by the City, and, in each case, except as set out, in all material detail, in the section titled "Conflicts; Collusion; Lobbying" in the Proposal Form.
- (b) The Proponent confirms and warrants that there is no person having an interest (as defined above) who is a former official, former employee or former contractor of the City and who has non-public information relevant to the RFP obtained during his or her employment or engagement by the City, except as set out, in all material detail, in the section titled "Conflicts; Collusion; Lobbying" in the Proposal Form.

9.2 Declaration as to No Conflict of Interest Respecting Proposed Supply

The Proponent confirms and warrants that neither the Proponent nor any of its proposed subcontractors is currently engaged in supplying (or is proposing to supply) goods or services to a third party such that entering into an agreement with the City in relation to the subject matter of the RFP would create a conflict of interest or the appearance of a conflict of interest between the Proponent's duties to the City and the Proponent's or its subcontractors' duties to such third party, except as set out, in all material detail, in the section titled "Conflicts; Collusion; Lobbying" in the Proposal Form.

9.3 Declaration as to No Collusion

The Proponent confirms and warrants that:

- (a) the Proponent is not competing within the RFP process with any entity with which it is legally or financially associated or affiliated, and
- (b) the Proponent is not cooperating in any manner in relation to the RFP with any other proponent responding to the RFP,

in each case, except as set out, in all material detail, in the section titled “Conflicts, Collusion, Lobbying” in the Proposal Form.

9.4 Declaration as to Lobbying

The Proponent confirms and warrants that:

- (a) neither it nor any officer, director, shareholder, partner, employee or agent of the Proponent or any of its proposed subcontractors is registered as a lobbyist under any lobbyist legislation in any jurisdiction in Canada or in the United States of America; and
- (b) neither it nor any officer, director, shareholder, partner, employee or agent of the Proponent or any of its proposed subcontractors has engaged in any form of political or other lobbying whatsoever with respect to the RFP or sought, other than through the submission of the Proposal, to influence the outcome of the RFP process,

in each case as set out, in all material detail, in the section titled “Conflicts, Collusion, Lobbying” in the Proposal Form.

10. GENERAL

- (a) All of the terms of this Appendix 2 to this Proposal Form which by their nature require performance or fulfillment following the conclusion of the proposal process will survive the conclusion of such process and will remain legally enforceable by and against the Proponent and the City.
- (b) The legal invalidity or unenforceability of any provision of this Appendix 2 will not affect the validity or enforceability of any other provision of this Appendix 2, which will remain in full force and effect.
- (c) The Proponent now assumes and agrees to bear all costs and expenses incurred by the Proponent in preparing its Proposal and participating in the RFP process.

APPENDIX 3
SAMPLE FORM OF AGREEMENT



PS20230002 - SERVICES CONTRACT

City of Vancouver (the “City”)

AND: <[legal name of other party]> (the “Contractor”)

having the following address:

453 West 12th Avenue

Vancouver, British Columbia, Canada

V5Y 1V4

Tel Number: [phone number of project manager]

Email: [email address of the project manager]

having the following address:

[address of other party]

Tel Number: [phone number]

Email: [email address]

Name of City Project Manager: []

This contract for services is comprised of this cover page, the following parts A, B, C, D and E, the attached Services Contract Terms and Conditions, and any other attachments, schedules, appendices or annexes expressly referred to in the aforementioned parts A, B, C, D and E, and the signature blocks following Part F below. By signing below, the City and the Contractor hereby agree to be bound by the terms of this contract.

PART A - SERVICES:

<  *Insert description.* >

[Note: Describe in detail what the services are, where they will be performed, who will be performing them, etc. Whenever necessary, supplement with a Schedule A further describing the services, as well as any delivery/performance schedule, milestones, etc.]

The Services are further described in Schedule A. <  **Delete if not included.** >

Start date for the Services: <  > (the "Start Date")

The Contractor agrees to complete the Services by: <  >

PART B - FEES AND EXPENSES:

Billing Date(s): See Section 20 of the Services Contract Terms and Conditions

Fees: <📄description>

[Insert description of fees and state which taxes will be charged in addition to the fees and/or which taxes are included in the fees.]

Definitions:

“GST” means the tax payable and imposed pursuant to Part IX of the *Excise Tax Act* (Canada), as amended or replaced from time to time.

Expenses: [Tick applicable ONE; tick one.]

- Reimbursable by the City but only in accordance with this Contract (see the Services Contract Terms and Conditions); or
- Not reimbursable (included in fees)

“PST” means the provincial sales tax payable and imposed pursuant to the Provincial Sales Tax Act (British Columbia), as amended or replaced from time to time.

Maximum Amount of Fees and Expenses (the “Maximum Amount”):

<📄description>

[Insert description of cap and state which taxes will be charged on top of the cap and/or which taxes are to be included in the cap.]

The fees and expenses are further described in Schedule B.

[Delete if not included.]

PART C: APPROVED SUBCONTRACTORS

<📄> [Provide names or write “None”.]

PART D: INSURANCE

Without limiting any of its obligations or liabilities under this Services Contract, the Contractor will obtain and continuously carry and will cause its subcontractors to obtain and continuously carry during the term of the Services Contract at its own expense and cost, the following insurance coverages with minimum limits of not less than those shown in the respective items set out below:

- (a) Commercial general liability insurance with a limit of not less than \$5,000,000 per occurrence and a deductible of not more than \$5,000 or other such amounts as the City may approve from time to time, protecting the Contractor and the Contractor's personnel against all claims for bodily injury including death, personal injury, advertising liability, products liability, sudden & accidental pollution, completed operations, or property damage or loss, arising out of the operations of the Contractor or the actions of the Contractor or the Contractor's personnel. The policy will carry blanket contractual liability coverage, include a cross-liability clause in favour of the City, and will name the City and the City's officials, officers, employees and agents as additional insureds;
- (b) All-risks property insurance covering the Contractor's property of every description containing a provision in which the insurer waives all rights which it may acquire by payment of a claim to recover the paid amount from the City or its officials, officers, employees or agents; and
- (c) Automobile insurance covering all vehicles owned, leased, rented or operated by the Contractor in connection with this Services Contract, including third party legal liability insurance in an amount not less than \$5,000,000 per occurrence, or such other amount as the City may approve from time to time.

The Contractor and each of its subcontractors will provide at its own cost other lines of insurance coverages, endorsements, or increased limits of insurance as deemed necessary by the City and as a reasonable and prudent contractor would require to protect their operations or performance of services.

All insurance policies required by this Services Contract shall be with insurers duly authorized to carry on business in the Province of British Columbia, in a form and in amounts satisfactory from time to time and acceptable to the City's Director of Risk Management.

The required insurance shall not be cancelled or endorsed to reduce the limits of liability without thirty (30) days' written notice by registered mail to the City. Should the policy be endorsed to restrict coverage midterm, written notice of such restriction will be provided by registered mail to the City no later than the effective date of change; the exception is cancellation for non-payment of premiums in which case the applicable statutory conditions will apply. Notice must identify the contract title, number, policy holder, and scope of work.

The Contractor's insurance policy (policies) shall be primary with respect to all claims arising out of the operations of the Contractor. Any insurance or self-insurance maintained by or on behalf of the City or its officials, officers, employees, or agents will be excess of the Contractor's insurance and will not contribute to it.

Neither the providing of insurance by the Contractor in accordance with this Agreement, nor the insolvency, bankruptcy or the failure of any insurance company to pay any claim accruing will be held to relieve the Contractor from any other provisions of the Services Contract with respect to liability of the Contractor or otherwise.

Prior to the Start Date, the Contractor will provide the City with evidence of all required insurance in the form of a certificate of insurance satisfactory to the City. The certificate of insurance will identify the contract title, number, policyholder, and scope of work. The Contractor will provide proof of insurance, in the form of a certificate of insurance or certified copies of all insurance policies to the Manager, Contracts and Administration at any time immediately upon request.

The Contractor will provide in its agreements with its subcontractors clauses in the same form as in this Part D. Upon request, the Contractor will deposit with the City detailed certificates of insurance for the policies it has obtained from its subcontractors and a copy of the applicable insurance clauses from its sub-contract agreements.

PART E: ADDITIONAL TERMS

<☒> [Describe or write "None".]

The following are integral parts of this Services Contract:

- <☒name of first schedule>;
- <☒name of second schedule>; and
- <☒name of third schedule>.

[Delete if no attachments.]

The parties hereto have duly executed this Contract as of the <☒> day of <☒month>, 20<☒year>.

SIGNED AND DELIVERED on behalf of the City by its authorized signatory(ies):

Per: _____

[Name and Title]

SIGNED AND DELIVERED on behalf of the Contractor by its authorized signatory(ies):

Per: _____

[Name and Title]

SERVICES CONTRACT TERMS AND CONDITIONS

A. CONTRACTOR'S OBLIGATIONS

1. **Performance of Services.** The Contractor agrees to provide the City with the services described in PART A (and in any schedule referred to therein), including, without limitation, and to the extent not expressly described in PART A (or in any such schedule), all services necessary or incidental to the completion of the services contemplated and described therein (the "Services"), all in accordance with the Services Contract (this "Contract"). The Contractor must provide the Services commencing on the Start Date described in PART A and in accordance with the delivery schedule (if any) specified in PART A (or in any schedule referred to therein), regardless of the date of execution or delivery of this Contract. The Contractor must comply with the City's instructions in performing the Services, but unless otherwise specified herein, the Contractor shall at all times retain control over the manner in which those instructions are carried out.
2. **Provision of Service Inputs.** Unless otherwise specified herein, the Contractor must supply and pay for all labour, materials, permits and approvals (including from any relevant government authority) necessary or advisable to provide the Services.
3. **Standard of Care and Applicable Laws.** The Contractor must perform the Services to the standard of care, skill, and diligence prescribed herein, or where not prescribed herein, to the standard customarily maintained by persons providing, on a commercial basis, services similar to the Services, and in accordance with all statutes, regulations, by-laws, codes, rules, notices, orders, directives, standards and requirements of every competent federal, provincial, regional, municipal and other statutory authority applicable to the Contractor and its personnel and the Services.
4. **Warranty.** Without limitation to any additional warranties provided by the Contractor, whether indicated on the face of this contract or otherwise provided, the Contractor warrants that: (a) all goods, provided by the Contractor in connection with its performance of the Services ("Goods"), shall be of merchantable quality and free from defects in workmanship and materials; (b) all Goods shall strictly conform to applicable samples, specifications and drawings; (c) all Goods and Services shall be fit for the purpose intended by the City; (d) all Goods shall be free and clear of all liens, charges and encumbrances; (e) the Goods and Services shall comply with the standards set forth by applicable federal, provincial, municipal and industry regulatory agencies; (f) the shipping and handling of any hazardous material will be made in accordance with all applicable laws and regulations; and (g) the Goods and Services shall comply with all applicable environmental protection laws and regulations.

Unless a longer warranty period is specified on the face of this Contract or is otherwise provided, the foregoing warranty shall be valid for one year from the date of acceptance of the Goods and Services by the City. If at any time prior to the expiration of any applicable warranty period, any weakness, deficiency, failure, breakdown or deterioration in workmanship or material should appear or be discovered in the Goods and Services furnished by the Contractor, or if the Goods and Services do not conform to the terms and conditions of this Contract, the City may at its option (a) require the Contractor to promptly replace, redesign or correct the defective and non-conforming Goods and Services at no expense to the City, or (b) the City may replace or correct the defective Goods and Services and charge the Contractor with all expenses incurred by the City. The Contractor agrees to indemnify and save harmless the City, its officials, officers, employees, assigns, agents, clients and the public from any liability, loss, cost and expense arising either directly or indirectly, from breach of any warranty given by the Contractor hereunder.

5. **Contractor Personnel.** The Contractor must ensure that all persons it employs or retains to perform the Services are competent to perform them and are properly trained, instructed, and supervised, and that all such persons comply with the provisions of this Contract.
6. **Reporting.** The Contractor must, upon the City's request, fully report to the City on all work it does or has done in connection with providing the Services.
7. **Deliverables.** As a result of or as part of providing the Services, the Contractor may receive, create, produce, acquire or collect items including, without limitation, products, goods, equipment, supplies, models, prototypes and other materials; information and data; reports, drawings, plans, designs, depictions, specifications and other documentation (collectively, "Deliverables"). Deliverables do not include items that are: not required to be produced by the Contractor or supplied to the City as part of or together with the Services unless the City pays for such items; or specified in this Contract as being excluded from the Deliverables category; or items which pre-existed the effective date of this Agreement that are owned by a third party or that are used by the Contractor as part of the services provided to any of its other customers. All Deliverables will be owned solely by the City unless otherwise expressly provided herein and the City will have the complete right to use and deal with the Deliverables for its own benefit in any way it sees fit without limitation. The Contractor waives, in favour of the City, all moral rights in the Deliverables, transfers to the City, free of all liens and encumbrances, ownership of each Deliverable, and assigns all of its world-wide present and future rights, title and interest in and to each Deliverable, including copyright, effective as of the date of creation or acquisition of such Deliverable. The Contractor will permit the City to inspect and copy all Deliverables.
8. **Confidentiality.** The Contractor acknowledges that, in performing the Services required under this Contract, it may acquire information about matters which are confidential to the City, which information is the exclusive world-wide property of the City or its suppliers or citizens, as the case may be. The Contractor undertakes to treat as confidential all Deliverables and all information received by reason of its position as Contractor and agrees not to disclose the same to any third party either during or after the performance of the Services under this Contract, without the City's express prior written consent.
9. **Insurance.** The Contractor must provide, maintain and pay for, and cause all subcontractors to provide, maintain and pay for, the insurance coverage (if any) described in PART D (including the type and form of policy, the coverage amounts, and the amount of deductible). If no insurance coverage is specified in PART D, the Contractor must provide, maintain and pay for, and cause all subcontractors to provide, maintain and pay for, such insurance as would be obtained by a prudent consultant or contractor providing services similar to the Services. The Contractor must provide written proof of such insurance coverage upon the written request of the City.
10. **WorkSafeBC.** The Contractor agrees that it will procure and carry and pay for, full WorkSafeBC coverage for itself and all workers, employees, servants and others engaged in or upon any work or service which is the subject of this Contract. The Contractor agrees that the City has the unfettered right to set off the amount of the unpaid premiums and assessments for such WorkSafeBC coverage against any monies owing by the City to the Contractor. The City will have the right to withhold payment under this Contract until the WorkSafeBC premiums, assessments or penalties in respect of work done or services performed in fulfilling this Contract have been paid in full. The Contractor will provide the City with the Contractor's and each subcontractor's WorkSafeBC registration number and clearance letters from WorkSafeBC confirming that the contractor and each subcontractor is in good standing with WorkSafeBC prior to the City having any obligation to pay monies under this Agreement.

Whenever the Contractor is required or permitted to perform any Services on any City sites, the Contractor is now appointed and now accepts appointment as the "prime contractor" in connection with such Services and will fulfil its obligations as Prime Contractor in accordance with the Workers Compensation Act (British Columbia), and the regulations thereunder, and the Contractor shall comply with all applicable health and safety laws.

11. **City Business Licence.** The Contractor will maintain a valid City of Vancouver business licence in good standing throughout the duration of this Contract.
12. **Resolution of Disputes.** This Contract will be governed by the laws of British Columbia and the parties now irrevocably attorn to the exclusive jurisdiction of, and agree to submit all disputes to, the courts of British Columbia for resolution. The Contractor shall continue performance of its obligations under this Contract notwithstanding the existence of a dispute.
13. **Independent Contractor.** This Contract is a contract for services and neither the Contractor nor the Contractor's personnel or permitted subcontractors, are, or deemed to be, partners, appointees, employees or agents of the City. The Contractor will not represent to anyone that the Contractor has any authority to bind the City or that the Contractor is an employee or agent of the City.
14. **No Assignment or Subcontracting.** The Contractor will not assign or subcontract (other than to persons listed in PART C (or a schedule referred to therein)), either directly or indirectly (including, without limitation, by way of any transfer of control of the shares or ownership interests in the Contractor), this Contract or any right or obligation of the Contractor under this Contract, without the prior written consent of the City, which consent may be arbitrarily withheld. No assignment or subcontract, whether consented to or not, relieves the Contractor from any obligations under this Contract. The Contractor must ensure that any assignee or subcontractor fully complies with this Contract in performing the Services and nothing in this Contract creates any contractual relationship between a subcontractor and the City.
15. **Conflict of Interest.** The Contractor must not provide any services to any person in circumstances which, in the City's reasonable opinion, could give rise to a conflict of interest between its duties to that person and its duties to the City under this Contract.

16. Release and Indemnification

a. Release

The Contractor now releases the City and the City's personnel from all losses including those caused by personal injury, death, property damage or loss, and economic loss, arising out of, suffered or experienced by the Contractor or the Contractor's personnel in connection with their performance of the Services.

b. Acceptance "As Is"

In undertaking the Services, the Contractor acknowledges that it has inspected the City's site(s), agrees to accept the site(s) "as-is" and undertakes to take all precautions necessary to ensure the safety of all the Contractor's personnel.

c. Indemnity

Despite any insurance which may be placed by the City, the Contractor now agrees to indemnify and save harmless the City and its officials, officers, employees, agents, successors, assigns and authorized representatives (in each case, an "Indemnified Party") from and against all costs, losses, claims, damages, actions and causes of action ("Claims") that an Indemnified Party may sustain, incur, suffer or be put to at any time either before or after the completion of the Services or sooner cancellation of this Contract, that arise out of any act or failure to act of the Contractor or the Contractor's personnel, permitted assignees or subcontractors in connection with the performance of this Contract, including any Claims that arise out of or are in any way related to unpaid WorkSafeBC assessments or the failure to observe safety rules, regulations and practices of WorkSafeBC, excepting always that this indemnity does not apply to the extent, if any, to which the Claims are caused by errors, omissions or negligent acts of an Indemnified Party.

d. Separate from Other Remedies and Rights

Nothing in this Contract (including this indemnity) will affect or prejudice the City from exercising any other rights that may be available to it at law or in equity.

e. Survival of Release/Indemnity

This Section 16 will survive the expiry or sooner termination of this Contract.

B. CHANGES TO SERVICES

17. **Changes.** The City may, at any time and from time to time and without invalidating this Contract, require a change to the Services and/or to the schedule for the delivery of the Services. Should the Contractor consider that any such request or instruction constitutes a change warranting amendment of the Maximum Amount, another price or the schedule for the Services set forth in the Contract, the Contractor must advise the City in writing prior to acting on any such request or instruction, and in any event within five (5) City of Vancouver business days of such request or instruction. In that case, the Maximum Amount, other price and/or schedule will be adjusted, if/as agreed to by both parties in writing, and failing agreement, if/as the City may determine, acting reasonably. Failing any such adjustment, the Services provided pursuant to the request or instruction will be deemed to be included within the prices specified herein, and to be subject to the schedule prescribed herein.

18. **Changes to Key Personnel.** The City may from time to time request reasonable changes to the key personnel of the Contractor engaged in performing the Services, and the Contractor shall comply with any such request. The Contractor shall not change any of such key personnel without the prior written approval of the City, which approval will not be unreasonably withheld.

C. PAYMENT

19. **Payment of Fees and Expenses.** In consideration for the satisfactory performance of the Services, The City will pay to the Contractor the fees specified in PART B (as supplemented by any schedule referred to therein), subject to this Section C. In addition, if the parties have specified in PART B that the Contractor's expenses are reimbursable in accordance with this Contract, the City will reimburse the Contractor for all expenses that: (i) are approved by the City in writing (in accordance with the City's existing policies and procedures for expense reimbursement) prior to their being incurred by the Contractor; (ii) are necessary, in the opinion of the City, to perform the Services; and (iii) are supported by proper receipts or other documentation satisfactory to the City (acting reasonably), provided always that the City reserves the right to make arrangements through its service providers for any flights and/or accommodations required by the Contractor in connection with its performance of the Services. If a "Maximum Amount" is specified in Part B, then the City is not, and shall not be, obliged to pay to the Contractor more than such Maximum Amount on account of aggregate fees (and, if applicable, expenses). Payment terms are "net 30 days" from the date of receipt of a valid invoice.

20. **Invoicing.** The Contractor will, by the 25th day of each month, provide to the City's Project Manager (named on the cover page of this Contract) a draft invoice with an attached detailed account of all charges to be claimed by the Contractor for the preceding month. The City's Project Manager shall review the draft, raise any concerns with the Contractor within ten working days and, after settlement of any issues (in the Project Manager's discretion), approve the draft invoice. The Contractor, if so requested, will meet with the City's Project Manager to expedite and settle the draft invoice. The Contractor will submit its final invoice, as per the approved draft invoice, to the City of Vancouver, Attention: Accounts Payable, by email to APInvoice@vancouver.ca. Each invoice must contain:

- Contractor name, address and telephone;
- City purchase order number;
- Name of the City's Project Manager;
- Invoice number and date;
- Details of any applicable taxes; and
- Tax registration number(s).

21. **Builders Lien Act.** If the Services to be performed under this Contract are subject to the holdback requirements set out in the *Builders Lien Act* (British Columbia) (the "Lien Act"), the City will withhold and discharge the required holdback amounts in accordance with the requirements set out in the Lien Act.

22. **Discharge of Liens and Withholding.** The Contractor will, if applicable, make payment and take all other steps which may be necessary so that no lien claims, including lien claims made under the Lien Act, are made in connection with the provision of the Services, and that the compensation payable to the Contractor by the City is not subject to attachment for debt, garnishing process or otherwise. In the event that any lien is filed in connection with the provision of the Services at any court or land title office, the Contractor shall immediately cause such lien to be discharged. The City may withhold from any payment due to the Contractor an amount sufficient to indemnify the City against any lien claim that could arise in connection with the provision of the Services, until such time as the lien has been discharged or other arrangements to satisfy such lien have been made by the Contractor.

23. **Withholding for Non-Residents.** If the Contractor is a non-resident of Canada, the City may withhold from any payment due to the Contractor such amounts as may be required to be withheld pursuant to the applicable provisions of the Canada *Income Tax Act* (the "ITA"). Any amount so withheld shall be remitted to the Receiver General for Canada or otherwise dealt with by the City strictly in accordance with the provisions of the ITA.

24. **Record Keeping.** The Contractor must maintain, and shall cause any subcontractors to maintain, time records and books of account, invoices, receipts, and vouchers of all expenses incurred, in form and content satisfactory to the City. The City or any of its authorized representatives will, for the purposes of audit and examination, have access and be permitted, upon reasonable notice to the Contractor, to inspect such records for review, copy and audit at any time and from time to time while this Contract is in effect and for a period of three years after the expiry or termination of this Contract for any reason.

25. **Currency.** Unless otherwise specified in this Contract, all references to money are to Canadian dollars.

26. **Electronic Funds Transfer.** The City expects to make payments by electronic funds transfer and the Contractor must provide banking information to the City in order to permit this.

D. GENERAL

27. **Time for Performance.** Time is of the essence in this Contract.
28. **Amendments.** No modification of this Contract is effective unless it is in writing and signed by all the parties.
29. **Entire Agreement.** This Contract constitutes the entire agreement between the parties as to performance of the Services, and replaces and supersedes any other agreements, correspondence or other discussions between the parties, whether or not any of the foregoing have been reduced to writing.
30. **Conflict.** If there is a conflict between a provision of a schedule to this Contract and the terms and conditions of this Services Contract, the provision in the relevant schedule is inoperative to the extent of the conflict unless it states that it operates despite a conflicting provision of this Contract.
31. **Severability.** If any provision of this Contract is determined to be void or unenforceable, in whole or in part, it shall not be deemed to affect or impair the enforceability or validity of any other provision of this Contract, and any such void or unenforceable provision may be severed from this Contract without affecting the remainder of the Contract.
32. **Termination.** The City may terminate this Contract:
- a. Upon failure of the Contractor to comply with this Contract, immediately on giving written notice of termination to the Contractor, or
 - b. For any other reason, on giving at least 10 days' written notice of termination to the Contractor.

If the City terminates this Contract under paragraph b. above, the City must pay the Contractor that portion of the fees and expenses described in PART B which equals the portion of the Services that was completed to the City's satisfaction before termination. That payment discharges the City from all liability to the Contractor under this Contract. If the Contractor fails to comply with this Contract, the City may terminate it and pursue other remedies as well.

33. **Binding Effect.** This Contract shall be binding on the Contractor's successors and permitted assigns and shall enure to the benefit of any successors and assigns of the City.
34. **Voluntary Agreement.** The Contractor acknowledges and declares that it has carefully considered and understood the terms of this Contract, that it has either consulted legal counsel or waived such right, and that it is executing this Contract voluntarily.
35. **Further Assurances.** The Contractor agrees that upon any reasonable request of the City, the Contractor will make, do, execute or cause to be made, done or executed all such other acts as may be required to more fully give effect to the terms and conditions hereof.
36. **Headings.** The headings used in the Parts and sections of this Contract are for convenience of reference only, and shall not operate to expand, modify or interpret the language therein.
37. **Counterparts.** This Contract may be executed in one or more counterparts, including by facsimile or other electronic transmission, and each of such counterparts shall be deemed to be taken together to constitute one and the same original document.
38. **Additional Terms:** The additional terms set out in Part E (or in any schedule referred to therein) apply to this Contract. **END OF TERMS AND CONDITIONS OF SERVICES CONTRACT**

[Add schedules.]

From: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
To: "Li, Charling" <charling.li@vancouver.ca>
Date: 12/16/2022 9:29:07 AM
Subject: RE: Briefing for Sean re: EMGs

Hi Charling,

Thanks for sharing this, it's great! Simple and clear. The only thing I would change is to add more on the scope – we might as well tell Sean every piece that's in there now, so he has an understanding of the full scope. For example, let's make sure he's aware of the energy efficiency piece.

Thanks,

Patrick Enright, P.Eng | Senior Green Building Engineer
(he/him/his)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
patrick.enright@vancouver.ca | 604.871.6158

For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and səłíwətaʔt / səłíwítlh (Tsleil-Waututh) nations.

From: Li, Charling
Sent: Tuesday, December 13, 2022 5:06 PM
To: Enright, Patrick
Subject: Briefing for Sean re: EMGs

Hi Patrick, in case you want to have a look at the high level presentation I put together, prior to our meeting Friday.

Thanks,
Charling

Charling Li, P.Eng., M.Urb. | Green Building Engineer
(she/her/hers)
Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver
Charling.Li@vancouver.ca | 604.871.6833

Learn about recently approved green building changes for Part 3 New Construction [here](#)
For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and səłíwətaʔt / səłíwítlh (Tsleil-Waututh) nations.

From: "Susan MacDougall" <susan@focaleng.com>
To: "Li, Charling" <charling.li@vancouver.ca>
CC: "Riley Beise" <riley@focaleng.com>
"Danny Taylor" <danny@focaleng.com>
Date: 11/15/2023 4:51:57 PM
Subject: RE: CoV Archetype Impact - Draft Letter

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Sounds like a plan!

Talk soon,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Li, Charling
Sent: Wednesday, November 15, 2023 4:50 PM
To: Susan MacDougall
Cc: Riley Beise ; Danny Taylor
Subject: RE: CoV Archetype Impact - Draft Letter

Hi Susan,

I don't have anything else to add. I was thinking about letting folks know about next steps and timelines but I think we can do that separately once we are done digesting the feedback.

Thanks,
Charling

From: Susan MacDougall <susan@focaleng.com>
Sent: Wednesday, November 15, 2023 4:40 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Riley Beise <riley@focaleng.com>; Danny Taylor <danny@focaleng.com>
Subject: RE: CoV Archetype Impact - Draft Letter

Thanks Charling!

I'll check the layout of the text boxes before pdf'ing to make sure they look ok.

Appreciate the feedback too:

- Good comment about Elevators... I'd second Tao's suggestion.
- Interesting about the DHW. Do they have a study (e.g. actual operation) to point to? It's funny because our team initially agreed with all suggestions but once we dug in (and saw the impact on the TEUI) the NECB 2020 recommendation seemed a more reasonable mid-point.

I'll get this posted and email out to everyone tomorrow morning. Is there anything else you'd like us to add in the email? (I was going to thank those who have already sent feedback, share the results and note the extended deadline.)

Have a good evening,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Li, Charling <charling.li@vancouver.ca>
Sent: Wednesday, November 15, 2023 4:32 PM
To: Susan MacDougall <susan@focaleng.com>
Cc: Riley Beise <riley@focaleng.com>; Danny Taylor <danny@focaleng.com>
Subject: RE: CoV Archetype Impact - Draft Letter

Hi Susan, I'm good with your changes and agree with your comments. The only thing is the formatting for the 4 text boxes on page 1 looks a bit wonky but it could've just been my viewer settings.

Please go ahead and issue to attendees via email and your website.

While I remember I'll share a few pieces of feedback I've heard recently – I'll encourage these folks to submit these comments in writing via the Form itself. I'm just parking these thoughts here in case we need to follow up in the future.

1. Tao mentioned that the BC CNC program guidelines document may be taken out of circulation in the future and we should consider putting all of the elevator loads information directly in the EMGs
2. Folks from Introba recommends adopting all 4 of the DHW adjustments proposed in the greenest city report (although I know you had done the analysis to do recommend not doing so)

Thanks!

Charling

From: Susan MacDougall <susan@focaleng.com>
Sent: Wednesday, November 15, 2023 4:04 PM
To: Li, Charling <charling.li@vancouver.ca>

Cc: Riley Beise <riley@focaleng.com>; Danny Taylor <danny@focaleng.com>
Subject: RE: CoV Archetype Impact - Draft Letter

Thanks Charling for the quick turnaround ☺

Addressed your comments though there are a few I questioned... let me know if you want a call. I'm around until about 5 though there will be kiddo noise starting around 4:30(!)

Thanks,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Li, Charling <charling.li@vancouver.ca>
Sent: Wednesday, November 15, 2023 2:56 PM
To: Susan MacDougall <susan@focaleng.com>
Cc: Riley Beise <riley@focaleng.com>; Danny Taylor <danny@focaleng.com>
Subject: RE: CoV Archetype Impact - Draft Letter

Hi Susan, some feedback from me attached. Please give me a call if anything doesn't make sense.

Thanks,
Charling

From: Susan MacDougall <susan@focaleng.com>
Sent: Wednesday, November 15, 2023 12:53 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Riley Beise <riley@focaleng.com>; Danny Taylor <danny@focaleng.com>
Subject: CoV Archetype Impact - Draft Letter

Hi Charling,

Here's our draft letter summarizing the impact of EMG v3 (over v2) on 3 archetypes.

We were aiming for a balance between providing helpful background & context, while focusing on the key results and which of the proposed changes were in effect. I've included both a pdf version (with hyperlinks) and Word version if you want to track any changes/ comments.

Let us know once you have feedback. Once you approve it, we can post it on our website, and email folks to let them know it's there and that the review has been extended for 1 week to the 24th.

Thanks,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC

Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com



From: "Danny Taylor" <danny@focaleng.com>
To: "Li, Charling" <charling.li@vancouver.ca>
CC: "McCall, Gregory" <Gregory.McCall@vancouver.ca>
"Susan MacDougall" <susan@focaleng.com>
Date: 8/20/2024 11:34:52 AM
Subject: RE: CoV EMG - Slim Buildings

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Thanks Charling! I'll let our team know about the proposed changes package.

Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: Li, Charling
Sent: Tuesday, August 20, 2024 11:31 AM
To: Danny Taylor
Cc: McCall, Gregory ; Susan MacDougall
Subject: RE: CoV EMG - Slim Buildings

Hi Danny, as discussed, the proposed whole building air leakage requirement is 1.5 L/s/m² at 75Pa, please include that value in your final refinement of the slim buildings adjustment factors once the VBBL public review feedback have all been collected (tentatively Oct/Nov).

FYI the package of proposed changes to the VBBL have just been published [here](#) under 2025 VBBL. You can see the EMGs v3.0b version under Code Change Request CCR-24-0014, and the airtightness changes under CCR-24-0021

Cheers,
Charling

From: McCall, Gregory <Gregory.McCall@vancouver.ca>
Sent: Tuesday, August 20, 2024 10:38 AM
To: Li, Charling <charling.li@vancouver.ca>
Subject: FW: CoV EMG - Slim Buildings

FYI

M. Greg McCall
B.Sc.(Gen), P.Eng., LEED AP
Energy Policy Specialist
Office of the Chief Building Official (CBO)
Development, Buildings, and Licensing
City of Vancouver
Tel: 604.873.7531
Email: Gregory.McCall@vancouver.ca

Energy webpage: <http://vancouver.ca/building-energy-requirements>
Field Review webpage: <http://vancouver.ca/home-property-development/field-review-inspection.aspx>

Energy info document for Renovations: [Present \(June 2019\) Version](#) or [Previous Version](#)
Training Videos for Energy Checklists: <http://vancouver.ca/home-property-development/energy-checklist-training-videos.aspx>

From: Danny Taylor <danny@focaleng.com>
Sent: Tuesday, August 20, 2024 10:25 AM
To: McCall, Gregory <Gregory.McCall@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>
Subject: RE: CoV EMG - Slim Buildings

Hi Greg,

Great talking with you just now. Attached the specific pages we were looking at, and we'll incorporate those report changes we talked about for the final round of revisions. Let us know if you have any follow up or another question pops up.

Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: Danny Taylor
Sent: Friday, August 16, 2024 2:41 PM
To: McCall, Gregory <Gregory.McCall@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>
Subject: CoV EMG - Slim Buildings

Hi Greg,

Susan gave me some context for your questions and I would be happy to meet for a short call next week. I am fairly free mornings next week (except Monday 8-10) if you have a time that would work best.

Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863

danny@focaleng.com



From: "Li, Charling" <charling.li@vancouver.ca>
To: "Danny Taylor" <danny@focaleng.com>
CC: "Susan MacDougall" <susan@focaleng.com>
Date: 9/5/2024 10:02:00 AM
Subject: RE: CoV EMG Report updates

Hi Danny, thanks for the call just now discussing timelines.

In terms of closing out the final report, we don't see the need to finalize the report now and then potentially have to make changes once the EMGs public review period is over (anticipated Sept27). My preference is to wait until the public comment period is over and then evaluate with your team whether minor or major adjustments are needed. If any potentially major items appear we can discuss additional scope to review and adjust. If no major adjustments are needed then it would make sense to close out the report, including the section on additional weather files modelling as an appendix or worked into the report (I don't have a preference here, as long as it makes sense).

Originally we had anticipated that the VBBL public review period would take place between May and August and we would be ready to finalize the EMGs report now, but unfortunately that got delayed with the larger VBBL package. My apologies for the delay and its impact on your timelines!

Cheers,
Charling

From: Danny Taylor
Sent: Wednesday, September 4, 2024 1:37 PM
To: Li, Charling
Subject: CoV EMG Report updates

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Report Suspicious

Hi Charling,

When you have a spare few minutes this week could you give me a call, we just had a few things on wrapping up the recommendations report we wanted to clarify from when we last spoke.

Thanks,
Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Riley Beise" <riley@focaleng.com>](mailto:riley@focaleng.com)
CC: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
["Danny Taylor" <danny@focaleng.com>](mailto:danny@focaleng.com)
Date: 1/9/2024 3:26:00 PM
Subject: RE: CoV EMG Review Comments
Attachments: 23009 240102 Workshop & Survey Feedback - CL.xlsx

Hi Riley and team, thanks for all the work you've put into reviewing and thinking through the comments. Attached see my feedback.

Generally I agree with your overall direction, and here's the list of things to talk through, in order or priority or how much time we may need to spend on them:

Higher priority

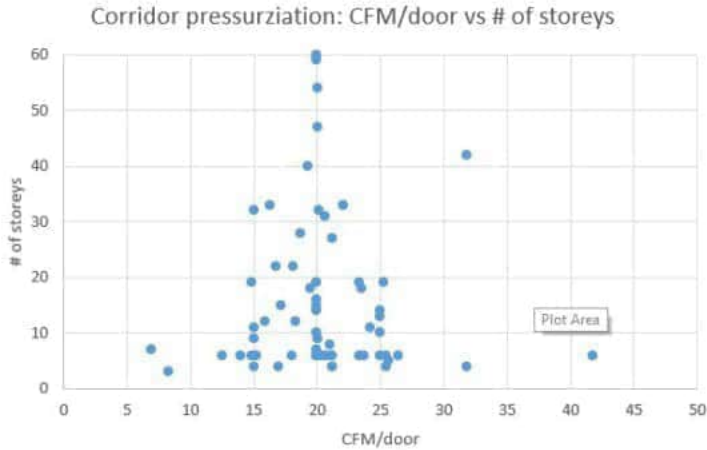
- Corridor Adjustment
- Slim & Small Buildings (need to bring BSSB in re: HDD)
- Overheating Analysis and Resilience (need to bring BSSB into discussion re: limits)
- Commercial Kitchens
- Infiltration
- NECB 2020 (need to bring BSSB in)
- Suite lighting
- DHW
- Elevators

Lower priority

- MFA
- TEDI and CEDI definition including latent loads
- Renewable energy deleted section 1.4
- Fenestration – I need to ask Brady to give you a briefing on the work that's been done so far and the proposed pathway for your opinion – I'll set this up, please let me know who from your team is available
- Pools

What is your team's availability looking like, I'm open to splitting up the meeting(s) based on who needs to attend for which topic, if that makes more sense on your side. Per usual my availability is here: [Book time with Li, Charling](#)

As a side note, here's the some data for corridor pressurization based on the data I've been collecting from projects between rezoning and building permit. I'm not seeing a strong correlation between the height of the building and CFM/door, despite what the some of the feedback may indicate is needed for pressurization of tall buildings.



Cheers,
Charling

From: Riley Beise
Sent: Tuesday, January 2, 2024 10:02 PM
To: Li, Charling
Cc: Susan MacDougall ; Danny Taylor
Subject: RE: CoV EMG Review Comments

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[Report Suspicious](#)

Charling,

The attached excel document summarizes the public feedback received after the second workshop. We have summarized by item, and provided our internal responses and in some cases, action items to follow up on. Also attached are the survey response charts for the items we requested ratings of support. Overall there is strong support.

The comments range from support to helpful comments, to strong objections. We have endeavored to be open minded about all comments and have responded accordingly. While navigating the excel sheet, it would be best to focus on items that have an action item listed.

We look forward to going over these when you've have a chance. Some of the items we would like to discuss with you before deciding on a direction. In the meantime, we will continue to work on some of the action items to look into items in more detail.

If you could please add any of your comments in another column, we can continue to work on our copy and add your comments in afterward.

Cheers,

Riley Beise P.Eng., BEMP
Principal | he/him
t 250.516.6088 ext. 2 | m 250.661.3817
riley@focaleng.com

From: Riley Beise <riley@focaleng.com>
Sent: Tuesday, January 2, 2024 11:06 AM
To: 'Li, Charling' <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>
Subject: CoV EMG Review Comments

Good morning and Happy New year Charling. Just a heads up that we received some comments from BSSB and are going through those now, adding them to our comments summary. We'll get the list of comments over to you today with our responses and any changes we are considering as a result.

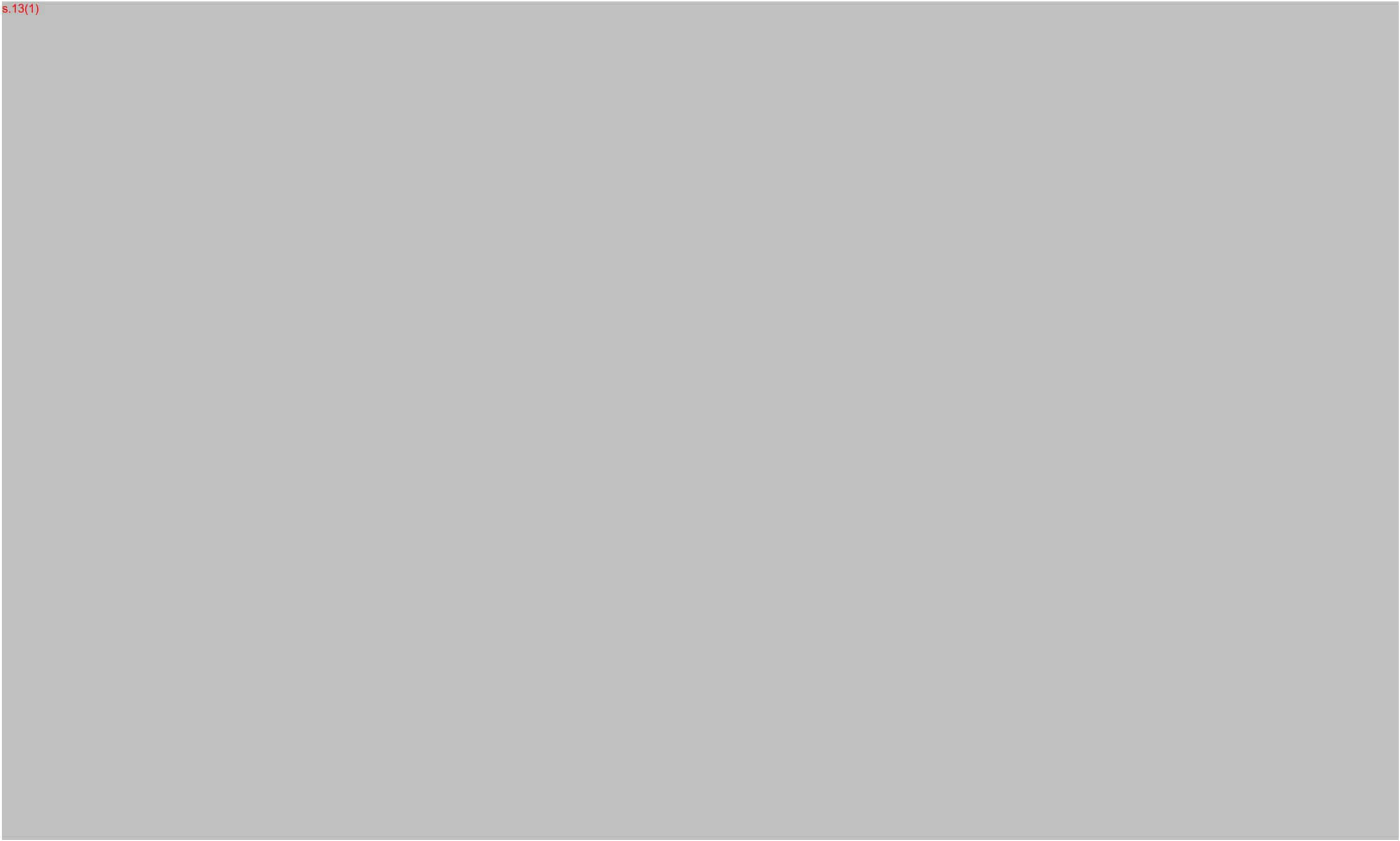
Regards,

Riley Beise P.Eng., BEMP
Principal | he/him
t 250.516.6088 ext. 2 | m 250.661.3817
riley@focaleng.com























From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
["Jennifer Blagborne" <jennifer@focaleng.com>](mailto:jennifer@focaleng.com)
CC: ["Riley Beise" <riley@focaleng.com>](mailto:riley@focaleng.com)
["Kristian Storgard" <kristian@focaleng.com>](mailto:kristian@focaleng.com)
["Danny Taylor" <danny@focaleng.com>](mailto:danny@focaleng.com)
Date: 3/15/2023 1:46:00 PM
Subject: RE: CoV EMG Update - Revised Project Outline
Attachments: 23009 230314 CoV EMG Updated Project Work
Plan_CL20230315.xlsx

Hi Susan and team, attached is my feedback. The schedule looks fine to me.

Thanks☺

Charling

From: Susan MacDougall
Sent: Tuesday, March 14, 2023 10:01 AM
To: Li, Charling ; Jennifer Blagborne
Cc: Riley Beise ; Kristian Storgard ; Danny Taylor
Subject: [EXT] CoV EMG Update - Revised Project Outline

City of Vancouver security warning: Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Hi Charling,

Thanks for meeting with us yesterday. As discussed, we've attached a copy of the revised project outline we showed you, for your comments. Here's a brief description:

1. Gantt
 - a. Revised schedule/ deliverables.
2. Guideline Framework
 - a. This is more of a data dump with the original RFP/ Focal's response, and other thoughts we don't want to lose track of.
 - b. We have also identified which items we can start early.
 - c. Note that other tabs refer to the grey cells on this tab.
3. Workshop Outline
 - a. Preliminary notes on which topics to consider including in the workshop and why.
 - b. We've begun to identify the types of questions, when we can ask modellers to suggest resources, and what methodologies we should try to "straw dog".
4. Rationale Matrix
 - a. Only the first column has been populated, identifying our understanding of the intent to verify that with you before proceeding to far along.

Next Steps:

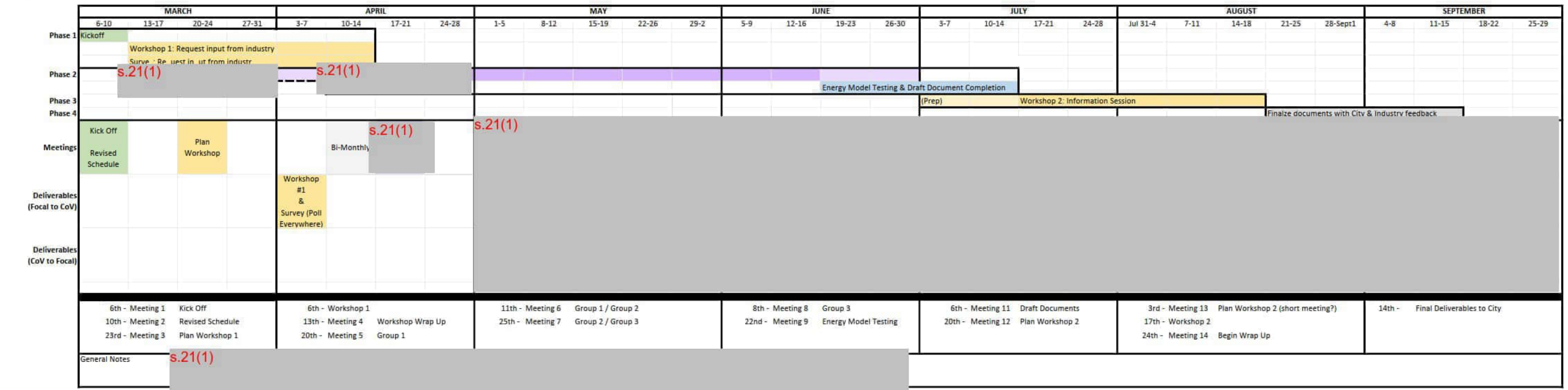
- Please send us your comments, particularly on the 3rd and 4th tabs, by end of week (or earlier, if possible).
- We will work on the workshop design and come prepared to the next meeting with proposed materials.
- [@Jennifer](#) will be in touch to coordinate a meeting for next week.

If you have any questions, don't hesitate to reach out! Thanks,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com



23009 CoV EMG Update - Revised Work Plan
 Revised Work Plan
 Project Gantt



Detailed Steps

Design Workshop (1 hr)
 . Suggest < 8 topics, max. 5 mins each, 5 min intro, 15 min open
 . Suggest Poll EV to ask questions, allow upvoting of results
 . Leave survey open for a few days for those who can't attend
 Generate invitation/ marketing list

s.21(1)

Optional additional
 . Areas to clarify

Finalize Draft
 as necessary

s.21(1)

s.13(1)























From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Riley Beise" <riley@focaleng.com>](mailto:riley@focaleng.com)
CC: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
["Danny Taylor" <danny@focaleng.com>](mailto:danny@focaleng.com)
["Kristian Storgard" <kristian@focaleng.com>](mailto:kristian@focaleng.com)
["Enright, Patrick" <Patrick.Enright@vancouver.ca>](mailto:Patrick.Enright@vancouver.ca)
Date: 5/24/2023 4:26:00 PM
Subject: RE: CoV EMG Updates - Group 2 Drafts for Review
Attachments: 23009 Miscellaneous Recommendations Write Up - CL.docx

Thanks Riley and team for the draft recommendations, looking forward to discussing tomorrow.

We didn't get through the Miscellaneous recommendations from Group 1, I'd like to tackle that tomorrow too.

Cheers,
Charling

From: Riley Beise
Sent: Monday, May 22, 2023 10:00 PM
To: Li, Charling
Cc: Susan MacDougall ; Danny Taylor ; Kristian Storgard ; Enright, Patrick
Subject: [EXT] CoV EMG Updates - Group 2 Drafts for Review

City of Vancouver security warning: Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Hello Charling, I hope you had a great long weekend.

Attached are the draft write-ups for Group 2:

1. GHGI-R
2. Ventilation Standard
3. CEDI
4. Compliance for Actively Cooled Buildings

The "Resilience to Future Climate" item has been very interesting and complex. We have some thoughts on how we may suggest approaching this, but I would like to discuss it with you at this Thursday's meeting to make sure we're on the right track before we start drafting language. I have notes on the resilience metrics, including comparisons to other cooling performance metrics that we can go over.

Also, please treat these drafts as just that, drafts. They need some word-smithing and in some cases further analysis to back up cases.

I look forward to our discussion!

Best regards,

Riley Beise P.Eng., BEMP

Principal | he/him

t 250.516.6088 ext. 2 | m 250.661.3817

riley@focaleng.com















From: "Li, Charling" <charling.li@vancouver.ca>
To: "Kristian Storgard" <kristian@focaleng.com>
CC: "Susan MacDougall" <susan@focaleng.com>
"Danny Taylor" <danny@focaleng.com>
"Enright, Patrick" <Patrick.Enright@vancouver.ca>
"Riley Beise" <riley@focaleng.com>
Date: 6/14/2023 4:27:00 PM
Subject: RE: CoV EMG Updates - Group 3 Draft Writeups
Attachments: 23009 230522 Compliance for Actively Cooled Buildings_CL.docx
23009 230522 Refrigerant Impact - GHGI-R_CL.docx
23009 230522 Ventilation Standard - Write Up_CL.docx
23009 230527 Resilience for Future Climate Writeup - CL.docx
23009 230522 CEDI - Write Up_CL.docx
23009 230606 CSA Z5020 Standard_CL.docx
23009 230608 Energy Efficiency Recommendations - CL.docx
23009 230608 Various Non RFP - Write Up-CL.docx

Hi Focal team,

I'll send back the Group 2 and 3 draft recommendations to you. Apologies for the delay! I haven't reviewed the "GHG Reduction for Groups ABF" yet as I understand it wasn't quite ready yet.

I'll propose the list of what we may need to talk through at next week's meeting:

- Slim Buildings
- Weather files – have you had a look at these future weather files from NRC? [OSF | Building simulation reference year files for 564 locations in Canada \[osf.io\]](#)
- CEDI
- Resilience for Future Climate – Thermal Autonomy
- Various Non RFP items

Thanks,
Charling

From: Kristian Storgard
Sent: Thursday, June 8, 2023 10:06 AM
To: Li, Charling
Cc: Susan MacDougall ; Danny Taylor ; Enright, Patrick ; Riley Beise
Subject: [EXT] RE: CoV EMG Updates - Group 3 Draft Writeups

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Hi Charling,

Just noting that the document Riley attached for *item 10 – Energy Efficiency Measures* was not the latest version. See attached for an updated draft in case you are able to scan through it before our meeting.

Thanks,
Kristian

From: Li, Charling <charling.li@vancouver.ca>
Sent: Thursday, June 8, 2023 9:54 AM
To: Riley Beise <riley@focaleng.com>
Cc: Susan MacDougall <susan@focaleng.com>; Danny Taylor <danny@focaleng.com>; Kristian Storgard <kristian@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV EMG Updates - Group 3 Draft Writeups

Thanks Riley, I'll do my best to go through these recommendations before our meeting today. Patrick won't be joining us today but we can plan to go over the all leftover discussion items at the next meeting – can we reschedule that meeting btw? We have a conflict on the 22nd but are available on the 21st between 10 and 2 and 3 to 4:30, and the 22nd between 10-11AM.

Charling

From: Riley Beise <riley@focaleng.com>
Sent: Thursday, June 8, 2023 7:59 AM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>; Danny Taylor <danny@focaleng.com>; Kristian Storgard <kristian@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: [EXT] CoV EMG Updates - Group 3 Draft Writeups

City of Vancouver security warning: Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Good morning Charling.

Attached are the draft write-ups for Group3, our final group of items for revision to the Guidelines. Included are:

- 10 – Energy Efficiency Recommendations
- 12 – GHG Reductions for Groups A B F
- 13 – Review CSA Z5020 Standard
- 14 – Various Non-RFP Items
 - Parkade heating
 - Commercial kitchens
 - NECB 2020 Conflicts
 - HRV Defrost
 - Airtightness & Infiltration

In addition, there are a few other small items we intend to propose be revised in the guidelines but don't require a write-up.

- Update emissions factors to align with BCBC
- Remove reference to Step Code

As we are getting these to you late I don't expect we will discuss all of these items, and we still have some content to discuss from the previous group. I suggest we plan to finish up any last comments /reviews on the 22nd meeting. We could look at an additional meeting next week instead if calendars allow but I know some of us on our end have busy calendars next week.

Best regards,

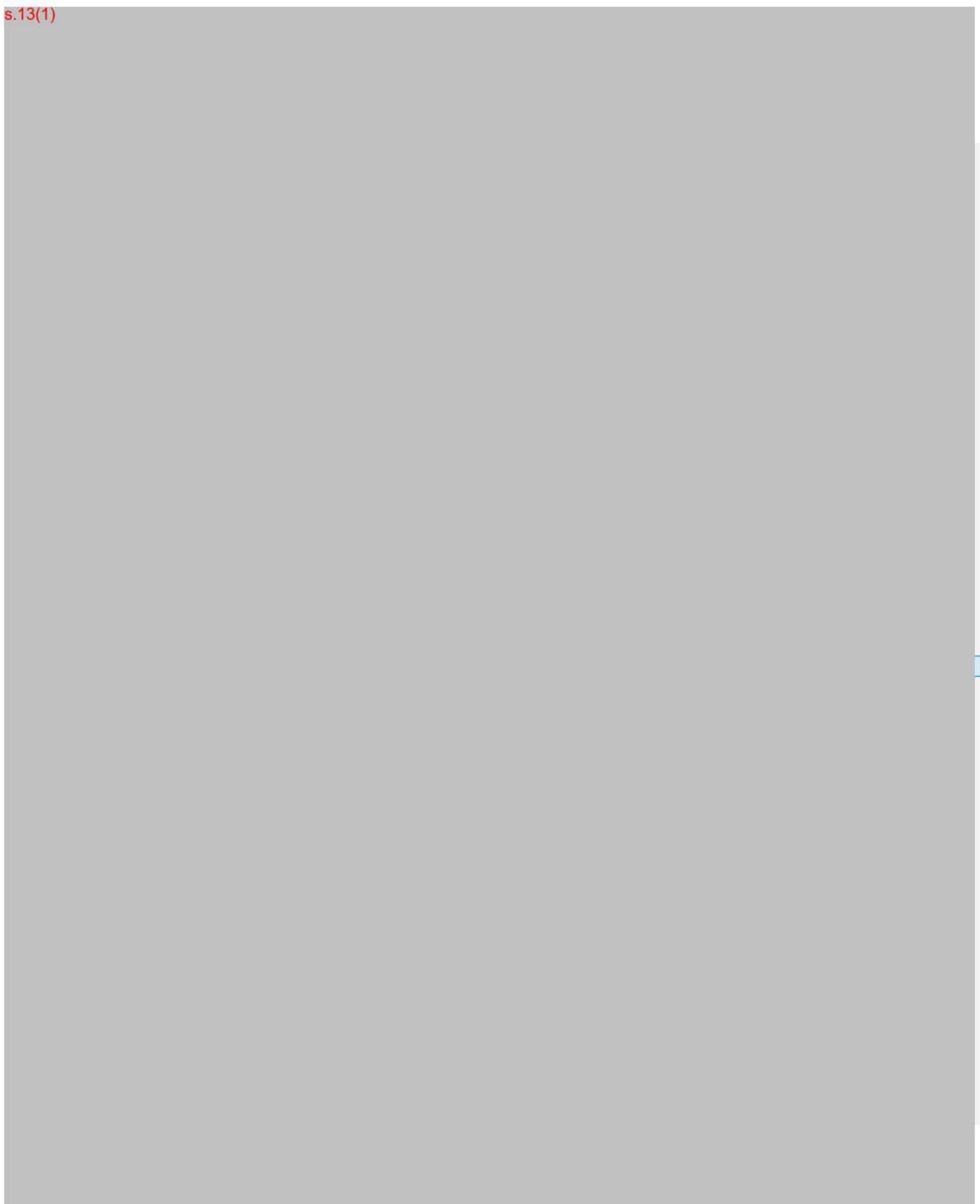
Riley Beise P.Eng., BEMP

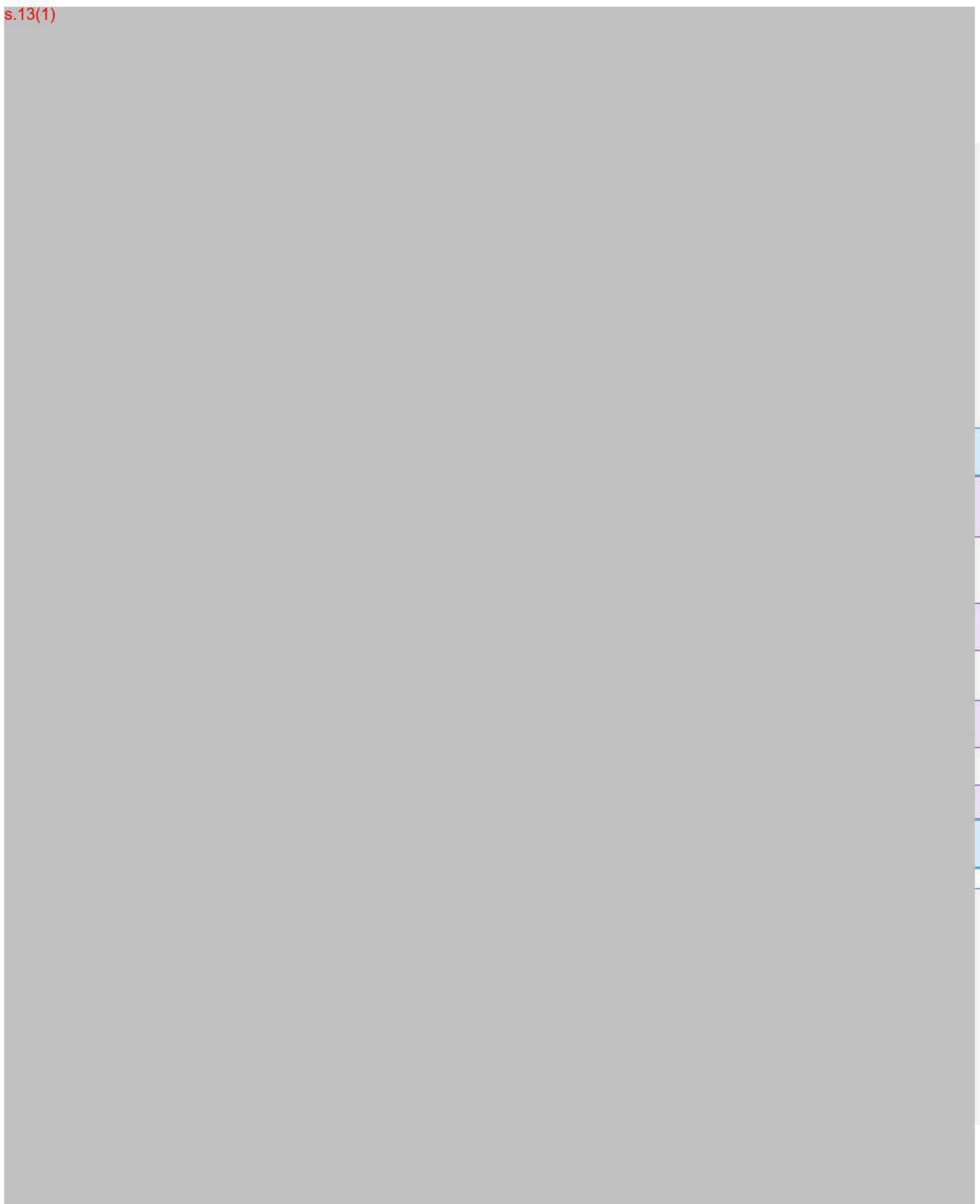
Principal | he/him

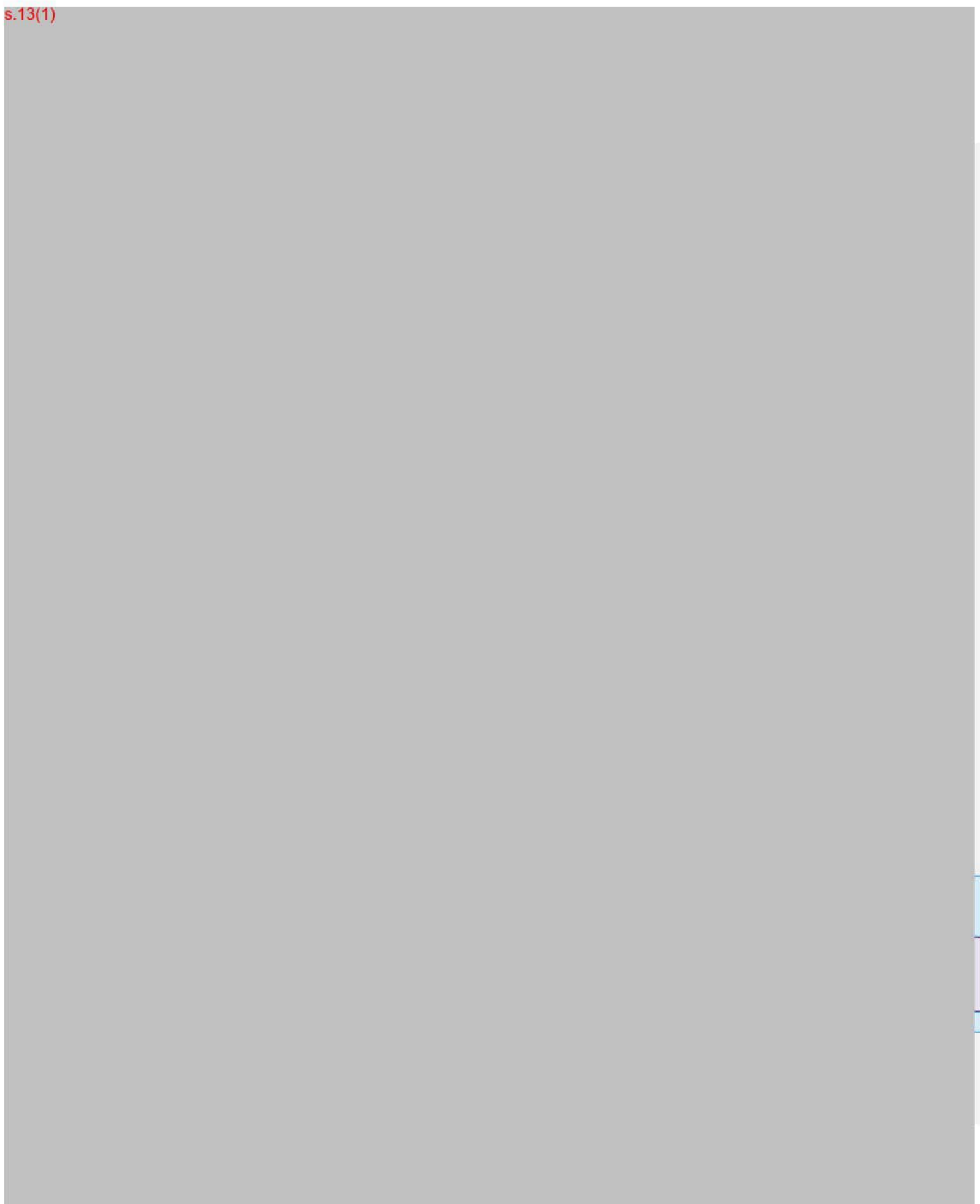
t 250.516.6088 ext. 2 | m 250.661.3817

riley@focaleng.com

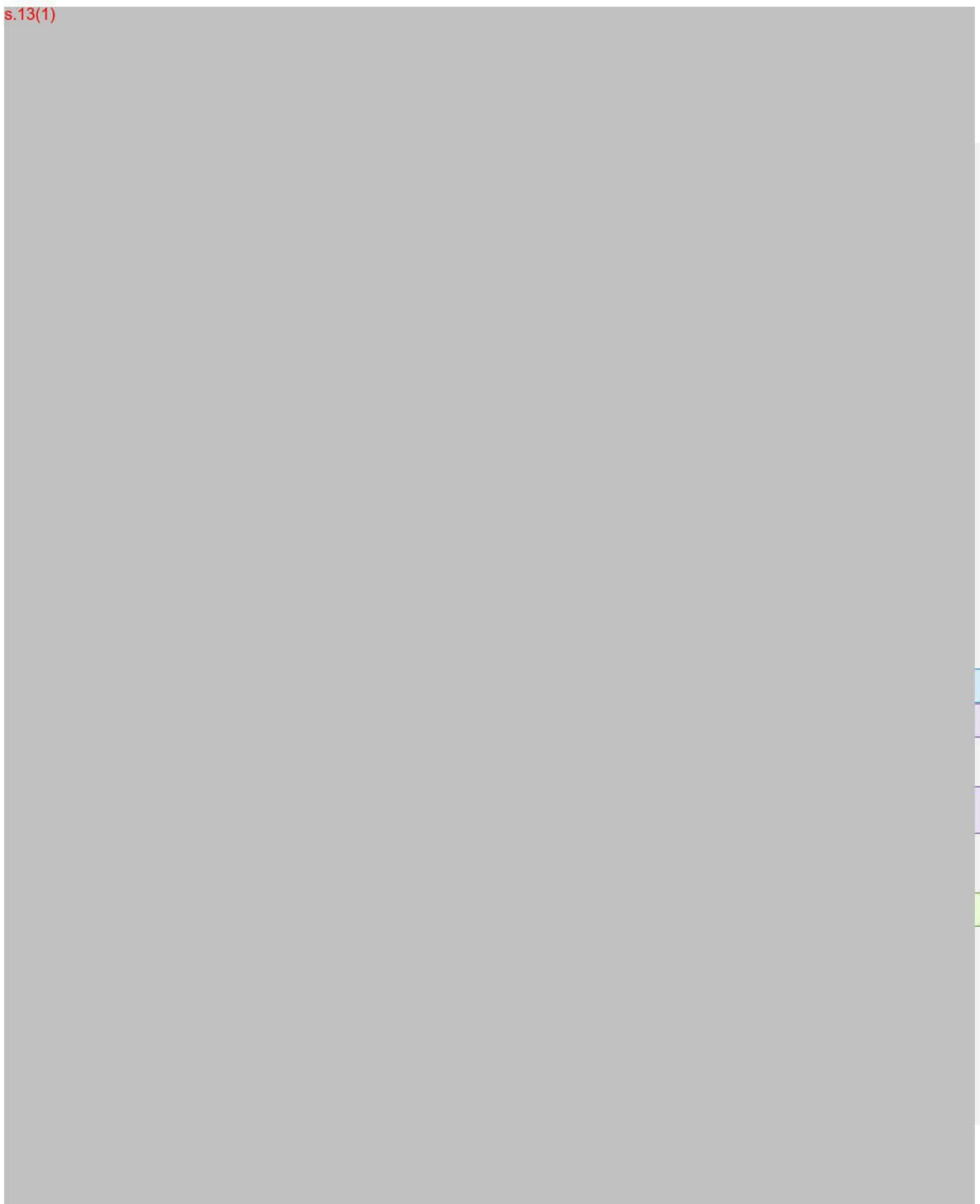


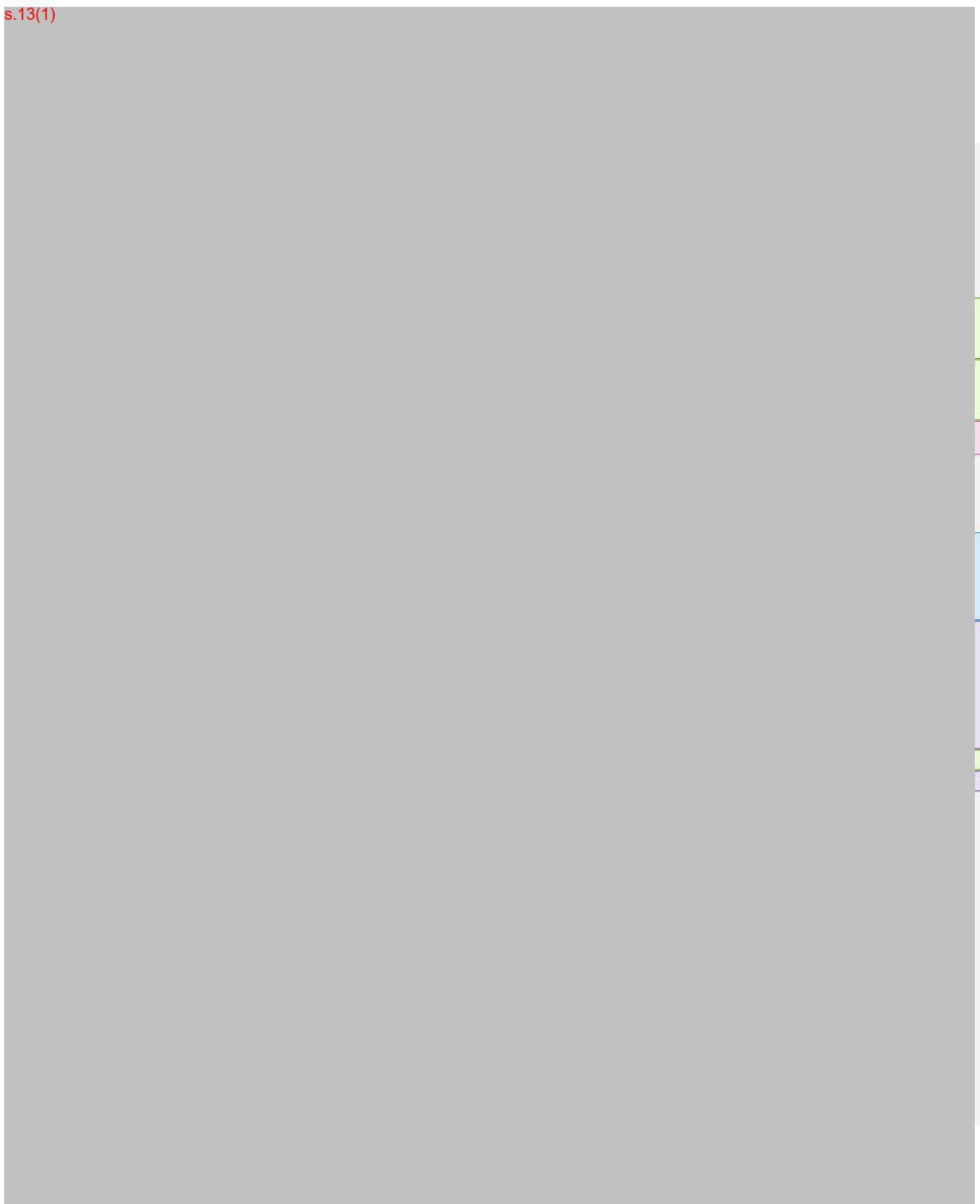






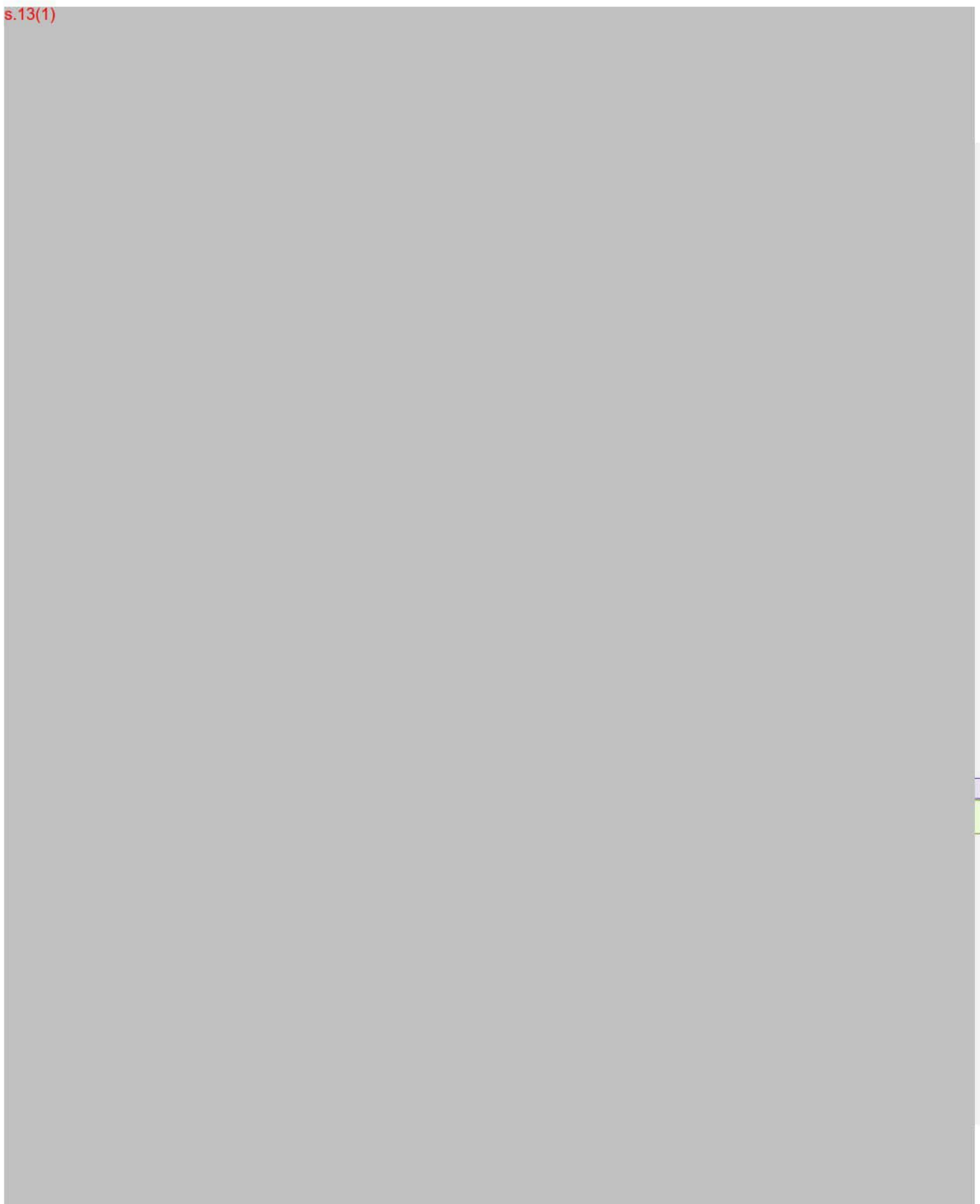






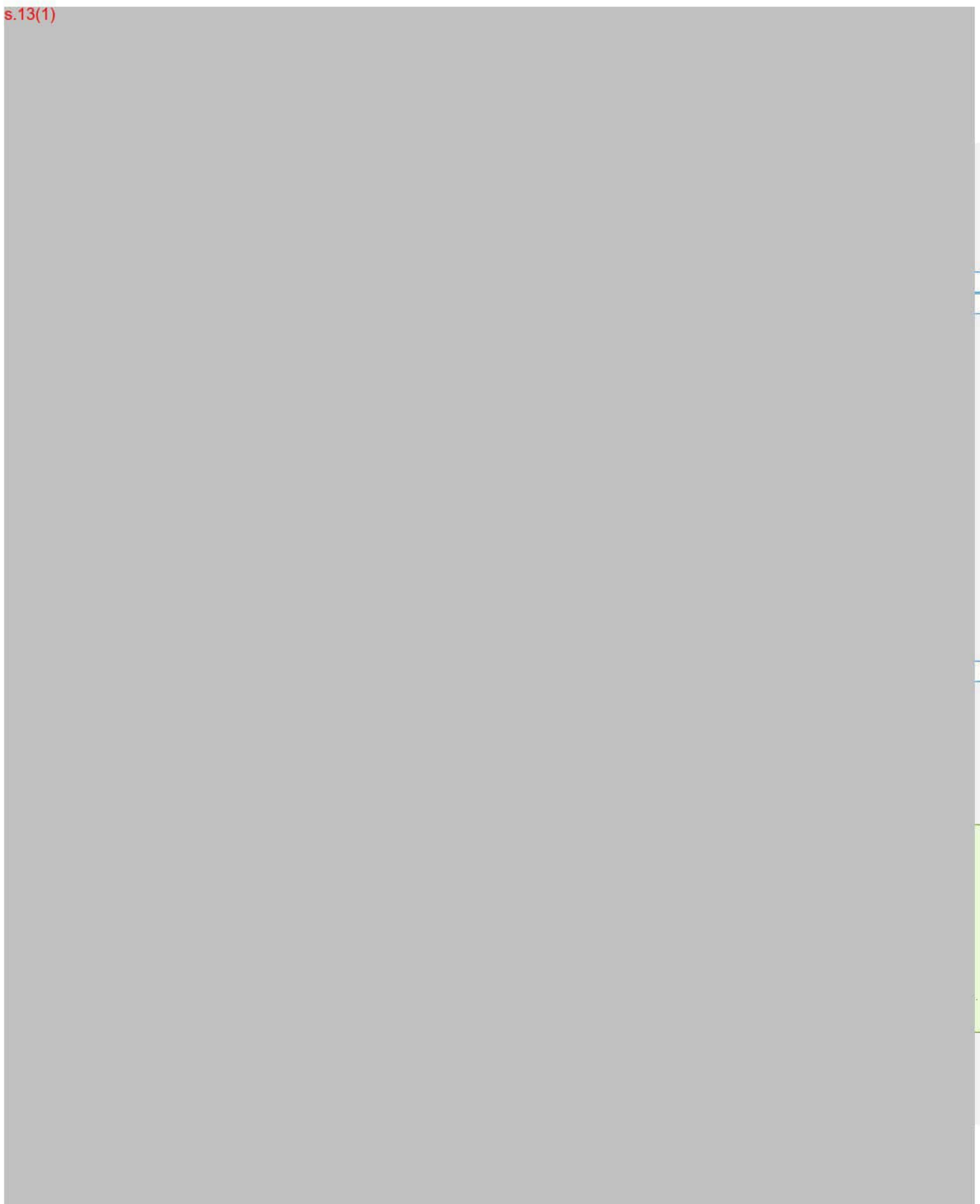


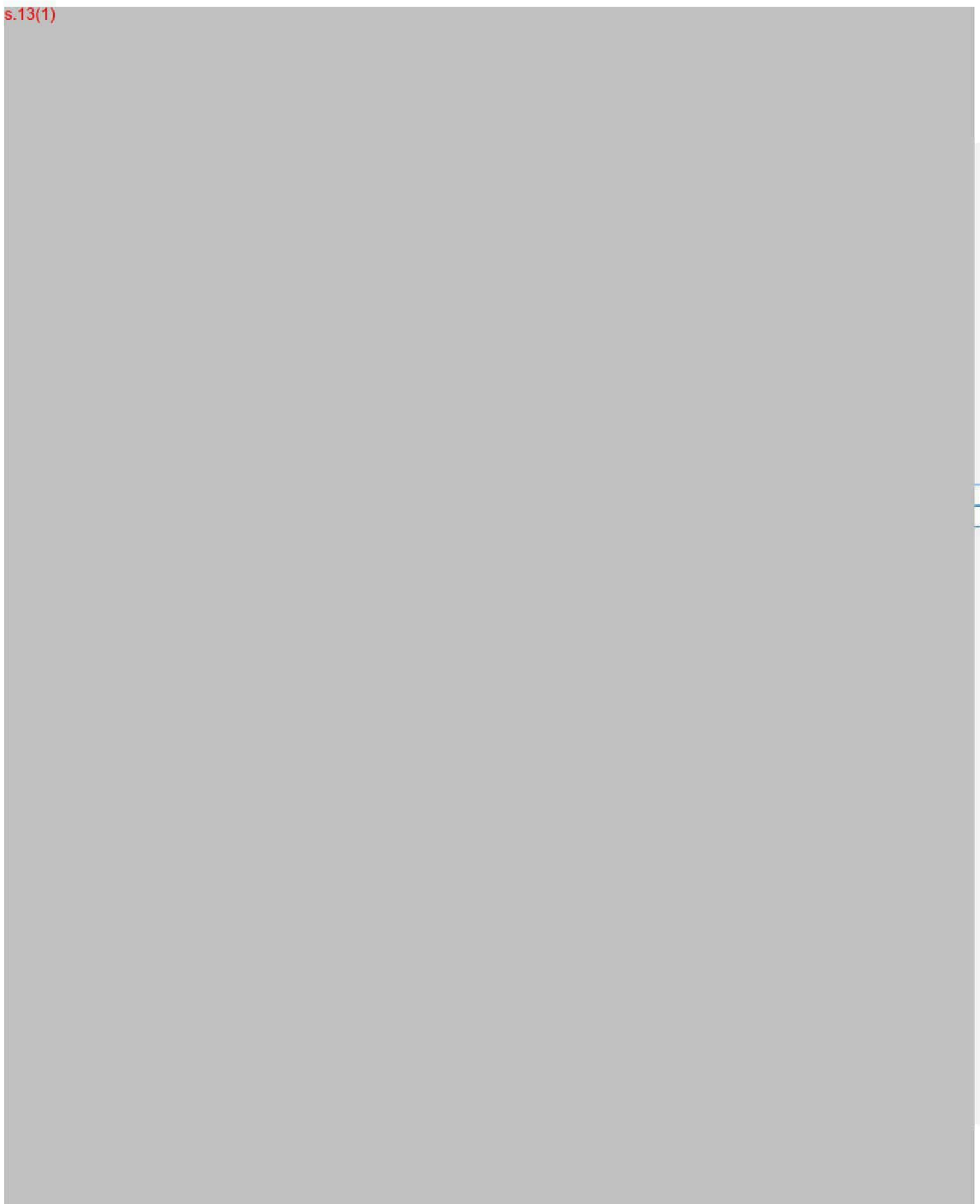








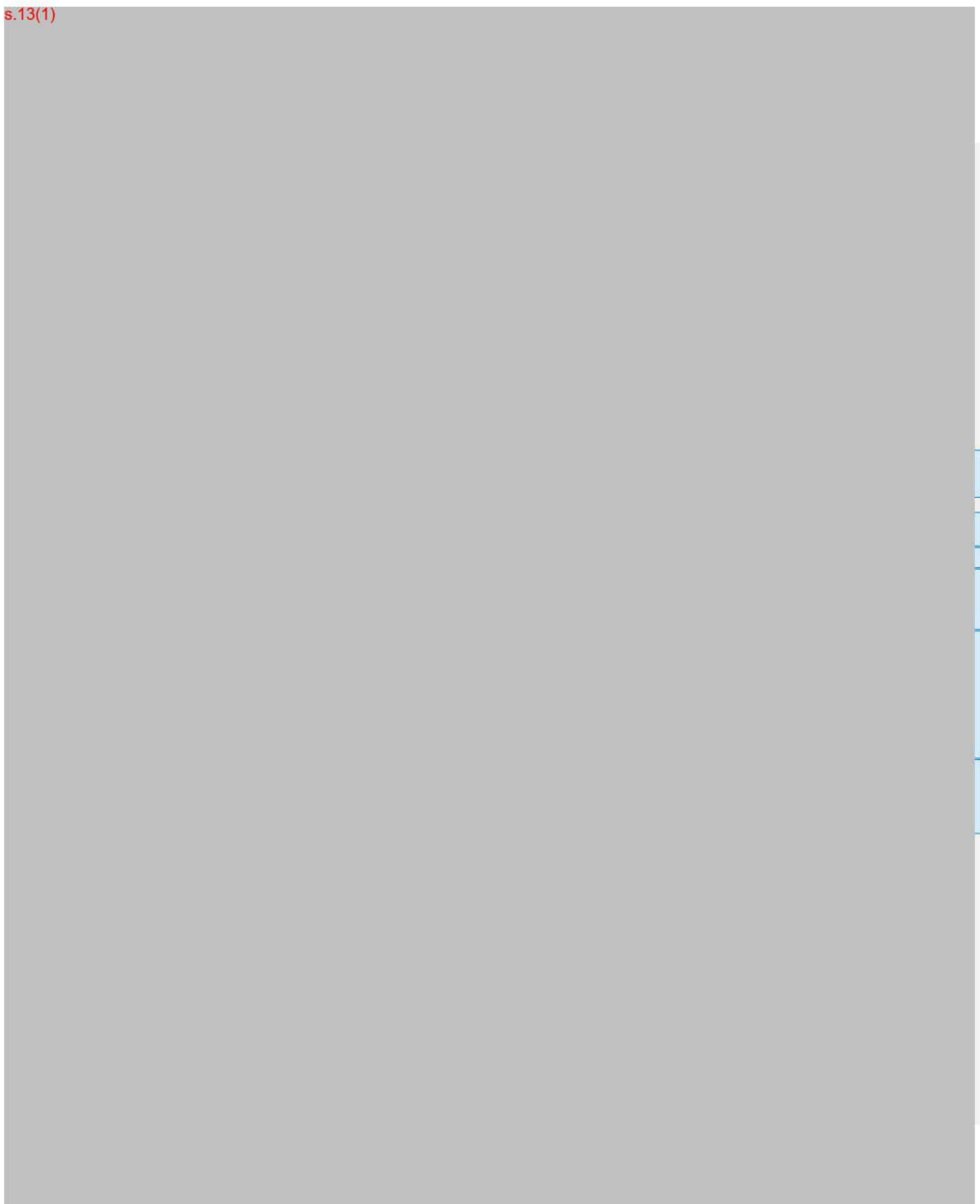


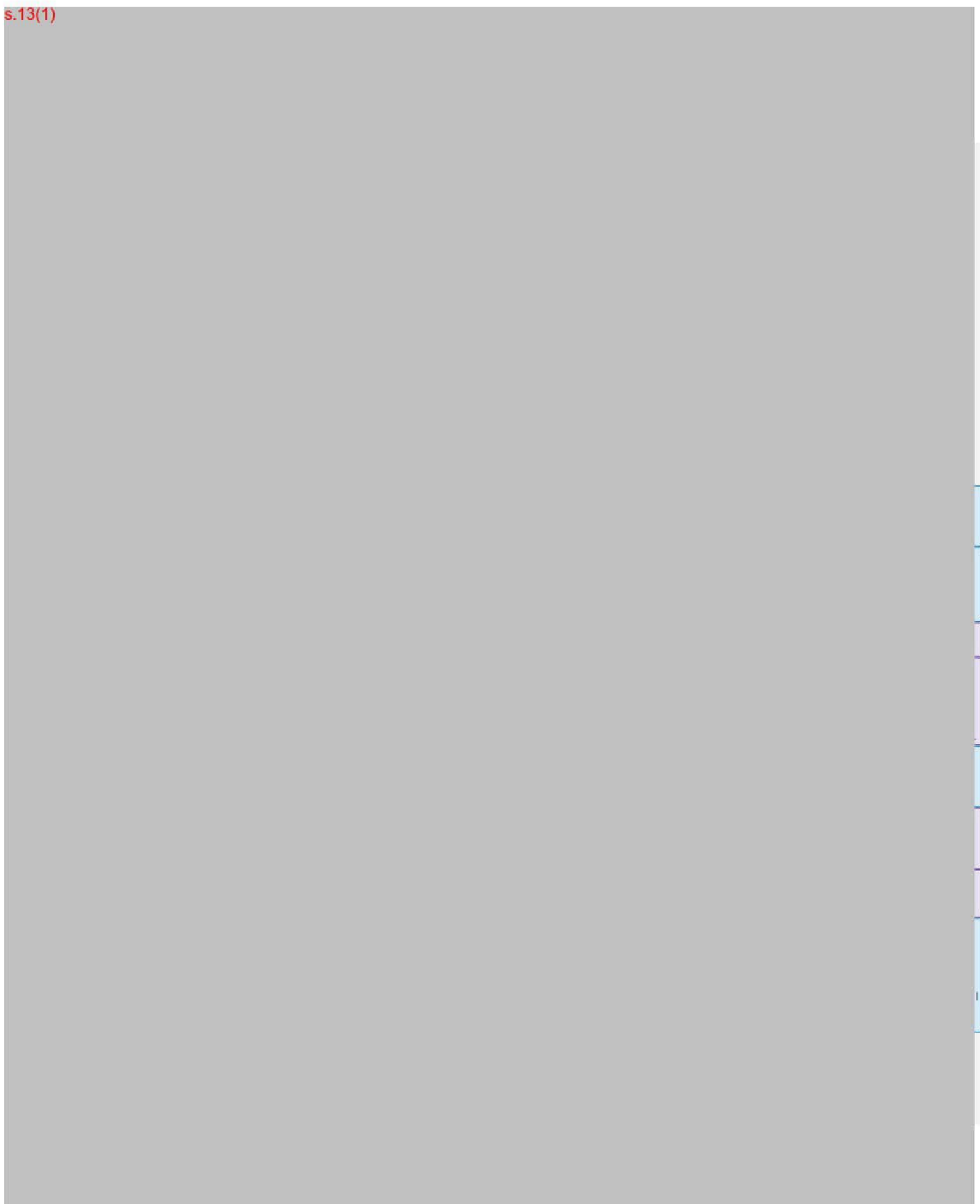


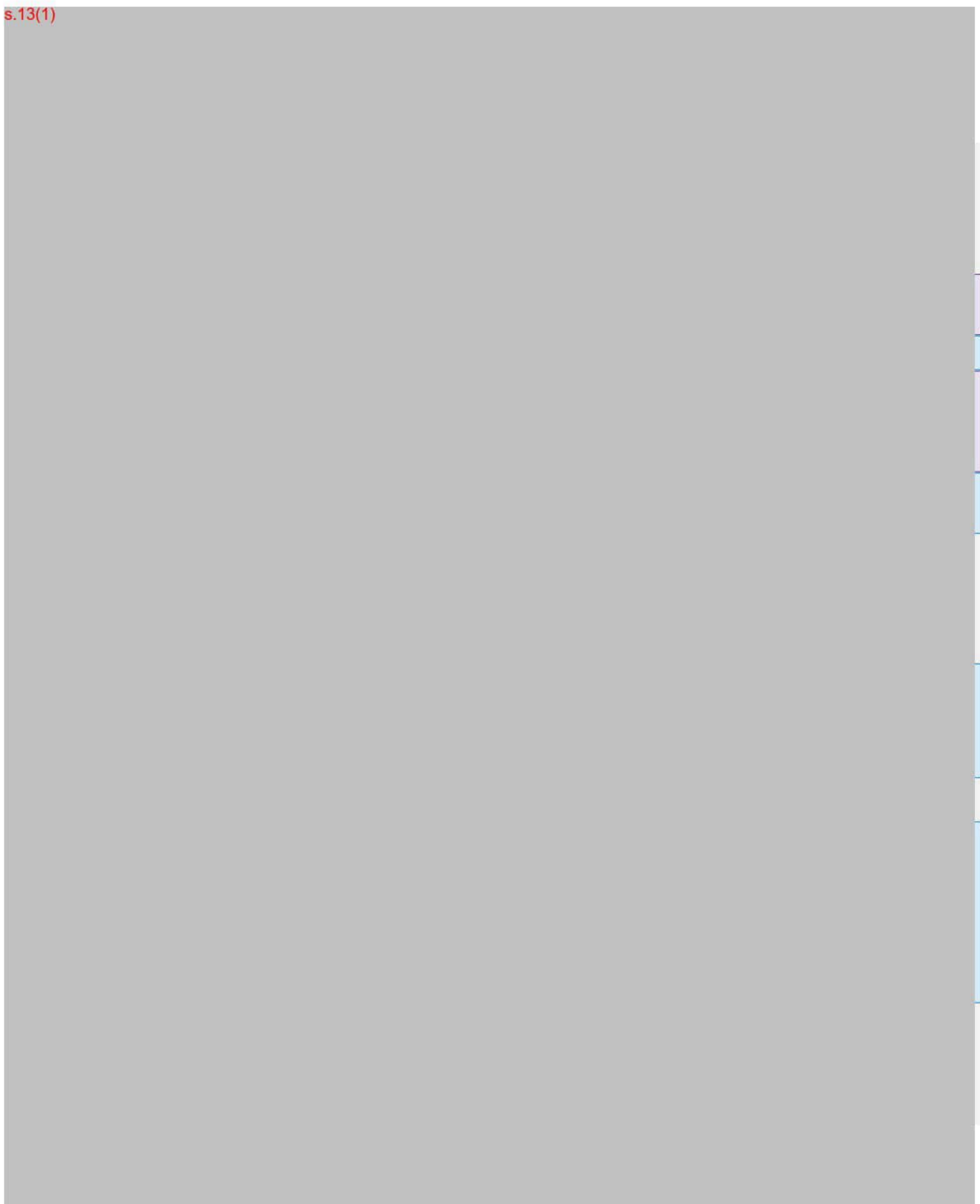
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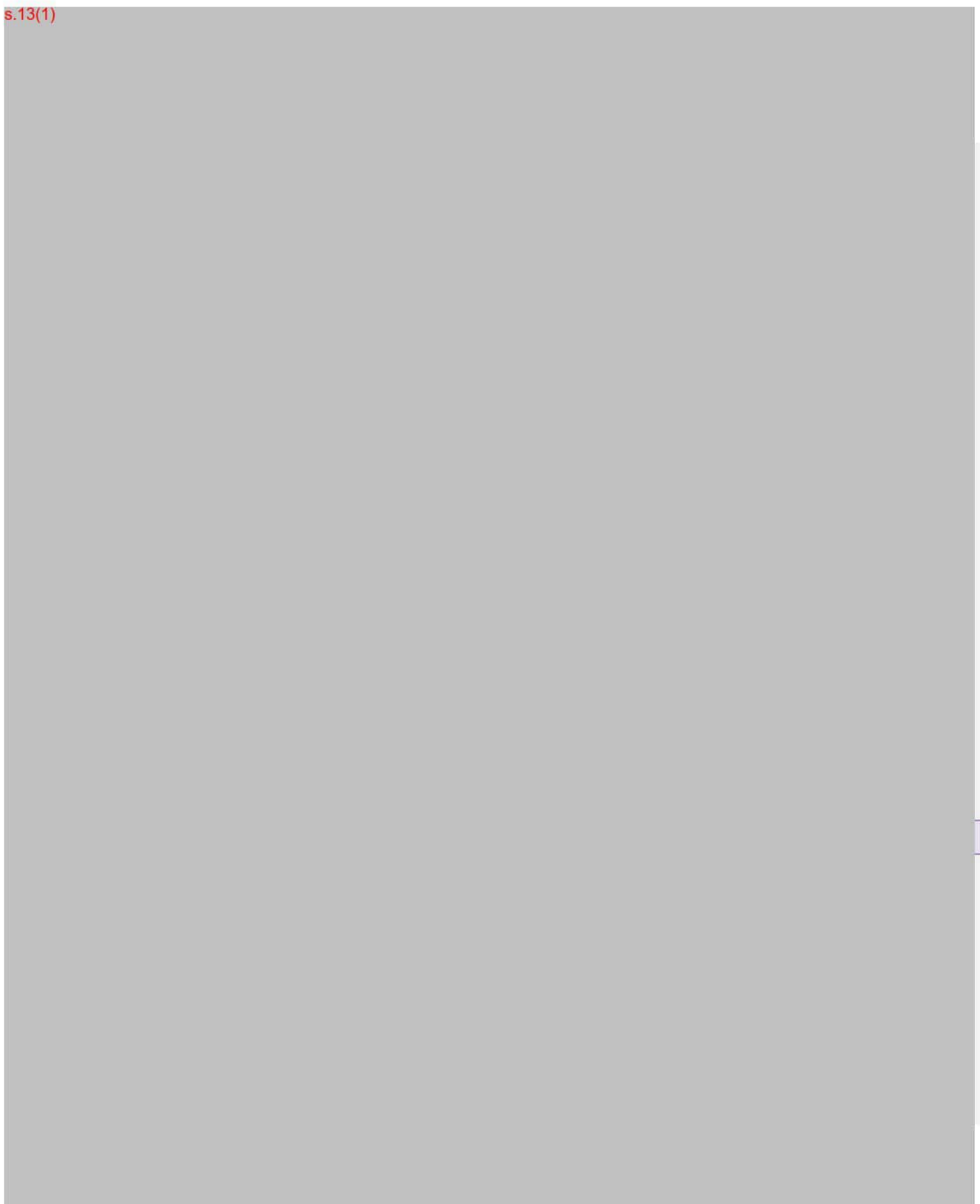


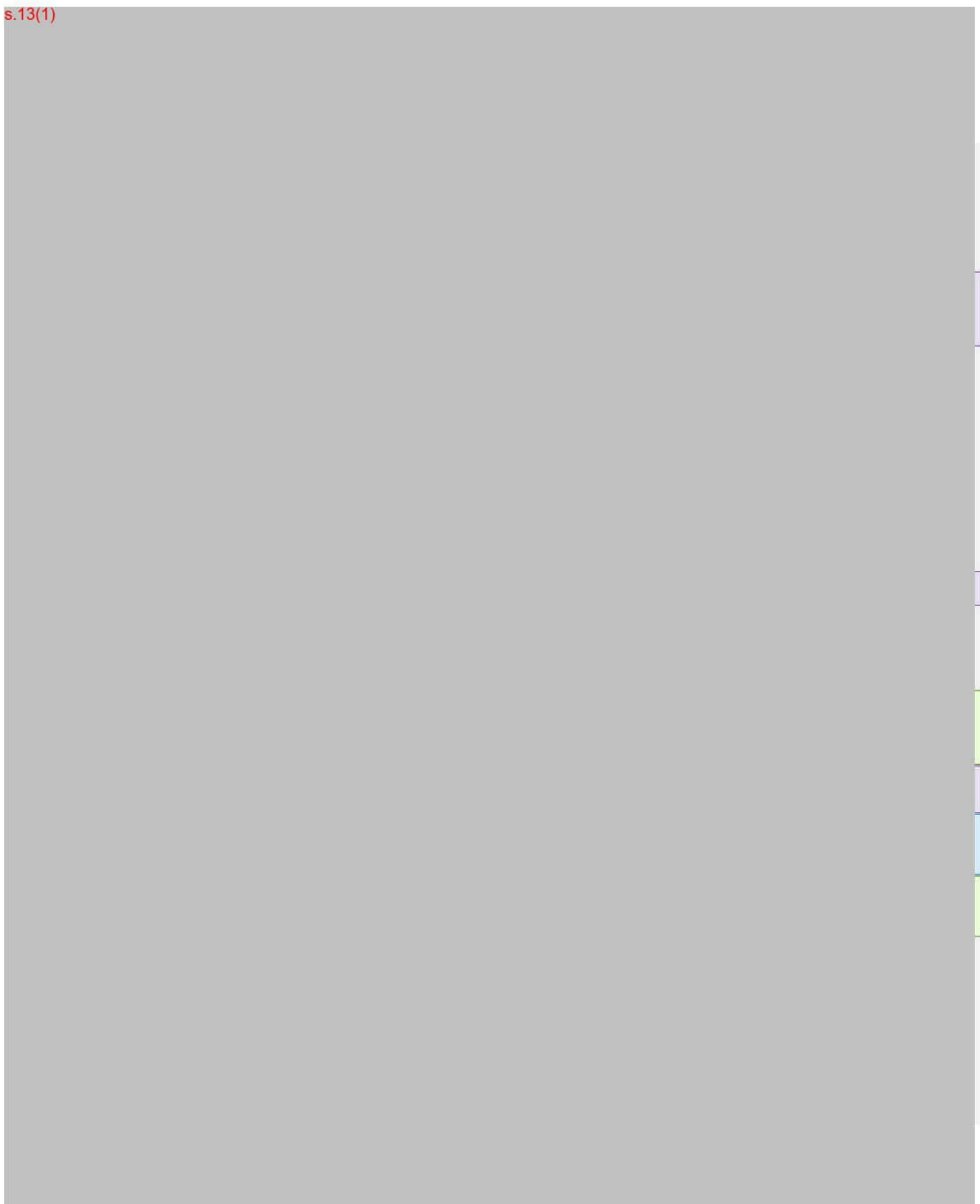


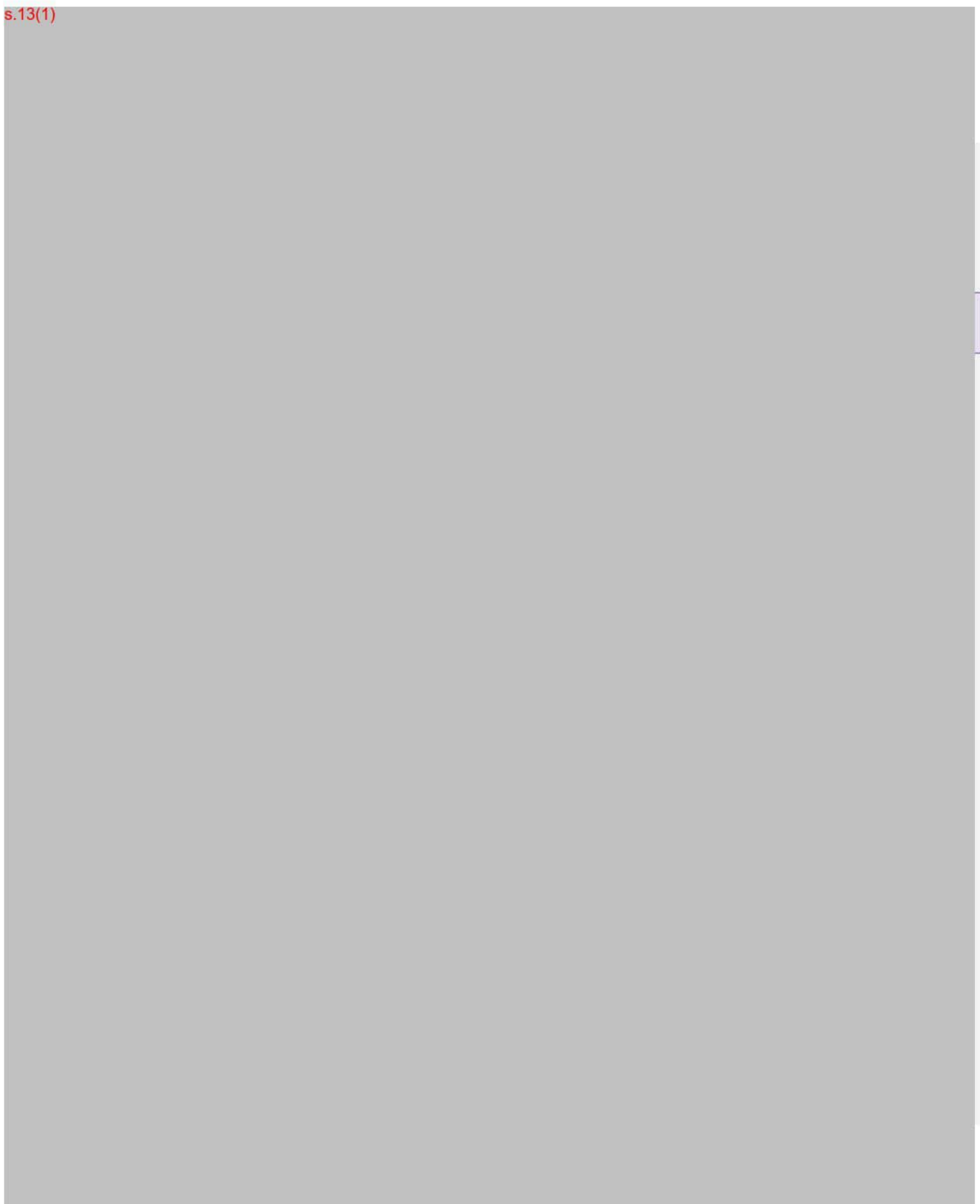


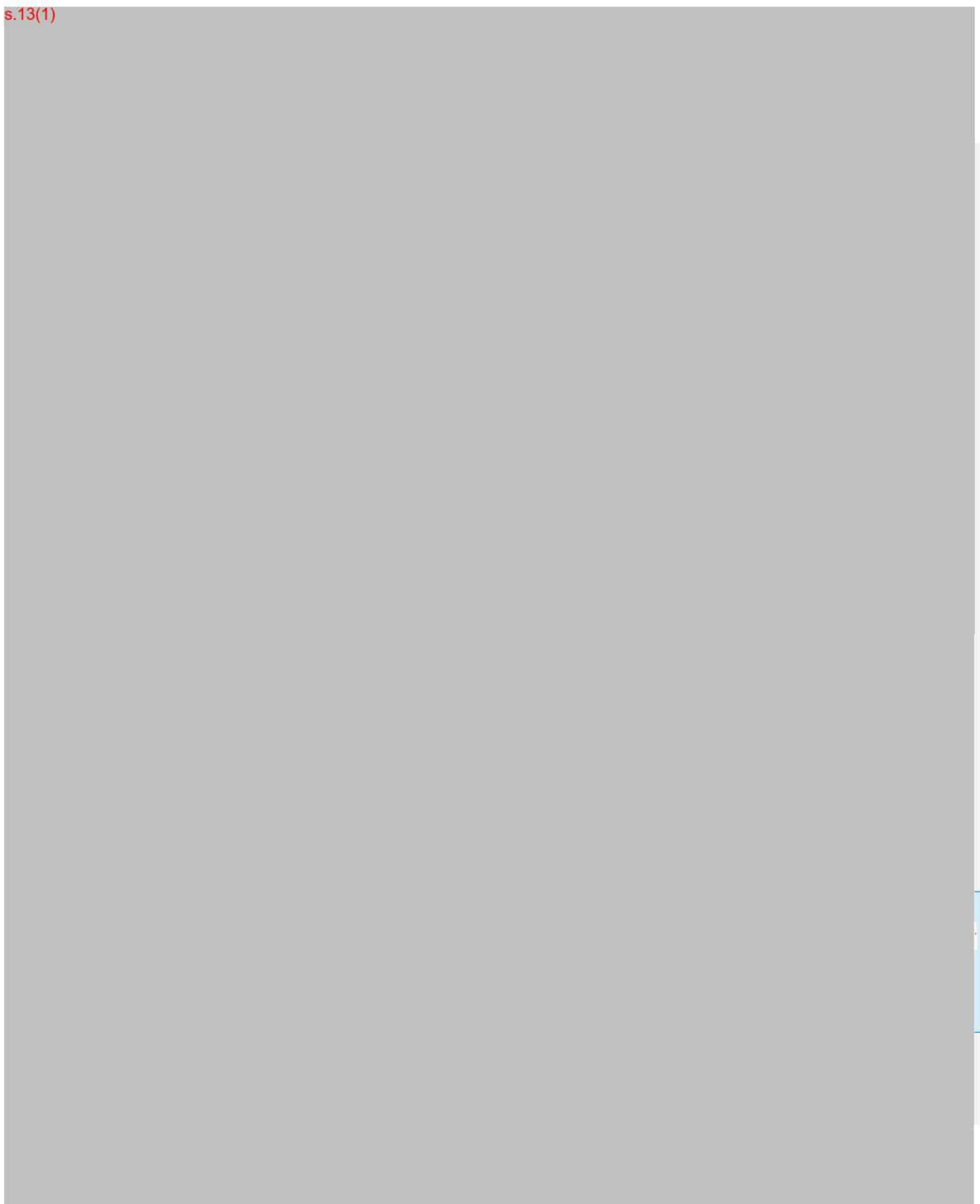


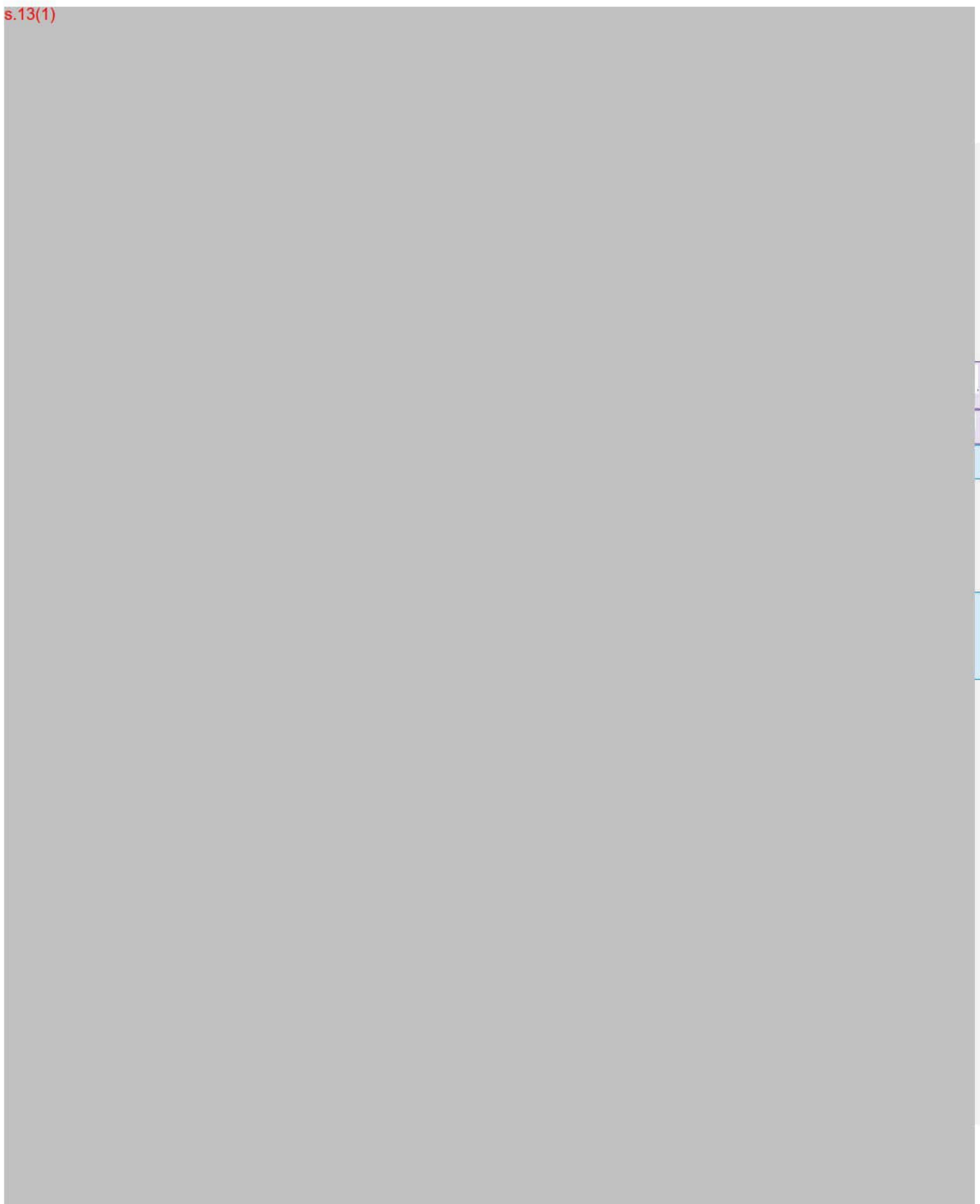






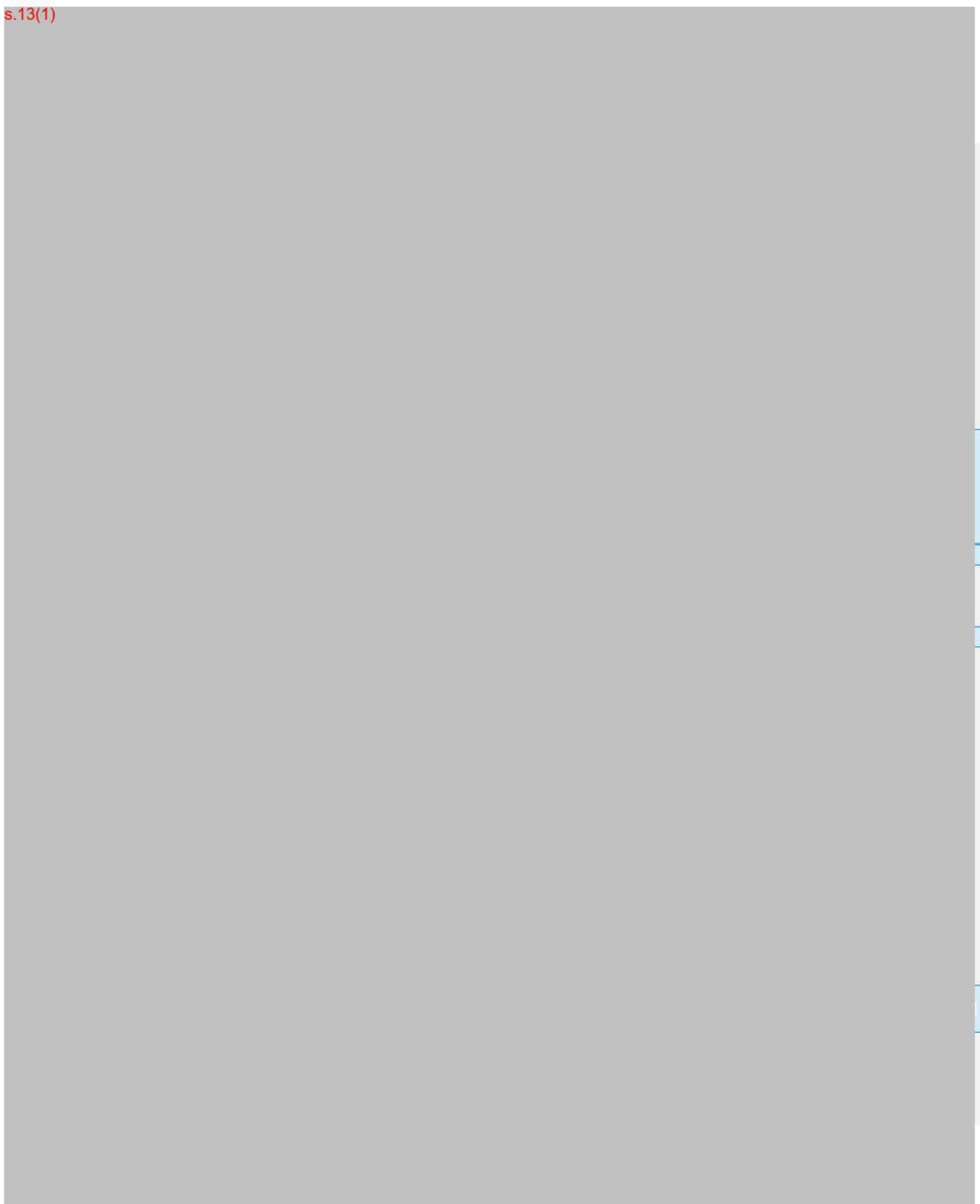


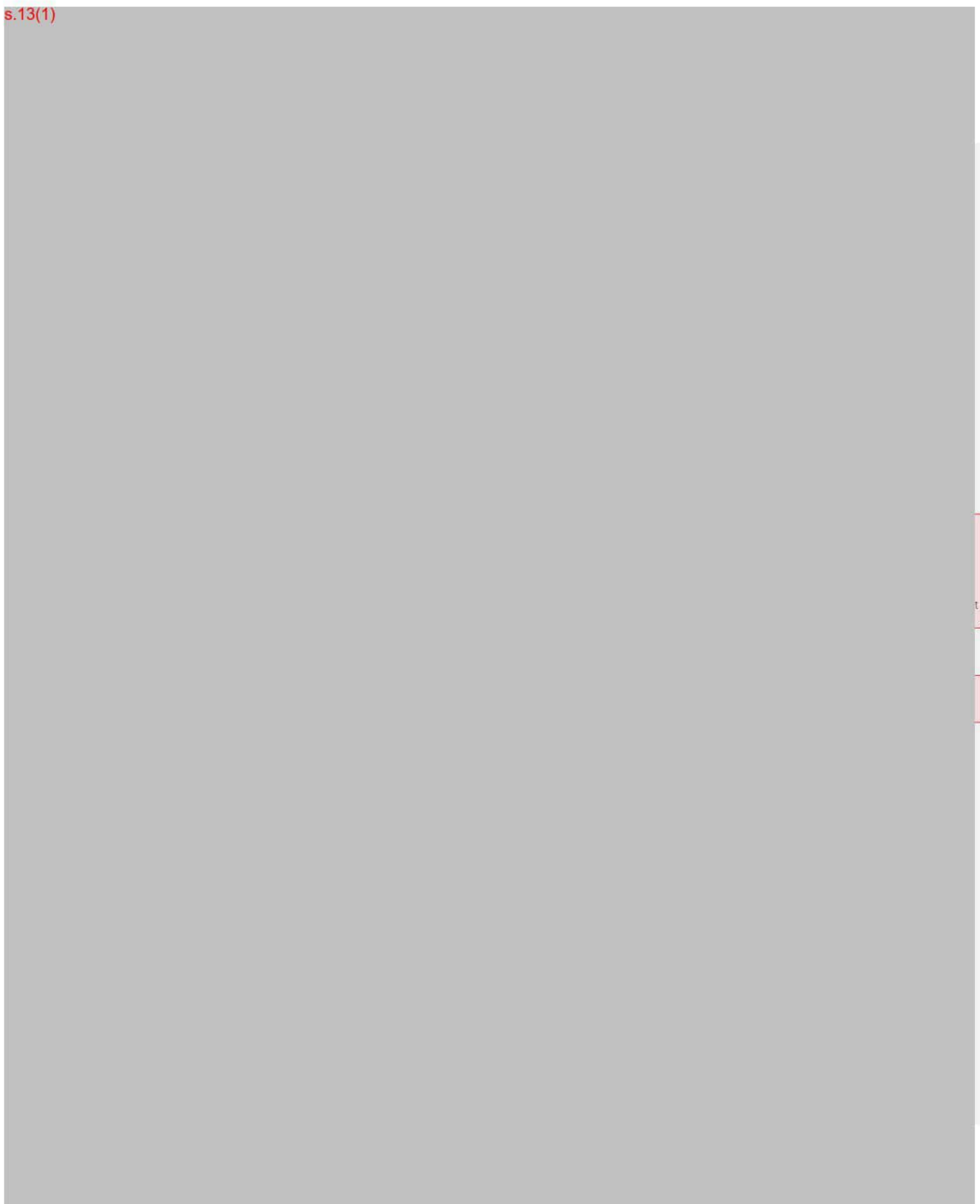




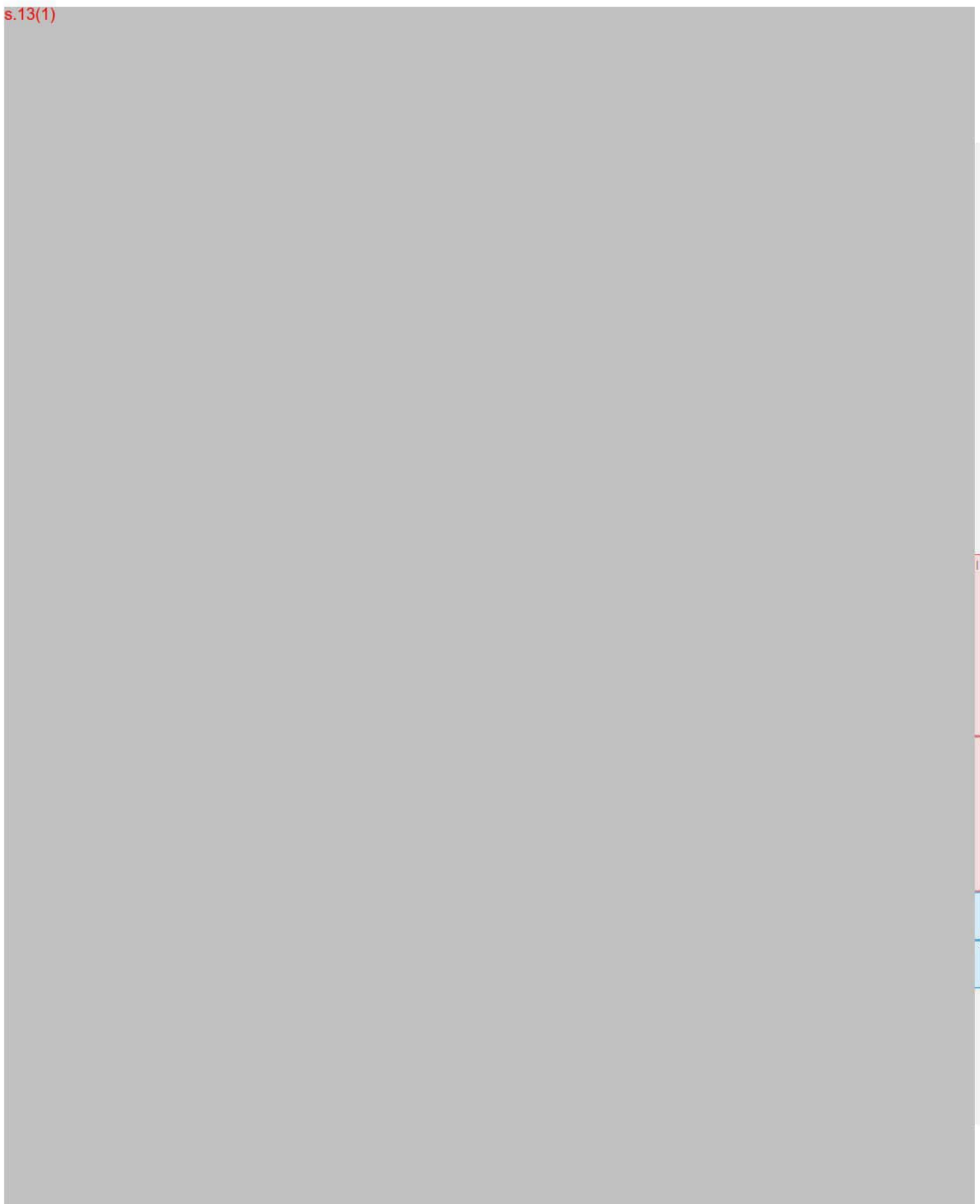


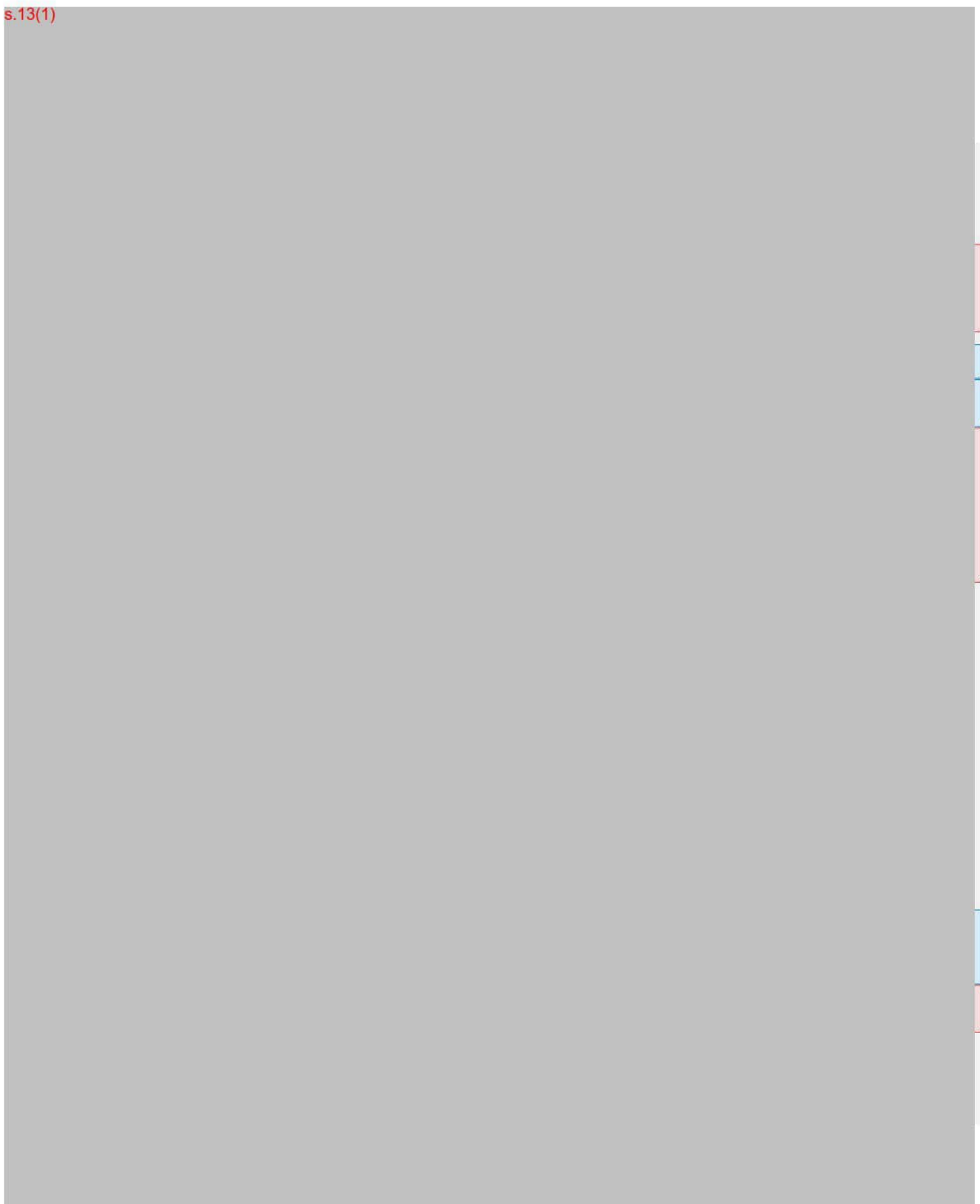


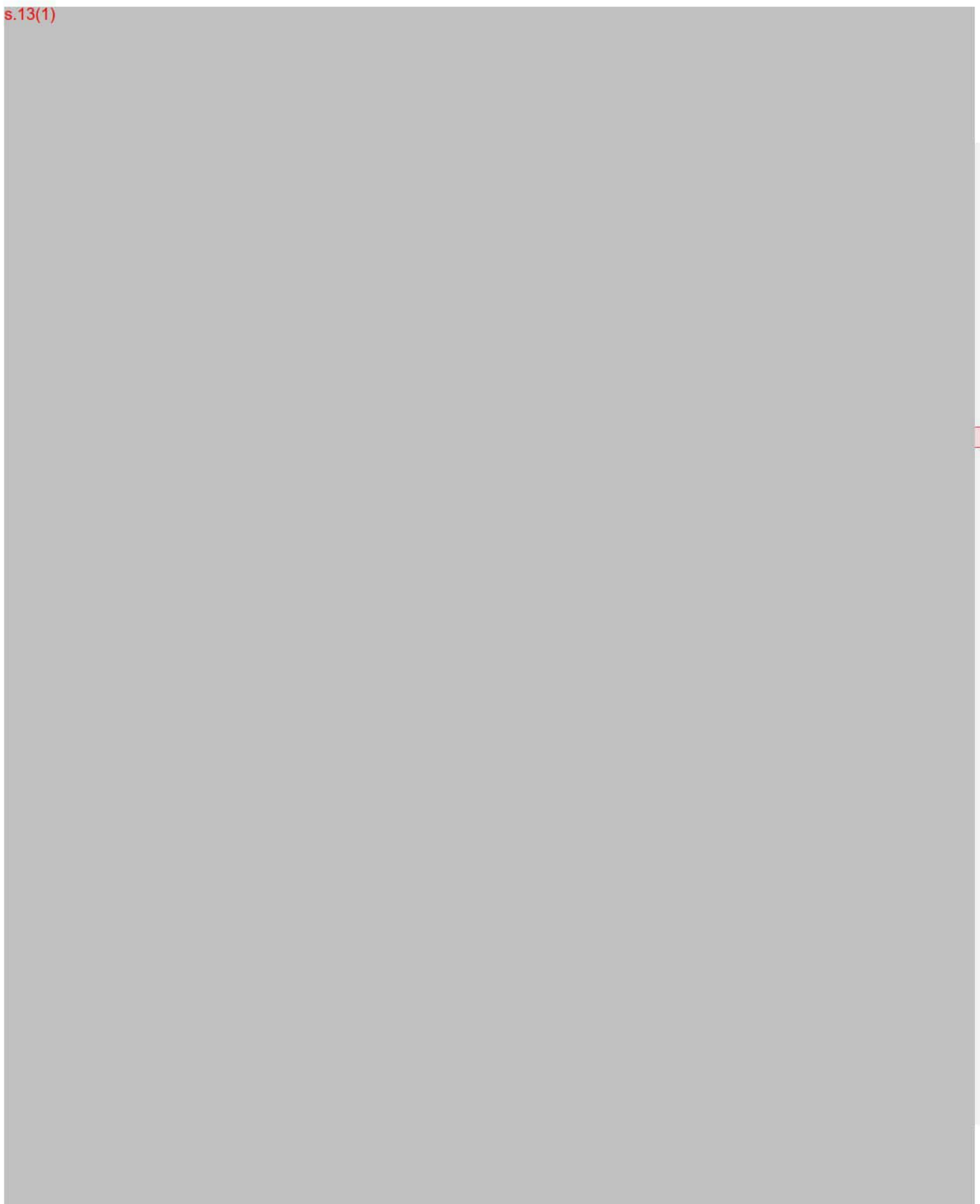


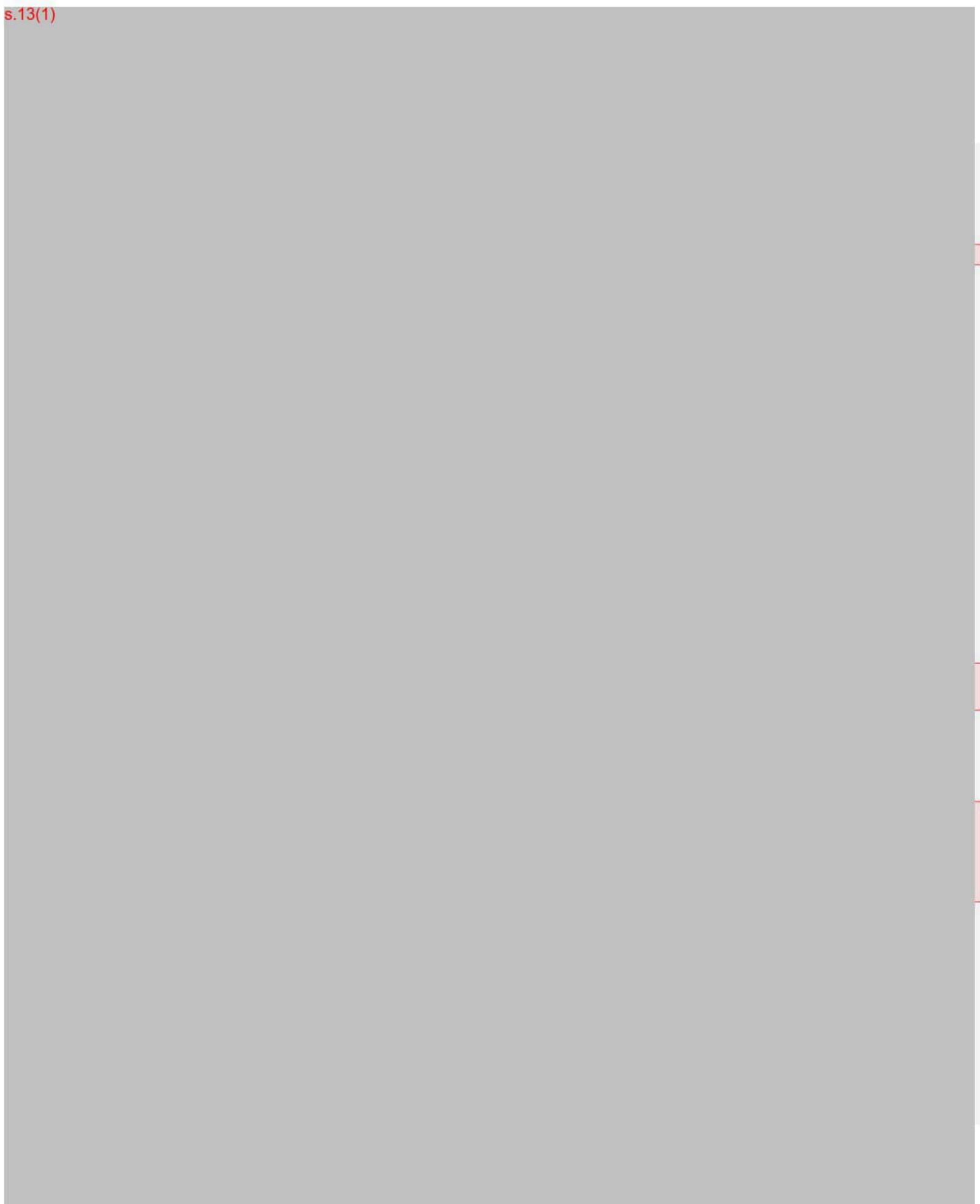


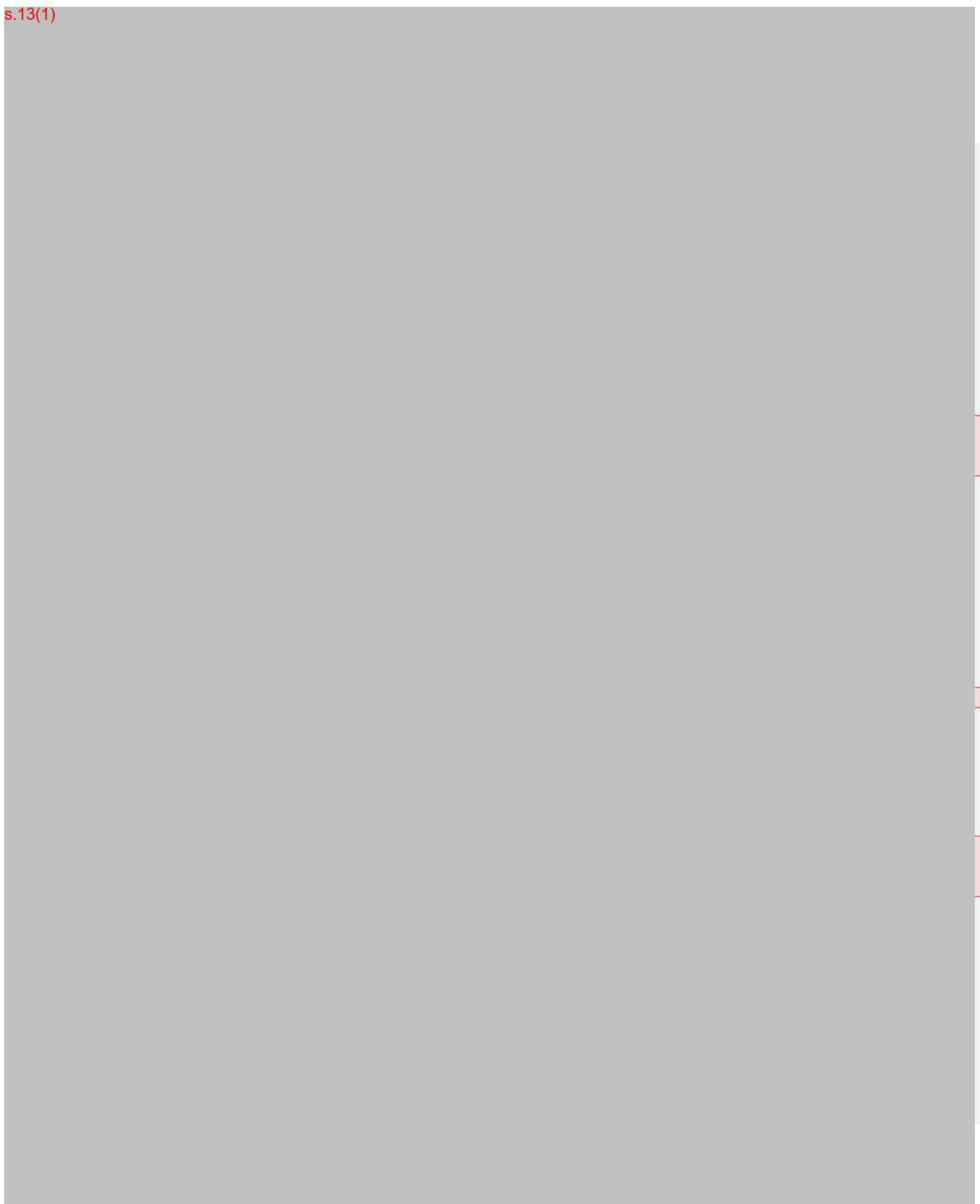
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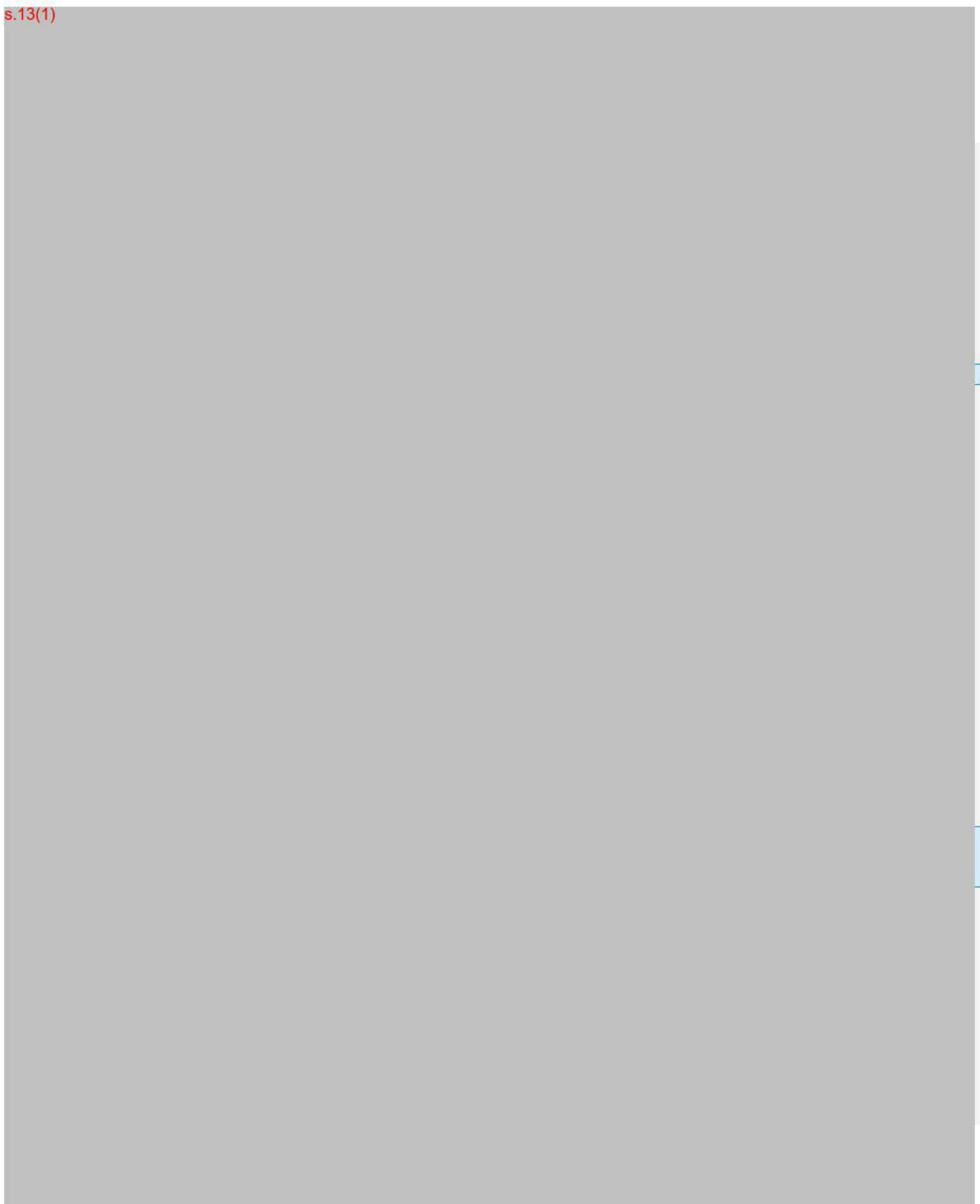












From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Riley Beise" <riley@focaleng.com>](mailto:riley@focaleng.com)
["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
CC: ["Kristian Storgard" <kristian@focaleng.com>](mailto:kristian@focaleng.com)
["Danny Taylor" <danny@focaleng.com>](mailto:danny@focaleng.com)
Date: 5/3/2023 8:38:00 PM
Subject: RE: CoV EMG Updates - Proposed Survey Questions

Thanks Riley, I agree we don't need to send a note to workshop attendees.

Cheers,
Charling

From: Riley Beise
Sent: Tuesday, May 2, 2023 3:04 PM
To: Li, Charling ; Susan MacDougall
Cc: Kristian Storgard ; Danny Taylor
Subject: [EXT] RE: CoV EMG Updates - Proposed Survey Questions

City of Vancouver security warning: Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Hi Charling.

We've discussed this internally and have agreed that what you're proposing makes a lot of sense. We'll cancel this post workshop survey and instead plan to provide a feedback survey of the draft recommendations. Depending on the timing of the survey, the length of the feedback period, and the comments we get back, this may push timelines for completion of the project. It may not, but just wanting to flag this.

I don't think we need to issue a note to workshop attendees that they will not be receiving a post workshop survey so we will not plan to do that. Let me know if you feel differently.

Cheers,

Riley Beise P.Eng., BEMP
Principal | he/him
t 250.516.6088 ext. 2 | m 250.661.3817
riley@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>
Sent: Friday, April 28, 2023 11:33 AM
To: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>

Subject: RE: CoV EMG Updates - Proposed Survey Questions

Hi Susan and Riley,

I'm looking over the survey questions and coming up with doubts about how useful it is at this point in the project. I know we said we would send out the survey post workshop to support engagement for those who couldn't attend, but we will be engaging again closer to the end of the project so I would be comfortable changing course on the survey.

Some questions coming to my mind:

- 1) Are we expecting much more input? Do you have enough feedback or data to work with now, or will the survey responses just add more noise to the analysis?
- 2) Could we better allocate efforts towards a 'feedback survey' for when the draft recommendations are ready, and industry can have specifics wording in the EMGs to react to? If this were the choice to make, I'd rather focus on the feedback survey as part of the review period.

I'd love to hear your thoughts on this!

Charling

From: Li, Charling
Sent: Tuesday, April 25, 2023 3:57 PM
To: Susan MacDougall <susan@focaleng.com>
Subject: RE: CoV EMG Updates - Proposed Survey Questions

All good, thanks for the heads up 😊

From: Susan MacDougall <susan@focaleng.com>
Sent: Monday, April 24, 2023 12:25 PM
To: Li, Charling <charling.li@vancouver.ca>
Subject: [EXT] RE: CoV EMG Updates - Proposed Survey Questions

City of Vancouver security warning: Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Hi Charling,

Hope you had a great weekend.

Just wanted to share my apologies that we were late on this deliverable. I had a busy week last week as we had to let our Office Manager go so I was catching up on a few items there and got my feedback to Kristian late. We're back on track and have started with the Group1 edits.

Thanks!

Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC

Principal | she/her

t 604.318.3596 x1 | m 604.842.7893

susan@focaleng.com

From: Kristian Storgard <kristian@focaleng.com>

Sent: Monday, April 24, 2023 11:42 AM

To: Li, Charling <charling.li@vancouver.ca>

Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Danny Taylor

<danny@focaleng.com>; Jennifer Blagborne <jennifer@focaleng.com>

Subject: CoV EMG Updates - Proposed Survey Questions

Hi Charling,

Please see attached our proposed survey questions for the CoV EMG Updates.

Note, the intent is to use a platform like Survey Monkey (or similar), and to have an intro page covering what the survey is about, what the goals are, and how long it will take. Then the subsequent tabs will each cover one topic.

Could you please review this week, so that we can implement any changes, and ideally issue the survey by next week?

Thanks, and happy Monday.

Kristian

Kristian Storgard, EIT

Energy Modeller | he/him

t 250.516.6088 ext. 6 | m 250.801.7408

kristian@focaleng.com



From: "Donal Dignan" <donal@edgec.ca>
To: "Li, Charling" <charling.li@vancouver.ca>
"Enright, Patrick" <Patrick.Enright@vancouver.ca>
CC: "Jason Nelson" <jason@edgec.ca>
"Eoghan Hayes" <ehayes@edgec.ca>
Date: 1/22/2026 4:50:58 PM
Subject: RE: CoV EMG v3 - Council Meeting Documentation

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Thank you kindly Charling!

Kind regards,

Dónal Dignan, P.Eng, B.Eng
Building Performance Engineer
Healthy · Smart · Sustainable

Please note: I am working remotely outside Canada and am not contactable by cell phone. Please email, contact me on Microsoft Teams, or send a virtual meeting request.

From: Li, Charling
Sent: May 1, 2025 12:10 PM
To: Donal Dignan ; Enright, Patrick
Cc: Jason Nelson ; Eoghan Hayes
Subject: RE: CoV EMG v3 - Council Meeting Documentation

Hi Donal, great timing, we are just in the process of publishing the guidelines to the web which may take a few more days. I'll attached v3.0 and redline version for your use in the meantime. I'm also preparing a broader notification email which outlines the major changes – you'll see that through your inbox in the next few days.

Cheers,
Charling

From: Donal Dignan <donal@edgec.ca>
Sent: Thursday, May 1, 2025 10:34 AM
To: Li, Charling <charling.li@vancouver.ca>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Cc: Jason Nelson <jason@edgec.ca>; Eoghan Hayes <ehayes@edgec.ca>
Subject: RE: CoV EMG v3 - Council Meeting Documentation

Hi Patrick and Charling,

I am following up on the original query here regarding the EMG version 3. Is this document now publicly available somewhere? If not, when can we expect it to be available?

Kind regards,

Dónal Dignan, P.Eng, B.Eng
Building Performance Engineer
Healthy · Smart · Sustainable

Please note: I am working remotely outside Canada and am not contactable by cell phone. Please email, contact me on Microsoft Teams, or send a virtual meeting request.

From: Donal Dignan
Sent: April 16, 2025 5:14 AM
To: Li, Charling <charling.li@vancouver.ca>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Cc: Jason Nelson <jason@edgec.ca>; Eoghan Hayes <ehayes@edgec.ca>
Subject: RE: CoV EMG v3 - Council Meeting Documentation

Hi Patrick and Charling,

Thanks for responses with requested information.

1. Noted regarding MUA adjustment not being applied and understand that to mean it will stay at 10. I believe tackling excessive energy use in MUAs should be an aim as there is no penalty when the adjustment offsets wasteful design in this area.
2. Thanks for confirmation on the guidelines regarding 1-3 storey residential buildings. This is not our area of expertise, and we only encounter them when it crosses into what would typically be Part 3 buildings. We don't really work on Part 9 buildings which gives a clear distinction under the BCBC.
3. Weather below and attached.

My own checks align with Eoghan's quick check from yesterday. See more comprehensive summary of the three weather files in the attached. Some observations below.

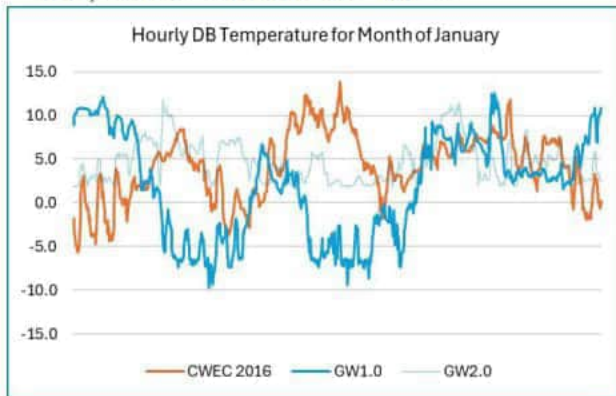
Average Temperatures and Heating Degree Days (EMG v2 CWEC 2016 versus EMG v3 GW1.0)

- HDDs are 2,798 in EMG v2 and 2,718 in EMG v3. Slightly milder shift overall which is good to see.
- A major reduction in overall HDD would have skewed models using v2 versus v3 of the guidelines, particularly returning lower TEDIs.
- The HDD reduction will result in a less performant envelope being able to achieve the same TEDI. Modest shift of 3% so not concerning.

Winter Peak Temperatures (EMG v2 CWEC 2016 versus EMG v3 GW1.0)

- Big shift in winter peak minimums. -9.7°C in EMG v3 versus -5.6°C in EMG v2.
- Winter design 1% from the VBBL for context: -8°C (general), -6°C (2020s), and -4°C (2050s).

- The weather file for energy modelling being below the winter design temperature may lead to heating setpoints not being met in model.
- It is not typical for an energy model to be below winter design temperature, but I don't see it as an issue personally.
- Would expect January and December to be comparable average temperatures generally.
- EMG v2 January is 4.2°C and December is 3.9°C. EMG v3 January is 1.8°C and December is 4.8°C.
- It looks like the EMG v3 January is significantly shifted to be cold. Unclear if this is deliberate or has intent behind it
- Personally, I don't see an issue with this as we do expect to see occasional temperatures around the -10°C.



Summer Peak Temperatures for Overheating Modelling (EMG v2 CWEC 2016 versus EMG v3 GW2.0)

- Major shift in peak and average summer temperatures (as is understood to be the intent).
- The increased heat is very focused in August. Increase for August is 4.8°C.
- Average temperatures for other warm months increase around 1.5-2.0°C.
- The peak temperatures and warm period in August will realise the understood intent of more overheating during peak.
- However, other months being significantly cooler may result in the total annual overheating hours being lower than intended.

Average Monthly Temperatures in Degrees Celcius		
	CWEC 2016	GW2.0
June	15.4	16.7
July	17.9	20.0
August	18.0	22.8
September	15.5	16.7
October	10.2	12.6

Kind regards,
Dónal Dignan, P.Eng, B.Eng
 Building Performance Engineer
 Healthy · Smart · Sustainable

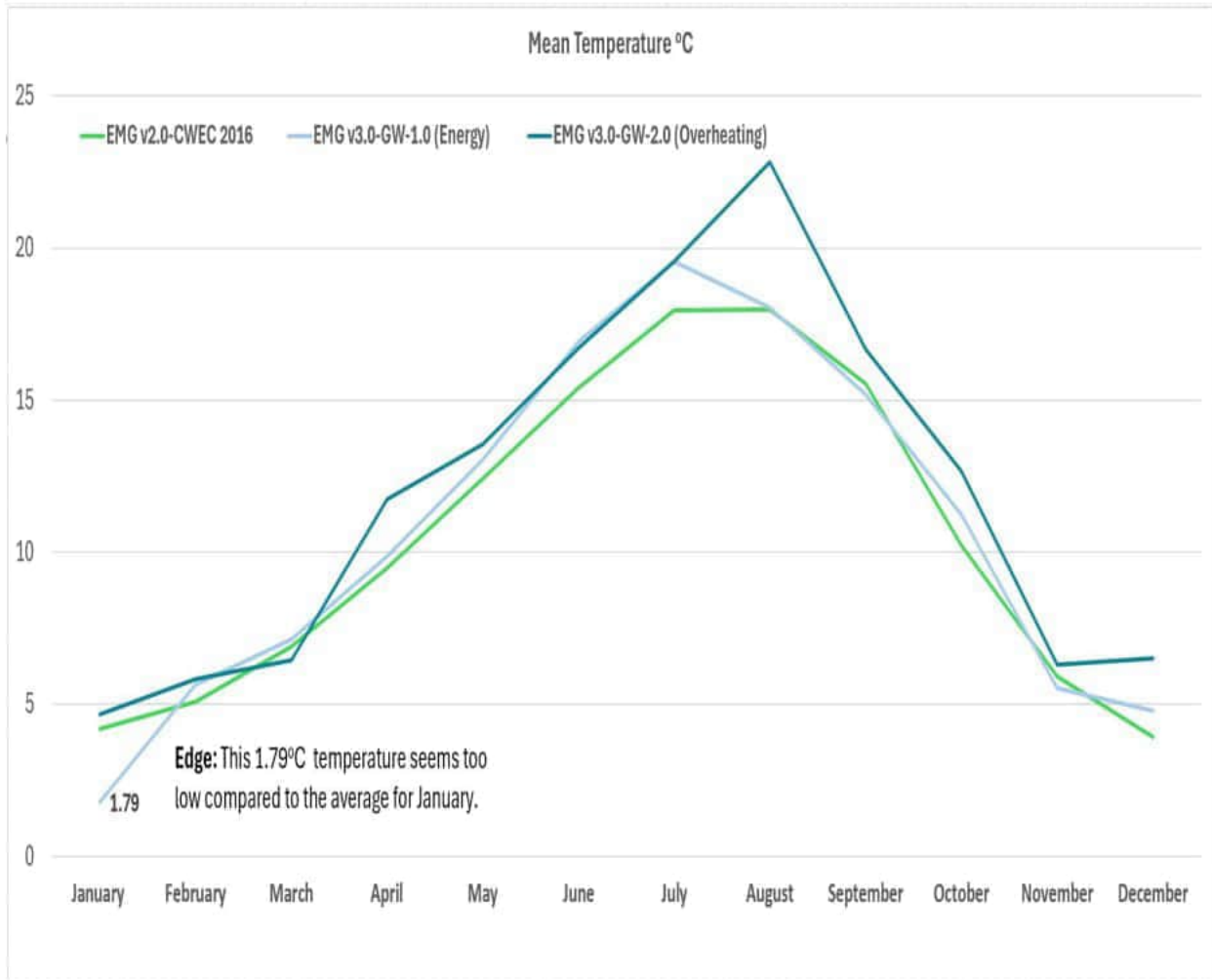
Please note: I am working remotely outside Canada and am not contactable by cell phone. Please email, contact me on Microsoft Teams, or send a virtual meeting request.

From: Eoghan Hayes <ehayes@edgec.ca>
Sent: April 15, 2025 4:29 PM
To: Li, Charling <charling.li@vancouver.ca>; Enright, Patrick <Patrick.Enright@vancouver.ca>; Donal Dignan <donal@edgec.ca>
Cc: Jason Nelson <jason@edgec.ca>
Subject: RE: CoV EMG v3 - Council Meeting Documentation

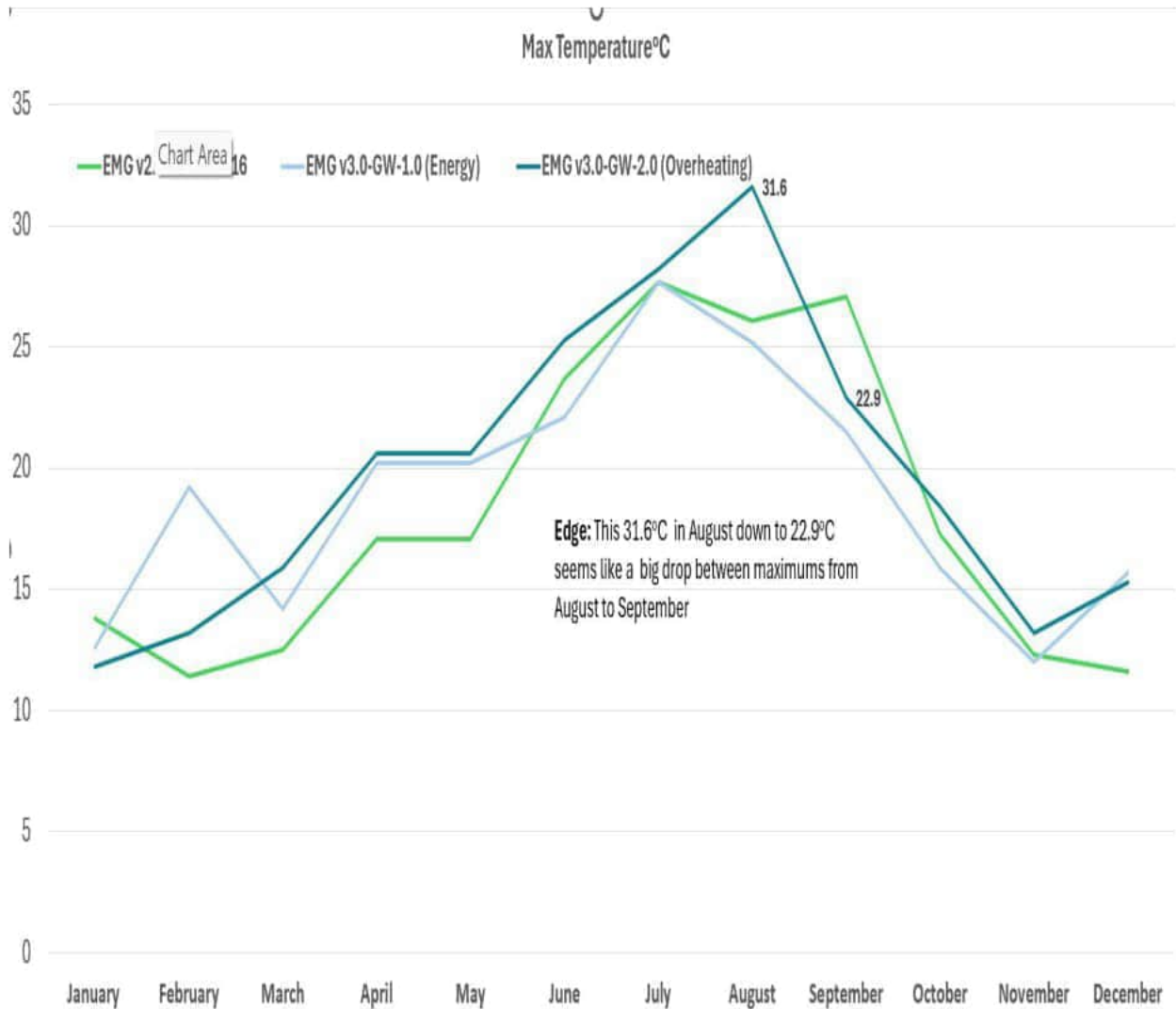
Thanks Charling

See attached, and quick analysis I completed. (Donal please QC and add to resources). Some observations.

1. HDD did not change much between the COV EMG v2.0 file and the 1.0 file used for energy.
2. The mean temperature for January in the update energy file seems low, 1.79°C.



- In the overheating weather file, the max temperature drop between August and September seems low.



Best regards,
Eoghan Hayes, P.Eng, BEMP, RESET AP
 Managing Director
 M: +1(604)-338-1063
 T: +1(888)-939-3343 Ext.701
www.edgesustainability.com [edgesustainability.com]
 601-211 East Georgia St., Vancouver BC, V6A 1Z6
 Healthy • Smart • Sustainable





Kindly note that our new address is now **6th Floor - 211 East Georgia St., Vancouver BC, V6A 1Z6**. We appreciate your attention to updating your records accordingly.

From: Li, Charling <charling.li@vancouver.ca>
Sent: April 15, 2025 1:44 PM
To: Eoghan Hayes <ehayes@edgec.ca>; Enright, Patrick <Patrick.Enright@vancouver.ca>; Donal Dignan <donal@edgec.ca>
Cc: Jason Nelson <jason@edgec.ca>
Subject: RE: CoV EMG v3 - Council Meeting Documentation

Here are the files. The GW1.0 files are to be used to demonstrate compliance to energy and carbon limits. The GW2.0 files are to be used to report the # of overheating hours for residential buildings (with any active cooling turned off). They will be hosted online with release v3.0 of the EMGs.

Cheers,
Charling

From: Eoghan Hayes <ehayes@edgec.ca>
Sent: Tuesday, April 15, 2025 1:14 PM
To: Enright, Patrick <Patrick.Enright@vancouver.ca>; Donal Dignan <donal@edgec.ca>; Li, Charling <charling.li@vancouver.ca>
Cc: Jason Nelson <jason@edgec.ca>
Subject: RE: CoV EMG v3 - Council Meeting Documentation

Thank you Patrick,

Can you please send on the specific EPW or CWEC weather file to be used for Vancouver ?

Cheers
E

Best regards,
Eoghan Hayes, P.Eng, BEMP, RESET AP
Managing Director
M: +1(604)-338-1063
T: +1(888)-939-3343 Ext.701
www.edgesustainability.com [edgesustainability.com]
601–211 East Georgia St., Vancouver BC, V6A 1Z6
Healthy • Smart • Sustainable





Kindly note that our new address is now **6th Floor - 211 East Georgia St., Vancouver BC, V6A 1Z6**. We appreciate your attention to updating your records accordingly.

From: Enright, Patrick <Patrick.Enright@vancouver.ca>
Sent: April 15, 2025 12:10 PM
To: Donal Dignan <donal@edgec.ca>; Li, Charling <charling.li@vancouver.ca>
Cc: Eoghan Hayes <ehayes@edgec.ca>
Subject: RE: CoV EMG v3 - Council Meeting Documentation

Hi Donal,

The final version of the guidelines are not published with the Council Report, but will be made available shortly along with several other web updates and updates to forms if Council approves the new by-law.

The guidelines are the same as the last [draft circulated for consultation](#), with the following changes:

- We chose not to proceed with the any changes to the TEDI adjustment for corridor pressurization, so it stays as-is with a maximum TEDI adjustment of 10;
- We have added another option for the calculation of fenestration performance.

As for the 1-3 storey energy modelling guidelines, these have been [available online](#) since 2023 and referenced in our pre-permit checklist for new 1-3 storey residential, the change noted below just makes a formal link to the by-law.

Happy to take a call/meeting this afternoon if you have any questions.

Sincerely,

Patrick Enright, P.Eng (he/him/his)
Team Lead, Small Existing and New Developments
Green & Resilient Buildings Branch | Sustainability Group
Planning, Urban Design & Sustainability | City of Vancouver
patrick.enright@vancouver.ca | 604.871.6158

For more information on green buildings, please visit <http://vancouver.ca/zeroemissions>

I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̓əm ([Musqueam \[musqueam.bc.ca\]](#)), Skwxwú7mesh ([Squamish \[squamish.net\]](#)), and səfilwətaʔt / səfilwítulh ([Tsleil-Waututh \[twnation.ca\]](#)) nations.

From: Donal Dignan <donal@edgec.ca>
Sent: Monday, April 14, 2025 9:00 AM
To: Li, Charling <charling.li@vancouver.ca>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Cc: Eoghan Hayes <ehayes@edgec.ca>

Subject: CoV EMG v3 - Council Meeting Documentation

Good morning,

We have been looking at the documentation associated with the [Standing Committee on City Finance and Services - April 16, 2025](#) and cannot locate the proposed energy modelling guidelines referenced in the updated VBBL.

Can you please direct me towards where that document is available for public review? Also, the guideline for 1-3 storey residential buildings which we were not previously aware existed.

CoV	Version 3.0	City of Vancouver Energy Modeling Guidelines	10.2.3.4.(1) 10.2.3.4.(3) 10.2.3.4.(4) 10.3.1.1.(2) A-10.2.3.4.
CoV	2024	City of Vancouver Energy Modelling Guidelines for 1 to 3 Storey Residential Buildings	10.2.2.4.

Kind regards,

Dónal Dignan, P.Eng, B.Eng

Building Performance Engineer

www.edgesustainability.com [edgesustainability.com]

Vancouver | Toronto

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Please note: I am working remotely outside Canada and am not contactable by cell phone. Please email, contact me on Microsoft Teams, or send a virtual meeting request.



From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Riley Beise" <riley@focaleng.com>](mailto:riley@focaleng.com)
CC: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
["Kristian Storgard" <kristian@focaleng.com>](mailto:kristian@focaleng.com)
["Danny Taylor" <danny@focaleng.com>](mailto:danny@focaleng.com)
["Enright, Patrick" <Patrick.Enright@vancouver.ca>](mailto:Patrick.Enright@vancouver.ca)
Date: 4/5/2023 2:02:00 PM
Subject: RE: CoV EMG v3 - De-Rating Envelope of NECB Ref Building for Mixed Use

Thanks for raising this Riley. We are likely to adopt NECB2020 so we'll keep this in mind.

From: Riley Beise
Sent: Wednesday, April 5, 2023 12:37 PM
To: Li, Charling
Cc: Susan MacDougall ; Kristian Storgard ; Danny Taylor
Subject: [EXT] CoV EMG v3 - De-Rating Envelope of NECB Ref Building for Mixed Use

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Hi Charling.

Something just came up in an email thread with some other modellers.

The BCBC is adopting NECB 2020, which now includes the requirement to apply BETBG to the proposed envelope. However, the performance of the Reference building's envelope is not de-rated.

The CoV EMG v2 specifically says to de-rate the envelope of the Reference Building, which will be at odds with NECB 2020. I'm thinking ahead to when/if CoV adopts 2020 and also when/if the CoV adopts EMGs v3. It would be nice and tidy to have the v3 language revised to remove the section about de-rating the Reference envelope. This would then align the CoV / Step Code NECB2020 Reference with a "plain" NECB 2020 Reference. Of course this would push performance requirements up.

Just something to think about, it would be nice to have these things aligned. I do also realize that this is somewhat a Step Code issue and not necessarily an issue for CoV.

Thanks.

Riley Beise P.Eng., BEMP
Principal | he/him
t 250.516.6088 ext. 2 | m 250.661.3817
riley@focaleng.com



From: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
To: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
CC: ["Danny Taylor" <danny@focaleng.com>](mailto:danny@focaleng.com)
["Riley Beise" <riley@focaleng.com>](mailto:riley@focaleng.com)
["Hayzel Boado" <hayzel@focaleng.com>](mailto:hayzel@focaleng.com)
Date: 9/25/2023 7:20:34 AM
Subject: RE: CoV EMG v3 on EventBrite

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Hi Charling,

Sounds good, we'll get those items added today and start promoting!

Hope you're keeping warm and dry ☹️

Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Li, Charling
Sent: Friday, September 22, 2023 7:29 PM
To: Susan MacDougall
Cc: Danny Taylor; Riley Beise; Hayzel Boado
Subject: Re: CoV EMG v3 on EventBrite

Hi Susan, I agree with adding something to set the expectation that the webinar is for those who have a lot of familiarity with the EMGs already. I think you have language around that from the previous webinar that we could reuse.

Let's put the question in to allow people to ask questions ahead of time. I don't expect to get much but I'd like to have the option for input available anyway.

Thanks so much! Have a restful weekend :)

Charling

Get [Outlook for Android \[aka.ms\]](#)

From: Susan MacDougall <susan@focaleng.com>
Sent: Friday, September 22, 2023 7:27:54 AM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Danny Taylor <danny@focaleng.com>; Riley Beise <riley@focaleng.com>; Hayzel Boado <hayzel@focaleng.com>
Subject: RE: CoV EMG v3 on EventBrite

Hi Charling,

Yes we can certainly add both questions. I did consider the “do you have any questions for us” one but then thought that since we’ll be presenting information out at this session, I’m not sure if any advance questions would inform the presentation... just food for thought but happy either way.

I thought of one more thing that I’d like to suggest adding: a note that this session is for people who are experienced with previous versions of the EMG so that we don’t get people turning up who are expecting education on it. Sound good?

Thanks they’re both doing well. We’ve already had a lot of bugs this season (4 or 5 times I think?) but fortunately most seem to be 24hr ones. Sleep is a different story ☹️

Talk soon,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Li, Charling <charling.li@vancouver.ca>
Sent: Thursday, September 21, 2023 6:17 PM
To: Susan MacDougall <susan@focaleng.com>
Cc: Danny Taylor <danny@focaleng.com>; Riley Beise <riley@focaleng.com>; Hayzel Boado <hayzel@focaleng.com>
Subject: RE: CoV EMG v3 on EventBrite

Hi Susan and team, the Eventbrite write up looks fine to me, and I like the graphic!
On the subsequent ticket registration page, can you please add this question with a Y/N answer:
“Would you like to be added to an email list for future communications from the City of Vancouver regarding green and resilient buildings?”
And could you add space for a prompt such as: “do you have any questions for the presenters ahead of the webinar?” or something similar, in case there are burning questions we should know before the webinar.

s.22(1)

Charling

From: Susan MacDougall <susan@focaleng.com>

Sent: Thursday, September 21, 2023 4:59 PM

To: Li, Charling <charling.li@vancouver.ca>

Cc: Danny Taylor <danny@focaleng.com>; Riley Beise <riley@focaleng.com>; Hayzel Boado <hayzel@focaleng.com>

Subject: RE: CoV EMG v3 on EventBrite

s.22(1)

Link now has an "s" in

workshop and should work.

<https://CoVEMGv3Workshop.eventbrite.ca> [[covemgv3workshop.eventbrite.ca](https://CoVEMGv3Workshop.eventbrite.ca)]

From: Susan MacDougall

Sent: Thursday, September 21, 2023 3:56 PM

To: Li, Charling <charling.li@vancouver.ca>

Cc: Danny Taylor <danny@focaleng.com>; Riley Beise <riley@focaleng.com>; Hayzel Boado <hayzel@focaleng.com>

Subject: RE: CoV EMG v3 on EventBrite

The link would probably help  <https://CoVEMGv3Workshop.eventbrite.ca>
[\[covemgv3workshop.eventbrite.ca\]](https://CoVEMGv3Workshop.eventbrite.ca)

I had meant to hold back because Hayzel is tweaking the image resolution, but that's the only thing that will change.

From: Susan MacDougall

Sent: Thursday, September 21, 2023 3:54 PM

To: Li, Charling <charling.li@vancouver.ca>

Cc: Danny Taylor <danny@focaleng.com>; Riley Beise <riley@focaleng.com>; Hayzel Boado <hayzel@focaleng.com>

Subject: CoV EMG v3 on EventBrite

Hi Charling,

First, I'd like to introduce you to our office manager Hayzel Boado (cc'd) who helps with some of our events.

We have set up an EventBrite site for people to register for the webinar. We set the limit to 200 people (I double checked and the first webinar was by invitation only with ~40 participants, so we can expect a much larger group this time around). Please have a look and let us know if you have any feedback.

Once we have your approval, we can look at distributing it through our networks and via:

- LinkedIn
- ZEBx's BC Green Building Calendar
- EGBC website (through Harshan)
- I assume you can talk to City staff about promotion

Does that sound good? Anywhere else you'd like us to reach out? BOABC? AIBC?

Thanks,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com



From: "Riley Beise" <riley@focaleng.com>
To: "Li, Charling" <charling.li@vancouver.ca>
CC: "Danny Taylor" <danny@focaleng.com>
"Susan MacDougall" <susan@focaleng.com>
Date: 10/12/2023 5:00:40 PM
Subject: RE: CoV EMG v3 Workshop 2 Draft Presentation
Attachments: 23009 231012 CoV EMG v3 Workshop.pptx

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Hi Charling, thank you for the comments, we've updated the presentation with those as well as our own continued edits, it's attached for your records.

Sure, we'll plan to record the session and link it in the survey.

Cheers,

Riley Beise P.Eng., BEMP
Principal | he/him
t 250.516.6088 ext. 2 | m 250.661.3817
riley@focaleng.com

From: Li, Charling
Sent: Thursday, October 12, 2023 12:31 PM
To: Riley Beise
Cc: Danny Taylor; Susan MacDougall
Subject: RE: CoV EMG v3 Workshop 2 Draft Presentation

Hi Riley, thanks for sharing. Some feedback:

- Somewhere between slide 4 and 5 could you mention that we've held an earlier open invitation workshop in April with 40+ attendees who provided feedback that help shape the proposed changes.
- Slide 7: for NRC Future weather files I would say "not yet adopted at Provincial or National levels but being explored" as more accurate
- Slide 8 – overheating analysis – can you contextualize "very difficult to comply with for 200 hours" – do you mean without better passive cooling design, or enhanced shading, or balanced SHGC, than is currently typical? I don't want to raise alarm bells with that wording around "difficult compliance". I'd like the framing more along the lines of 'building design needs to change with our level of knowledge around the climate and good design', and less about 'the rules keep changing and making it harder to build the same building we're used to building'. You

- don't have to say all that but having more nuance around 'difficult compliance' would help.
- Slide 13 – can I suggest the following change in framing?



Resilience – Summary

Change	Reason
<i>To evaluate summer climate resiliency, buildings are to be evaluated for overheating hours as per Section 4, with mechanical cooling systems disabled.</i>	<ul style="list-style-type: none"> • With mechanical cooling required, this metric encourages passive design • Improves resilience during summer power outages or equipment failure • Provides owners and designers with information about how resilient the building spaces may or may not be during power outages or equipment failure in the summer.

•

Will you plan on recording the video and having a link to it on the survey as well?

Thanks,
Charling

From: Riley Beise <riley@focaleng.com>
 Sent: Wednesday, October 11, 2023 4:45 PM
 To: Li, Charling <charling.li@vancouver.ca>
 Cc: Danny Taylor <danny@focaleng.com>; Susan MacDougall <susan@focaleng.com>
 Subject: CoV EMG v3 Workshop 2 Draft Presentation

Hello Charling.

Our in-progress presentation is attached for your review. We are still working on fleshing out some of the slides but the number of slides and general content is set and timing is looking good.

We will continue to refine and practice. Let me know if you'd like another copy when we've rounded out the content.

Cheers,

Riley Beise P.Eng., BEMP
 Principal | he/him
 t 250.516.6088 ext. 2 | m 250.661.3817
riley@focaleng.com



City of Vancouver

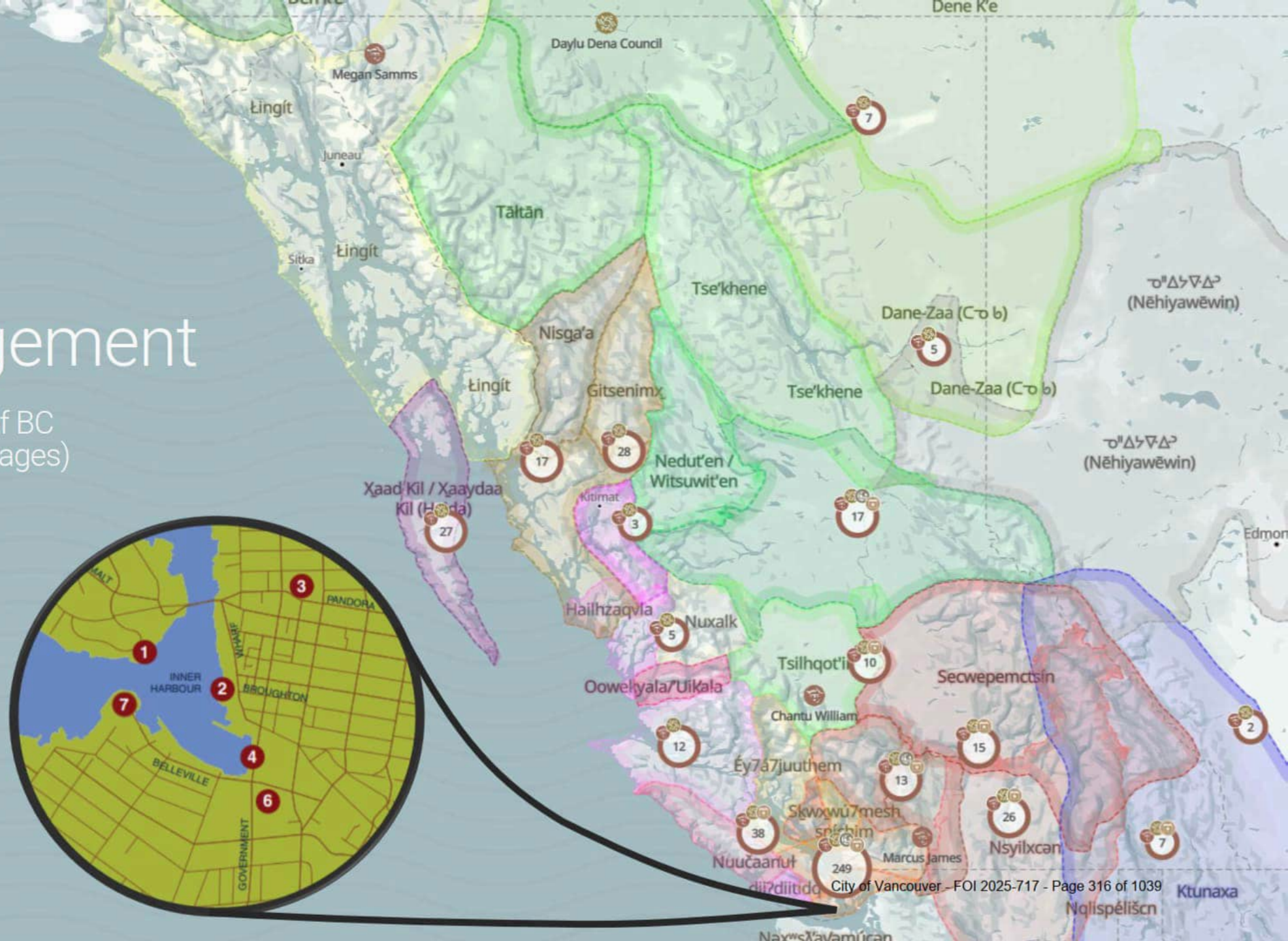
Energy Modelling Guidelines v3: Proposed Updates

WORKSHOP 2 – OCTOBER 13, 2023



Land Acknowledgement

Credit: First People's Map of BC
(<https://maps.fpcc.ca/heritages>)



Agenda

Introduction (10:30-10:35)

Key Changes Overview (10:35-11:40)

Discussion and Q&A (11:40-11:55)

Wrap up (11:55-12:00)

Introduction

GOALS

Update

- Consistency between modellers – clarify where there are multiple interpretations/ gaps
- Methodology, not limits – not changing requirements, but clarifying modelling strategy
- No major changes – don't make it impossible for projects that could previously comply

Forward looking

- Improve building performance – energy & GHG
- Increase emphasis on resilience to changing climate



Timeline & Adoption

Timeline

- **Apr 2023** – Workshop with 40+ attendees providing feedback shaping recommendations
- **Oct 2023** – Workshop, survey, and draft for public review
- **Dec 2023** - Version 3 complete

Adoption

- Vancouver Building Bylaw (VBBL) – anticipated **Dec 2024 or Jan 2025**
- Provincial adoption to BCBC - unknown if and when

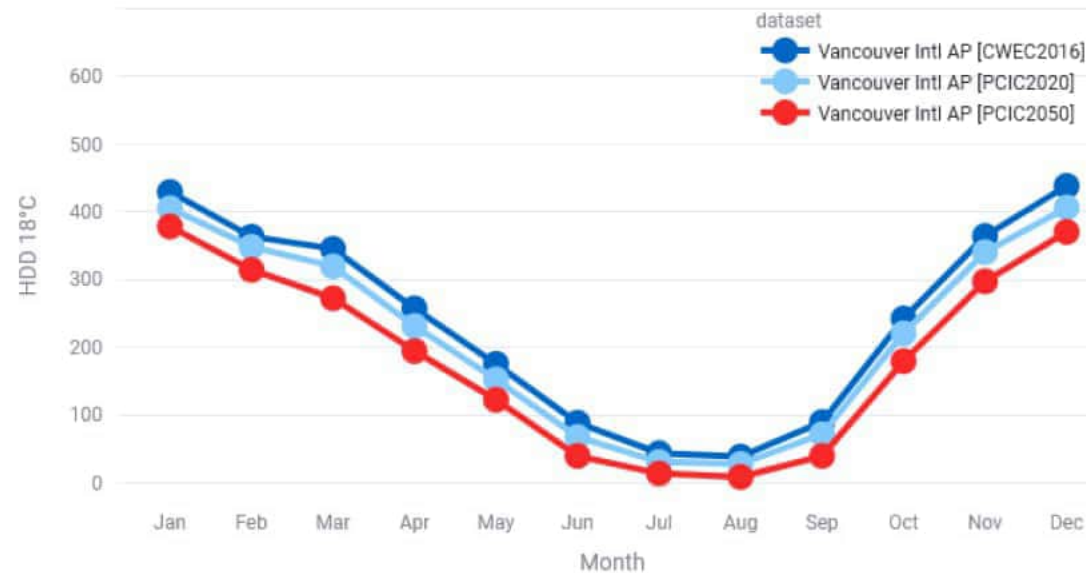


Weather Files - Summary

Change	Reason
<p><i>Require Future Shifted Weather files:</i></p> <ul style="list-style-type: none">• <i>PCIC 2020s for energy modelling</i>• <i>PCIC 2050s for overheating</i>	<ul style="list-style-type: none">• CWEC 2016 file based on historical data• Not representative of current weather• Not representative of future weather under new construction lifespans
Impact on Compliance	
<ul style="list-style-type: none">• Slightly lower heating loads, higher cooling loads, and higher and more frequent overheating hours.• One more energy model to be run with 2050s file.	

Weather Files – cont.

- PCIC file use in industry
- In use already under BC Housing Design Guidelines
- Incremental change
- 2020s projected to represent current temperatures (2010-2040 period)

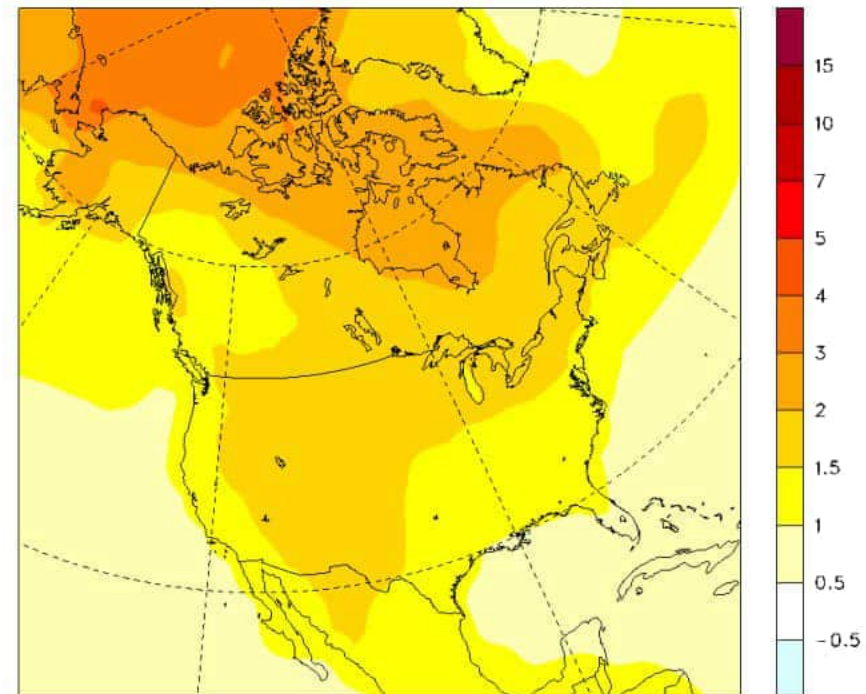


Weather Files – cont.

Also considered

- CWEC 2020 Files
 - Very minor change from CWEC 2016,
 - Still historical data (3 additional years of data)
- NRC Future Weather Files:
 - Not yet adopted at Provincial or National levels but being explored
 - Intent of use in modelling differs

CanESM2 RCP85 21-yr mean temperature(C) change yr=2023 vs 1986-2005

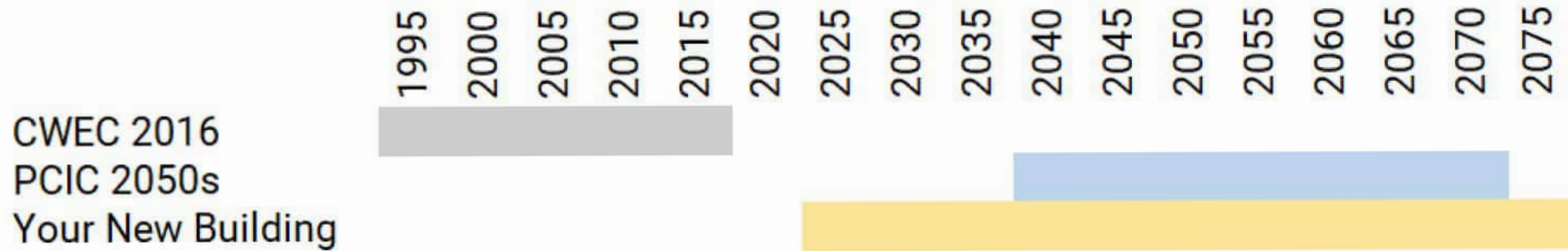


Overheating Analysis - Summary

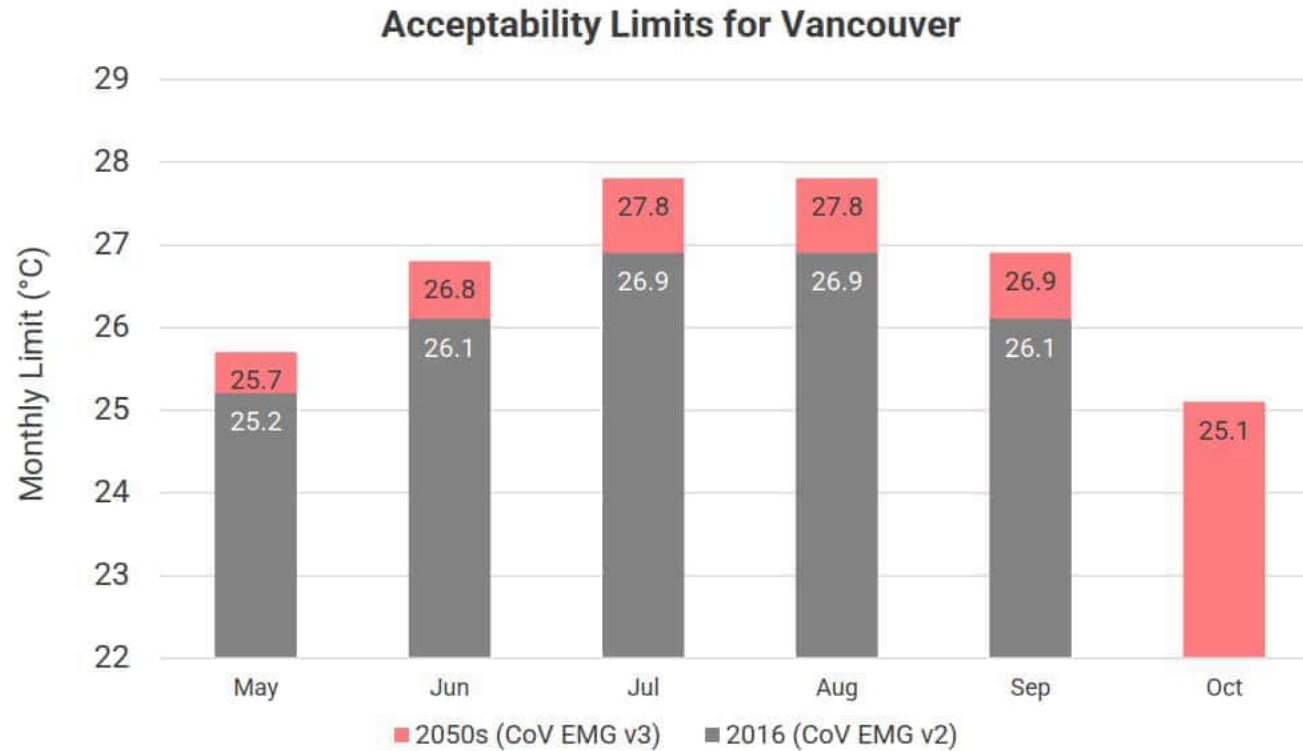
Change	Reason
<ul style="list-style-type: none">• <i>PCIC 2050s weather file</i>• <i>Standardized Occupant Behavior</i>• <i>Guidance on effective operable area</i>	<ul style="list-style-type: none">• Better represent overheating risk and thermal comfort under future conditions• Improve consistency
Impact on Compliance	
<ul style="list-style-type: none">• Additional simulation under 2050s file• Higher outdoor temperatures, higher temperature limits• Possible to comply with for 200 hours, not for 20 Hours• Less relevant – mandated cooling requirements	



Overheating Analysis – Weather Files



Overheating Analysis – Monthly Limits

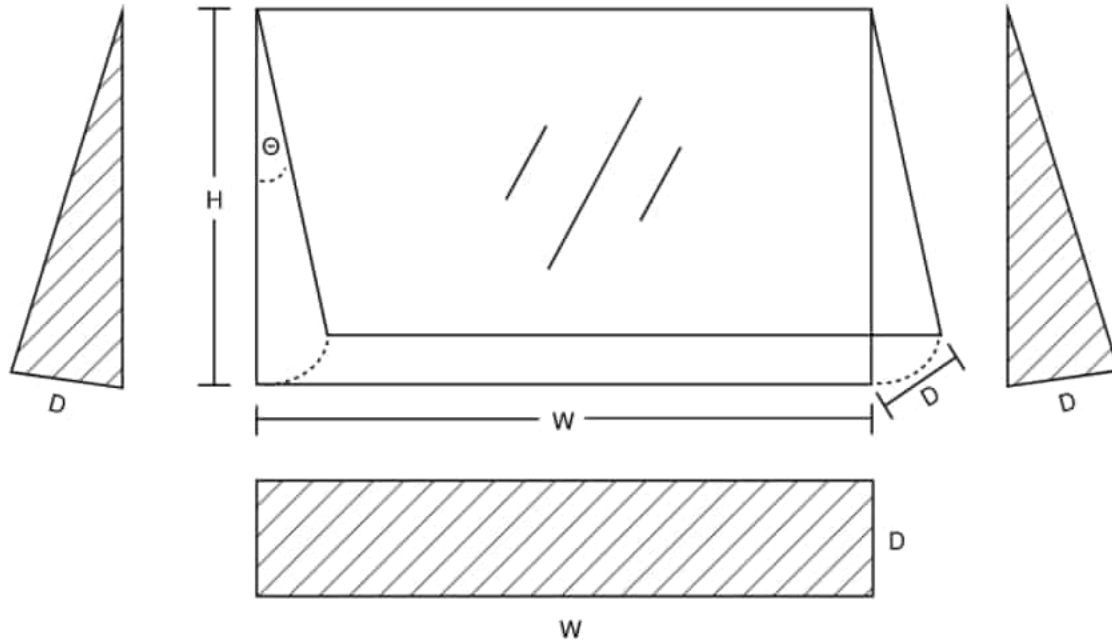


	Overheating Hours
CWEC 2016	81
PCIC 2050s	242



Overheating Analysis

Effective Operable Area



Considerations

- Type of opening
- Bug Screens
- Opening Limiters

Overheating Analysis

Standardized Occupant Behavior



Standard Behavior

- Windows open when inside $>22^{\circ}\text{C}$
- Windows close when temp outside $>$ inside
- Exhaust fans not used for cooling
- Patio doors not used for cooling
- Interior blinds/shades not modelled
- Exterior shades deployed when indoor temp $> 24^{\circ}\text{C}$

Resilience – Summary

Change	Reason
<p><i>To evaluate summer climate resiliency, buildings are to be evaluated for overheating hours as per Section 4, with mechanical cooling systems disabled.</i></p>	<ul style="list-style-type: none">• With mechanical cooling required, this metric encourages passive design• Provides owners and designers with information on building resilience in the event of power outages or equipment failure
Impact on Compliance	
<ul style="list-style-type: none">• No associated compliance requirement.	



Resilience – Metrics

CEDI

- Pros: already being used/ discussed
- Cons: not being reported consistently, mixed opinion on utility

Thermal Autonomy

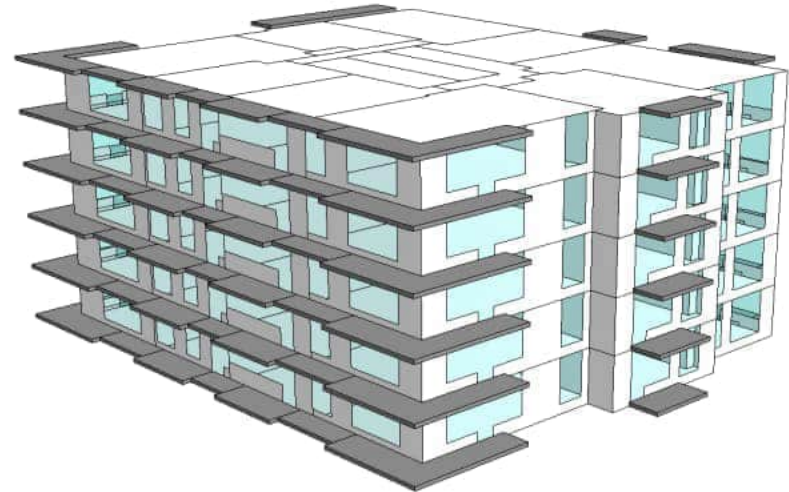
- Pros: metric calculated through published research
- Cons: brand new metric & process for evaluation; some parameters still not defined

Proposed Metric

- Evaluates at the room level
- BC modellers already familiar with the process & metric
- Intuitive; just turn the cooling off and see how the building performs

Resilience – Methodology

- Disable all mech cooling
 - Cooling coils, radiant systems, etc.
- Simulate as per Overheating section
 - Operable windows
 - Occupant Behavior
 - 2050s weather file



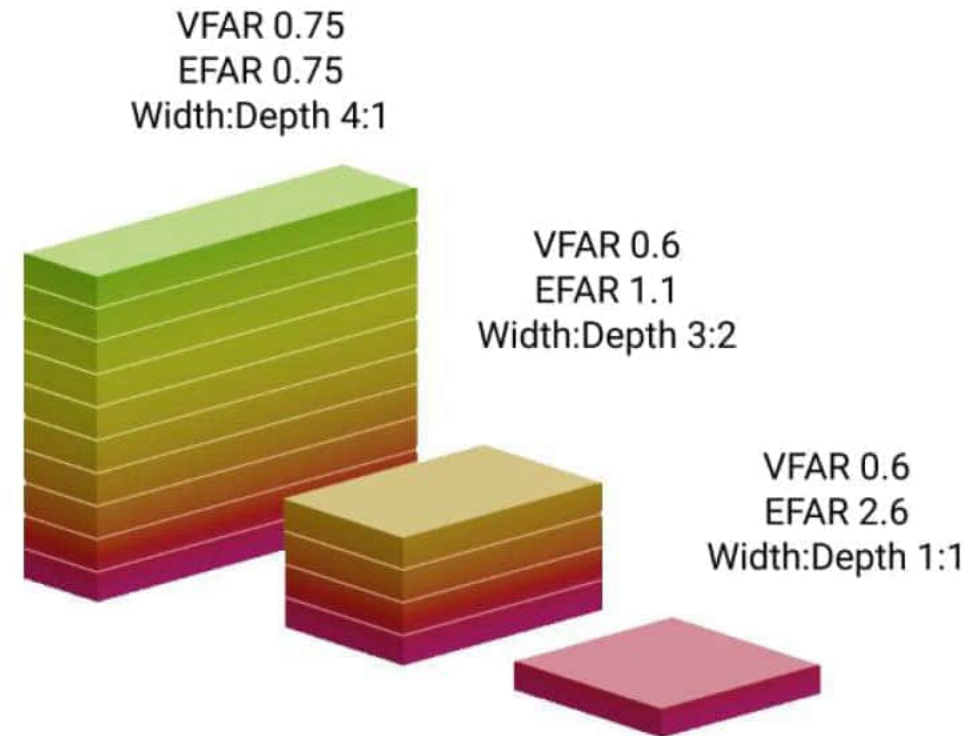
	May	Jun	Jul	Aug	Sep	Oct	Total
Temp Limit °C	25.7	26.8	27.8	27.8	26.9	25.1	
OH Hours							
Weather File	0	0	18	7	11	0	36
Average Suite	0	8	77	48	23	0	156
Worst Suite	2	15	108	91	26	0	<u>242</u>

Slim and Small Buildings - Summary

Change	Reason
<ul style="list-style-type: none">• TEUI and TEDI adjustment for specific slim and small buildings	<ul style="list-style-type: none">• Not feasible for some building forms to meet TEDI/TEUI requirements due to high envelope to floor area ratios
Impact on Compliance	
<ul style="list-style-type: none">• Less compliance issues for smaller buildings	

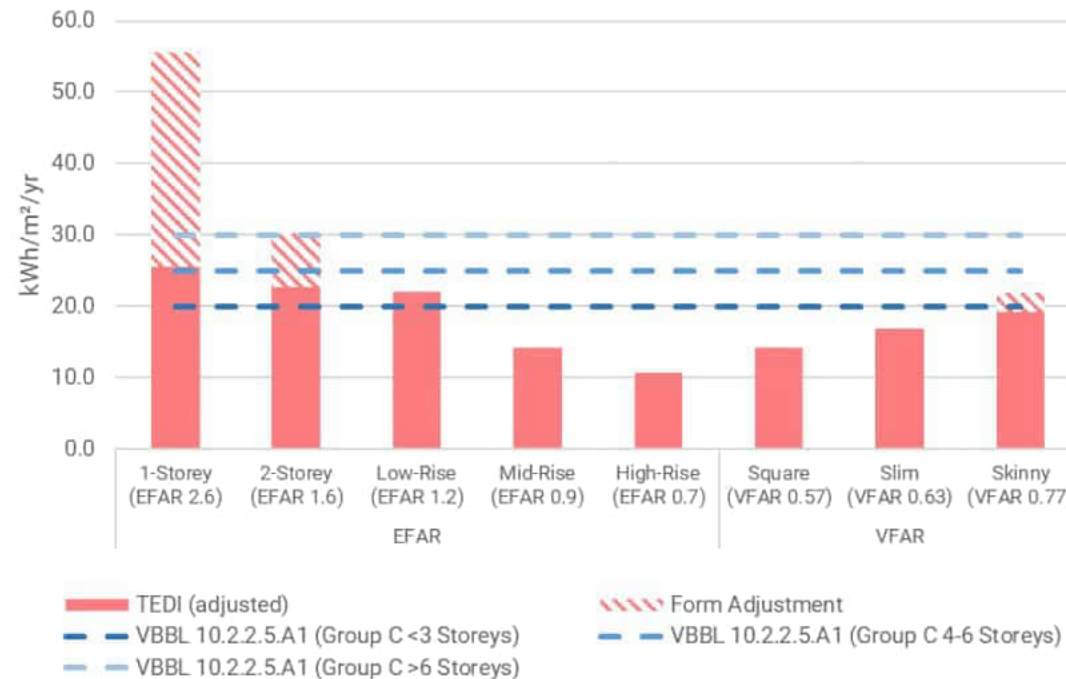
Slim and Small Buildings – cont.

- Considerations
 - Alternate compliance path not proposed through Guidelines changes
 - Additional modelling scope if reference-based approach used
 - Adjustment to not result in a worse building or make compliance easier



Slim and Small Buildings – cont.

- Example residential building with different building forms (EFAR, VFAR varied)
- Other inputs kept constant (infiltration, envelope, HVAC, internal gains)
- Intent to provide pathway for compliance, but not to make it easier for these building types



Slim and Small Buildings – Example

A small, 2 storey, stand alone convenience store building has

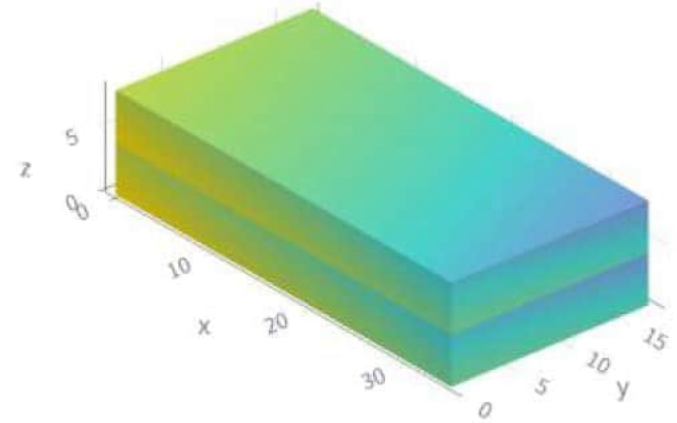
- 1220 m² modelled floor area
- 840 m² exterior above-grade wall area
- VBBL TEDI requirement of 20 kWh/m²a

$$\text{Small Building Adjustment} = 15 \cdot (3-2) \cdot (600/1200) = 7.4 \text{ kWh/m}^2\text{a}$$

$$\text{VFAR} = 840/1220 = 0.689$$

Not eligible for VFAR adjustment (< 0.70)

$$\text{Form Adjustment} = 7.4 \text{ kWh/m}^2\text{/yr}$$

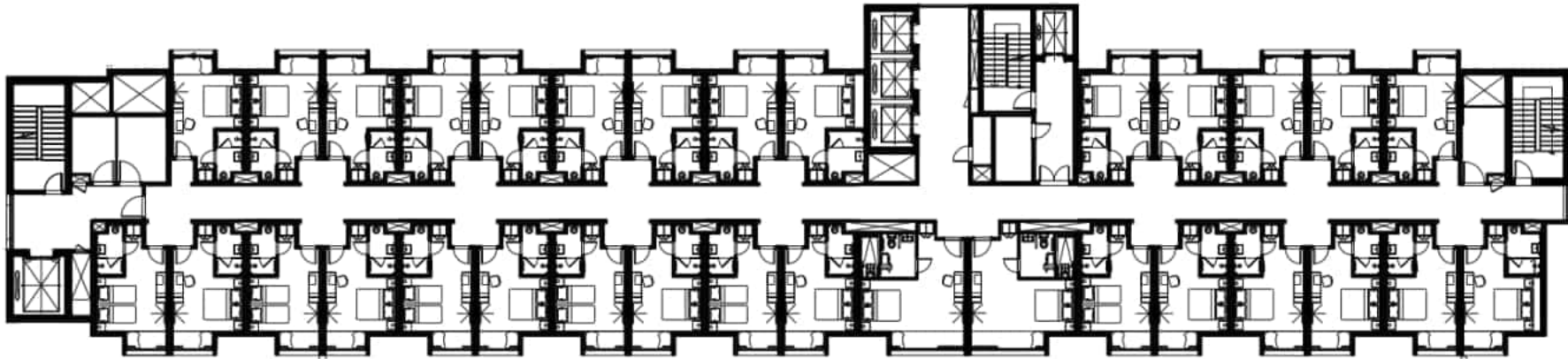


Corridor Adjustment - Summary

Change	Reason
<ul style="list-style-type: none">• <i>Reduction of adjustment maximum from 10 to 5 kWh/m²a</i>• <i>Removal of GHGI adjustment</i>	<ul style="list-style-type: none">• Reduce credit for excessive pressurization
Impact on Compliance	
<ul style="list-style-type: none">• Lower maximum adjustment, residential and hotel/motel projects only	

Corridor Adjustment – cont.

- Original adjustment in part transitional approach as building industry moves towards better airtight and compartmentalized designs
- Reported results not representative of actual TEDI and TEUI if adjustments are included
- No benefit to electrifying corridor ventilation heating if using a GHGI adjustment
- Clarification added: Corridor ventilation by HRVs also can claim credit



Modelled Floor Area - Summary

Change (Clarifications)	Reason
<p><i>INCLUDED IN MFA</i> Unconditioned spaces adjacent to vehicle parking areas are included in MFA, consistent with current definition.</p> <p><i>EXCLUDED FROM MFA</i> Crawlspaces and similar spaces which are not-full height, and not designed for regular access.</p>	<ul style="list-style-type: none">• Inconsistent industry MFA calculations• Explicitly clarify common areas of confusion
Impact on Compliance	
<ul style="list-style-type: none">• No associated compliance change.	



TEDI Heating Loads - Summary

Change	Reason
<p><i>Space and ventilation heating of enclosed vehicle parking areas and crawlspaces is to be included in the TEDI unless the heating setpoint is equal to or less than 7°C. This does not affect which areas are included in the MFA.</i></p>	<ul style="list-style-type: none">• Inconsistent approaches to calculation in industry• Provide explicit language where Guidelines differ from Step Code
Impact on Compliance	
<ul style="list-style-type: none">• No associated compliance change.	



TEDI Heating Loads– cont.

Considerations

- Significant heating loads in spaces excluded from the MFA
- Heating loads not clearly categorized under current guidelines
- Potential for excessive heating of non-MFA space if allowed to be excluded from the TEDI
- Cold climate freeze protection if Guidelines are referenced outside of Vancouver

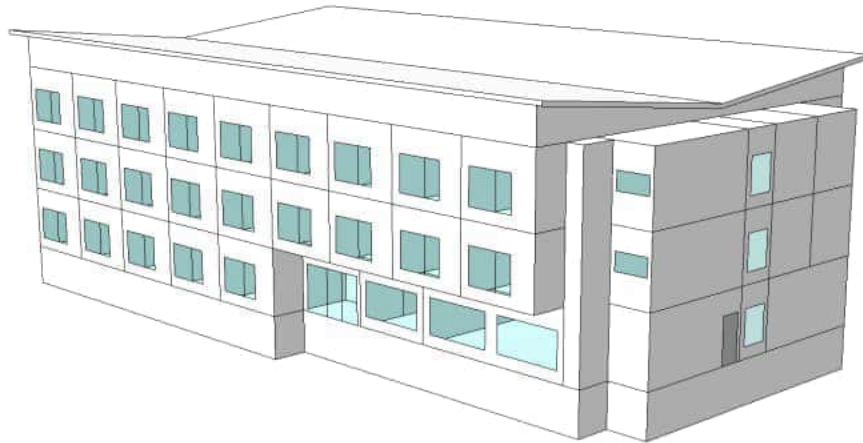


Airtightness & Infiltration - Summary

Change	Reason
<ul style="list-style-type: none">Removed tiered modelled infiltration dependent on TEDI requirement.Modelled infiltration is a design item, to be determined based on target airtightness test value. No longer "0.2 default"No change to calculations	<ul style="list-style-type: none">Modelled infiltration rates are arbitrary, not connected to the enclosure design
Impact on Compliance	
<ul style="list-style-type: none">Design narrative when $I_{75Pa} < 1.0$ L/s/m² targeted in design phase.Likely higher infiltration rates in models	



Airtightness & Infiltration – Story



Design (2018)

Façade Area	1050 m ²
Model Infiltration	0.2 L/s per m ² of façade (at op pressure)
Total Building Infiltration	210 L/s

Occupancy - Airtightness Test (2019)

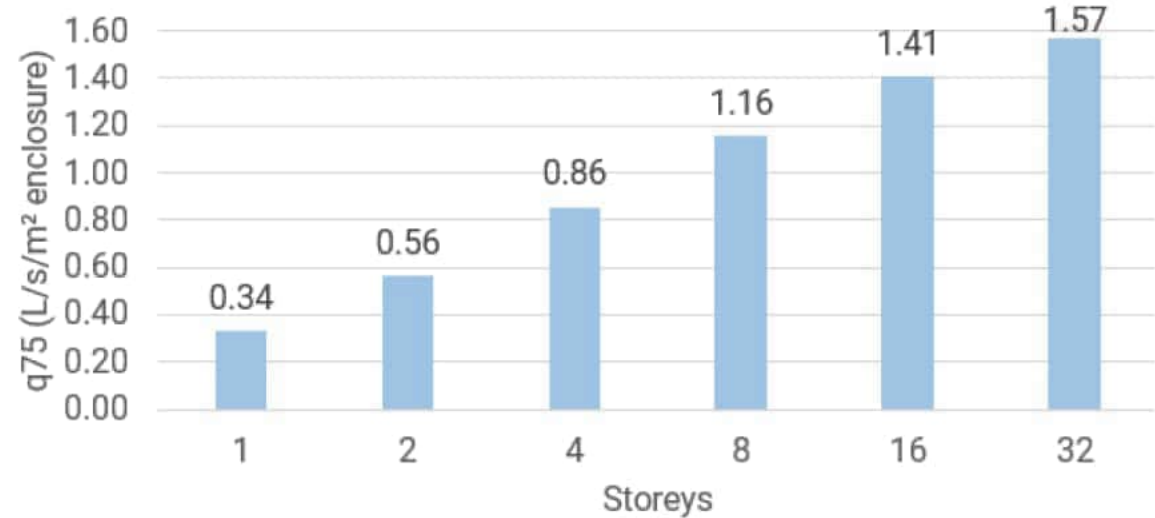
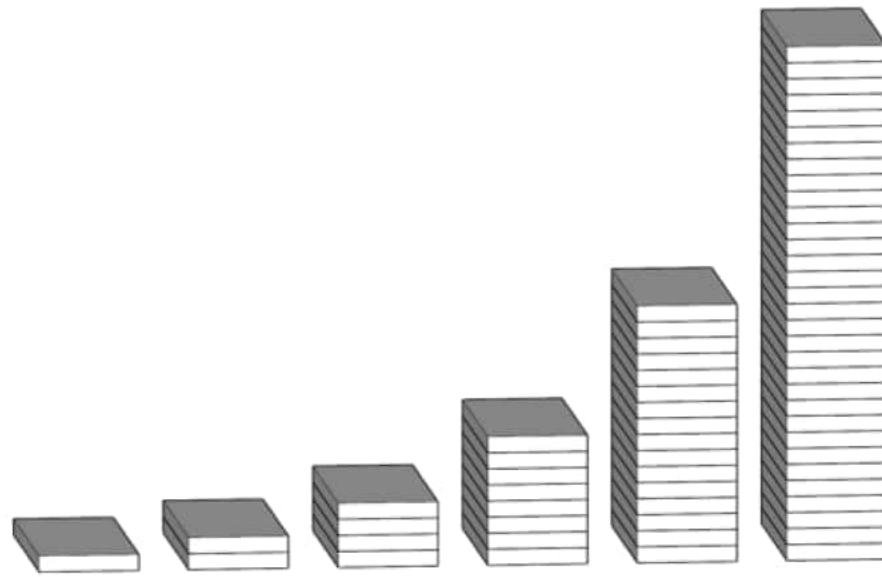
Exterior Floor Area	720 m ²
Façade Area	1050 m ²
Roof	720 m ²
Total Enclosure Area	2490 m ²

Airtightness Test Result	1.60 L/s per m ² of Total Enclosure at 75 Pa
--------------------------	--

Total Infiltration	446 L/s
Model Infiltration	0.42 L/s per m ² of façade

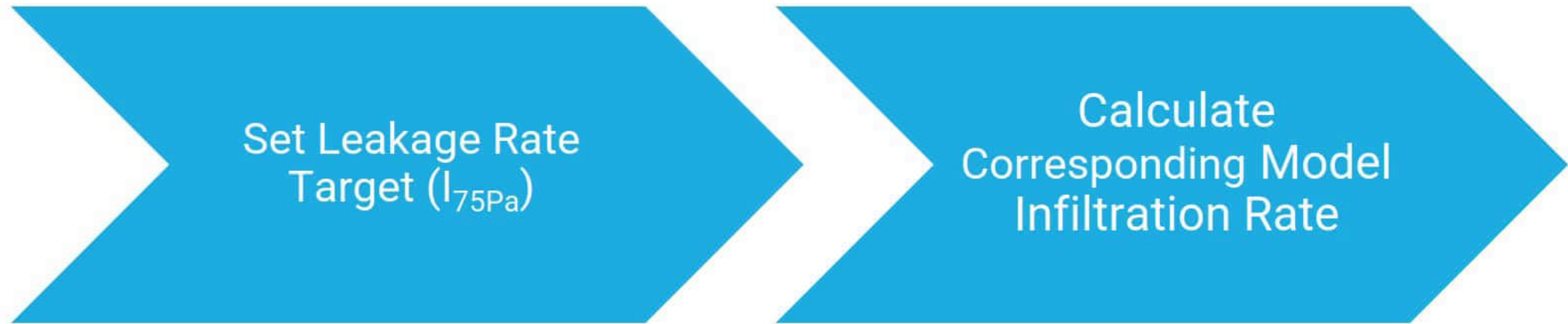
TEDI increased by 8.1!!!

Airtightness & Infiltration– cont.



NLR₇₅ Values for "Default" Infiltration

Airtightness & Infiltration New Process for Design Phase



- Air barrier design
- Enclosure engineer
- Team experience

Airtightness & Infiltration Example

Old Method

Design

Model Façade Infiltration Rate	0.20
Whole Building Airtightness @ 75 Pa	??

Using 0.20, not considering what whole building air leakage this corresponds to. Not connected to building design

Occupancy

Whole Building Airtightness @ 75 Pa	1.40
Modelled, Façade Infiltration Rate	0.28

Test result was ok but design infiltration was set too low. Project fails TEDI

New Method

Design

Targeted Whole Building Airtightness @ 75 Pa	1.50
Corresponding Model Façade Infiltration Rate	0.30

Project team sets a whole building air leakage target of 1.50 considering air barrier and project team experience.

Model infiltration rate is based on air leakage target and building geometry.

Occupancy

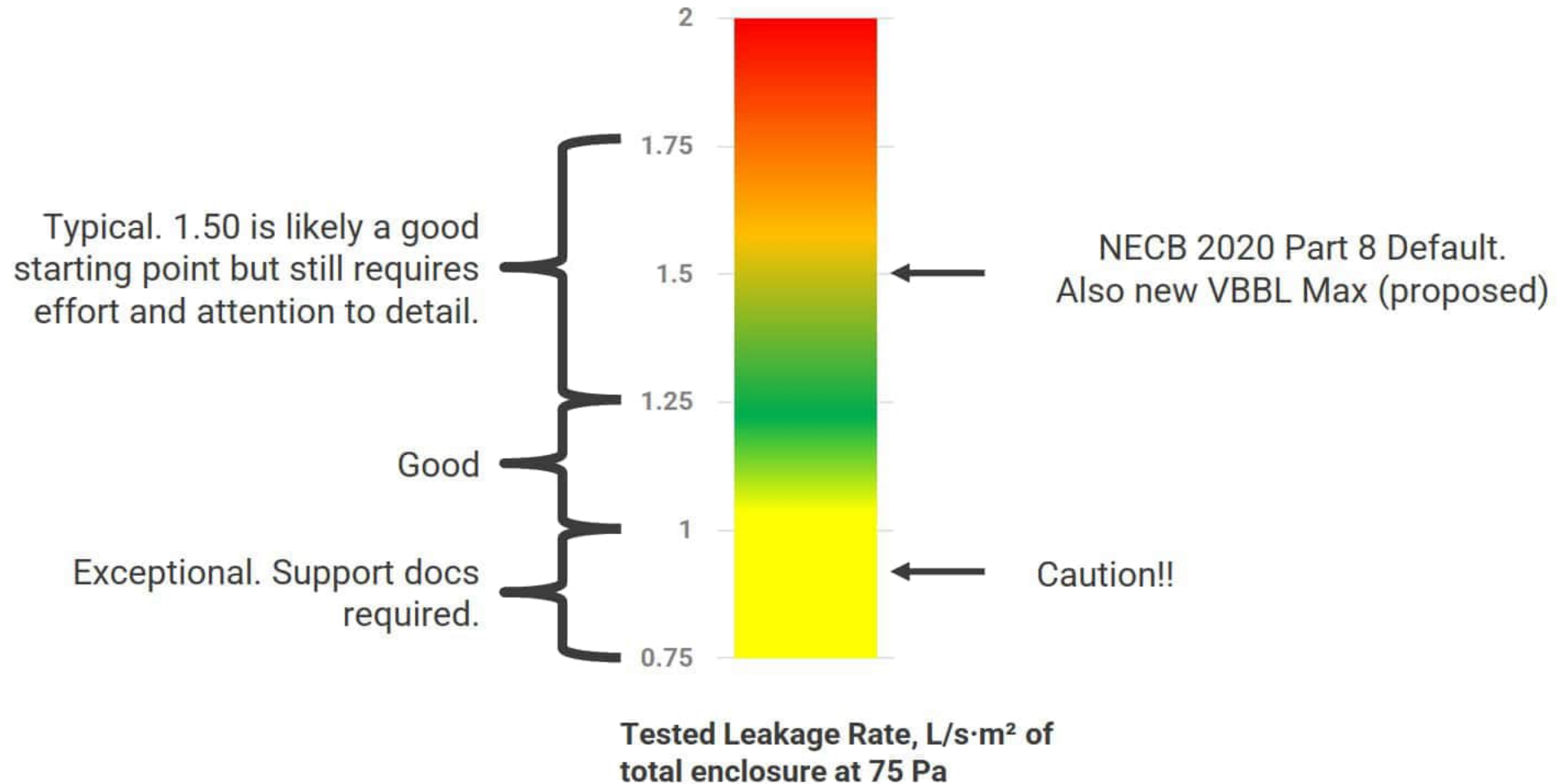
Tested Whole Building Airtightness @ 75 Pa	1.40
Modelled, Façade Infiltration Rate	0.28

Building tested against targeted leakage set in design and meets target.

Model updated and still meets TEDI requirement



Airtightness & Infiltration – Targets



Other Items - DHW

Change	Reason
<ul style="list-style-type: none">• Residential DHW base loads changing• FROM 0.0016 L/s per person• TO 500 W per person	<ul style="list-style-type: none">• Aligned with NECB 2020
Impact on Compliance	
<ul style="list-style-type: none">• 36% increase to DHW TEUI• More DHW heat pumps and claiming savings from low flow fixtures	



Other Items - CEDI

Change	Reason
<ul style="list-style-type: none">• Added definition for clarity	<ul style="list-style-type: none">• Improve consistency• May use CEDI in future requirement
Impact on Compliance	
<ul style="list-style-type: none">• None	



Other Items – GHGI-R

Change	Reason
<ul style="list-style-type: none">• GHGI-R definition added (from existing CoV Rezoning documents)• Annual equivalent GHG emissions from refrigerant leakage.• Reported separately from current GHGI	<ul style="list-style-type: none">• Future considerations
Impact on Compliance	
<ul style="list-style-type: none">• None, no requirement yet	



Other Items – Elevators

Change	Reason
<ul style="list-style-type: none">• Now using BC Hydro / CleanBC loads and schedules	<ul style="list-style-type: none">• More realistic elevator energy• Industry feedback
Impact on Compliance	
<ul style="list-style-type: none">• Significant increase to elevator energy use (~2-4x depending on building type and height)	



Other Items – Commercial Kitchens

Change	Reason
<ul style="list-style-type: none">• Commercial kitchens and related dining areas can be modelled as separate occupancy (EMG Mixed Use)• Allows for these large loads to be compared to NECB 2020 Baseline instead of archetype TEDI/TEUI	<ul style="list-style-type: none">• Clarification that commercial kitchens are not part of Archetype Buildings• Avoiding issues where commercial kitchen can skew building results
Impact on Compliance	
<ul style="list-style-type: none">• Less issues with trying to fit commercial kitchen in a fixed Archetype TEDI/TEUI	



Other Items – Hydronic Sub-Metering

Change	Reason
<ul style="list-style-type: none">Removed TEUI penalty for not having sub-metering of hydronic heating systems	<ul style="list-style-type: none">Want to promote air-source heat pump central heating plants, not penalize themWas not a significant barrier or driving changeSimplifies reporting
Impact on Compliance	
<ul style="list-style-type: none">Minimal	

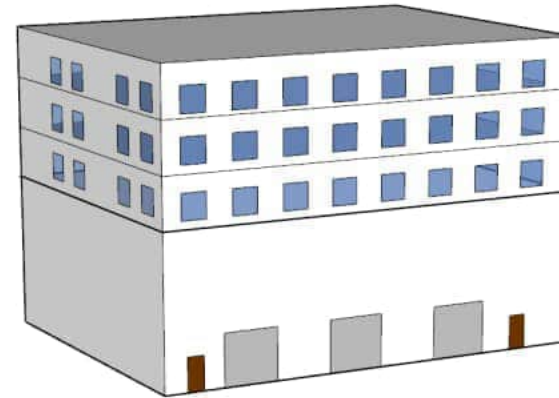


Other Items – NECB 2020

Change	Reason
<ul style="list-style-type: none">• Referenced NECB version updated from 2015 to 2020• Clarified that NECB 2020 Ref buildings do not have envelope de-rated• Clarified airtightness for NECB 2020 models	<ul style="list-style-type: none">• Updates to align with VBBL adoption of NECB 2020• Alignment with national code and BCBC
Impact on Compliance	
<ul style="list-style-type: none">• Increased performance requirements for buildings comparing to NECB	

Other Items – NECB 2020, Example

- Warehouse building with Office
- Mixed-Use Building (EMGs section 5)
- Office TEDI and TEUI per VBBL
- Warehouse TEDI and TEUI per NECB 2020 Reference Model



Occupancy	Total Enclosure Area (m ²)	Façade Area (m ²)	Targeted or Tested Leakage Rate (L/s·m ² at 75 Pa)	Conversion from Tested to Operating	Infiltration L/s·m ² Façade
Warehouse NECB Ref	1310	810	1.50	NECB 2020	0.48
Warehouse	1310	810	1.20	NECB 2020	0.38
Office	1310	810		CoV	0.22

Discussion and Questions

11:40 to 11:55

Wrap Up

11:55 TO 12:00

Thank you

for your time & commitment!

From: "Li, Charling" <charling.li@vancouver.ca>
To: "Danny Taylor" <danny@focaleng.com>
"Susan MacDougall" <susan@focaleng.com>
"Riley Beise" <riley@focaleng.com>
CC: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
Date: 5/9/2024 4:30:00 PM
Subject: RE: CoV v3 Report and Guidelines
Attachments: PDS - SUS - Energy Modelling Guidelines v3.0 - 240408-cl.docx
23009 240410 CoV EMG v3 Recommendations - Draft- CL
edits.docx

Hi Focal team,

Thanks for your patience as I made my way through this very thorough draft final report – see attached! I have mostly minor changes, with the exception of the compliance weather files.

As discussed, please update your recommendation for the NRC weather files, and **provide an estimate of additional scope** to complete modeling impacts of this recommendation on TEDI + TEUI for a reasonable number of buildings that Focal has access to and can provide by mid to late June. I'm looking mostly for low and high-rise residential or mixed use buildings, with a few office or commercial archetypes if these are available within the set of models you already have access to. If possible I'd like to have the proposed scope in the next week to confirm. Since this draft text of the Draft v3.0b out is expected to be out for public review as part of the 2025 VBBL package by end of May, I'd like to have your specific NRC recommendation in the text **by May 24**. During the review period (June-July) hopefully you are able to work on building the dataset of TEDI/TEUI impacts based on the NRC weather files and any changes you need to make to the final report text. **Please let me know if that is feasible!**

One last minor thing is to please update your version of the proposed text for the EMGs as draft version 3.0a (to differentiate it from the previously published v3.0 and the soon to be released for public comment v3.0b).

Thanks,
Charling

From: Danny Taylor
Sent: Monday, May 6, 2024 12:17 PM
To: Li, Charling
Cc: Riley Beise ; Enright, Patrick ; Susan MacDougall
Subject: RE: CoV v3 Report and Guidelines

City of Vancouver Warning - This message is from an external sender

Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Report Suspicious

Hi Charling,

We could certainly expand on the analysis for the NRC file which we're pivoting to (unless the upcoming PCF Scott mentioned says otherwise). It likely wouldn't be for the full gamut of the Metrics Archetypes, but could be expanded for a more types of building shapes, constructions, target performances, and occupancies to get a better idea of a typical impact. We expect the same general trend to apply to the other buildings, but agree more data points would be good here.

We also were just now discussing the option of looking at the NRC +1.0 file instead of +0.5 which will likely closer match the current CWEC file TEDI results, if that's something you wanted to discuss. Different methodologies, but the PCIC 2020s file falls roughly in the middle between the NRC +0.5 and +1.0 intended time periods. If it works for you, we can wait until the your other minor edits then update the weather analysis with these changes, and any other sections this would impact.

Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>
Sent: Friday, May 3, 2024 5:04 PM
To: Susan MacDougall <susan@focaleng.com>; Danny Taylor <danny@focaleng.com>
Cc: Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3 Report and Guidelines

Hi folks,

I'm almost through reviewing the final report draft and only have a few minor edits; however the only significant item is the update of the recommendation for the weather files from PCIC to NRC as discussed with Riley and Danny last week. I'm happy to move to the NRC files in anticipation of alignment with national code in the future. The only hesitation for me is the how the NRC +0.5C files (assuming this is the recommendation for compliance, instead of PCIC 2020s files – please confirm) shows an increase in both TEDI and TEUI in Table 3 (+8% and +5% respectively). As NRC +0.5C files may make compliance appear *slightly* more difficult (based on dataset of 1!), I'd be more comfortable if we had a few more data points to understand what NRC+0.5C means to more projects, and it may impact whether we make any changes to the corridor pressurization adjustment or not.

Looking forward to hearing your thoughts on this, whether you think that NRC+0.5C is expected to have that same general increase to TEDI/TEUI for more projects, or how many more data points you might have access to.

I'll follow up on Monday and we can talk more.

Thanks and have a great weekend!

Charling

From: Susan MacDougall <susan@focaleng.com>
Sent: Thursday, April 11, 2024 8:56 AM
To: Danny Taylor <danny@focaleng.com>; Li, Charling <charling.li@vancouver.ca>
Cc: Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3 Report and Guidelines

Hi Charling and Patrick,

I wanted to echo Danny's thanks for choosing our team, working with us through so many challenging areas, and being flexible with the schedule.

It's been an interesting project but also very gratifying... I shared this with Riley and Danny already, but in 2022 I gave a keynote presentation at eSIM on how BC was doing 4 years into the Step Code and highlighted successes and challenges. I re-visited it this week as I'm preparing slides for AIBC (want to show improvement over older projects) and when I stumbled upon the challenges slide, I realized that all of the items listed have been addressed by the proposed EMG! Thought that was a nice realization right as we wrap this up ☺

Look forward to your final comments and getting this one out to industry! Best,
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Danny Taylor <danny@focaleng.com>
Sent: Wednesday, April 10, 2024 5:20 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3 Report and Guidelines

Thanks for all your work also! We're excited to have this close to the finish line.

Danny Taylor, CPHC

Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>
Sent: Wednesday, April 10, 2024 1:28 PM
To: Danny Taylor <danny@focaleng.com>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3 Report and Guidelines

Received, thanks to the whole team for your hard work and perseverance! I'll do my best to get back to you with comments in the next two weeks.

Cheers,
Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Wednesday, April 10, 2024 12:33 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: CoV v3 Report and Guidelines

Hi Charling,

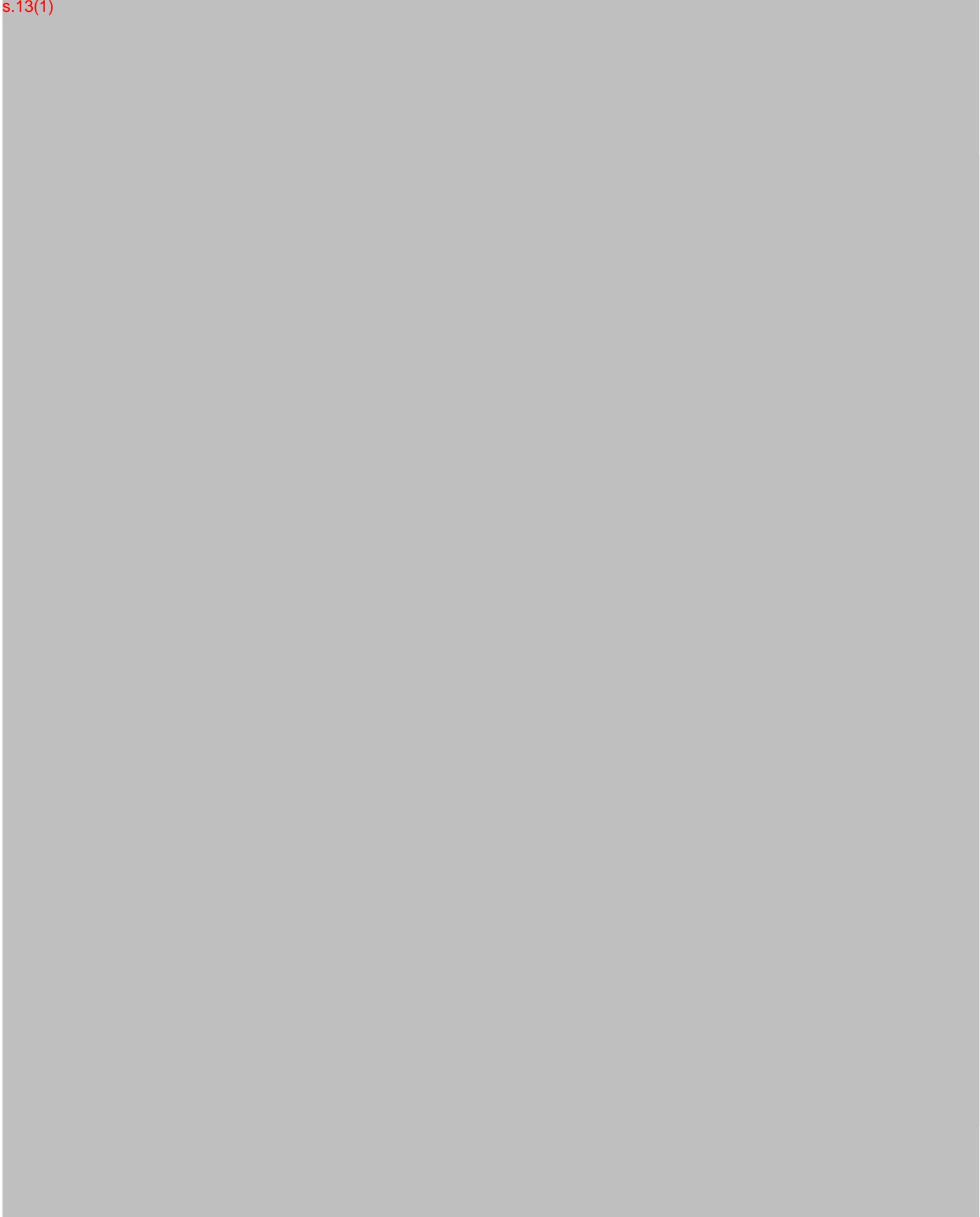
See the Sharepoint link below for the Recommendations Report (Word and PDF) and red-lined Guidelines document. Once you've had a chance to do a final review and read through let us know if you have any final adjustments and comments, and we can wrap it up and provide the signed and finalized report.

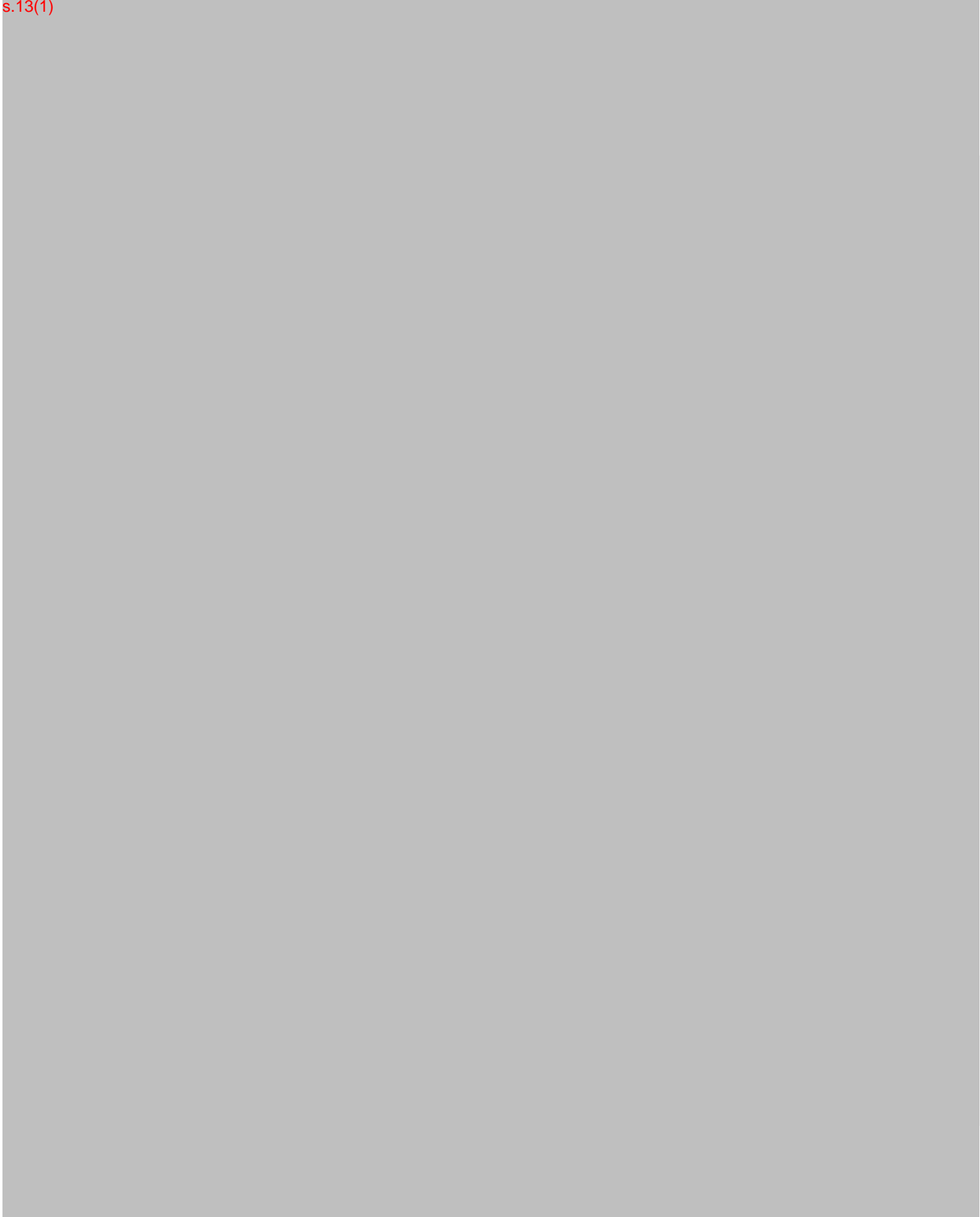
Let us know if you questions, want to schedule a meeting or call to go over anything, or have any issues accessing the files.

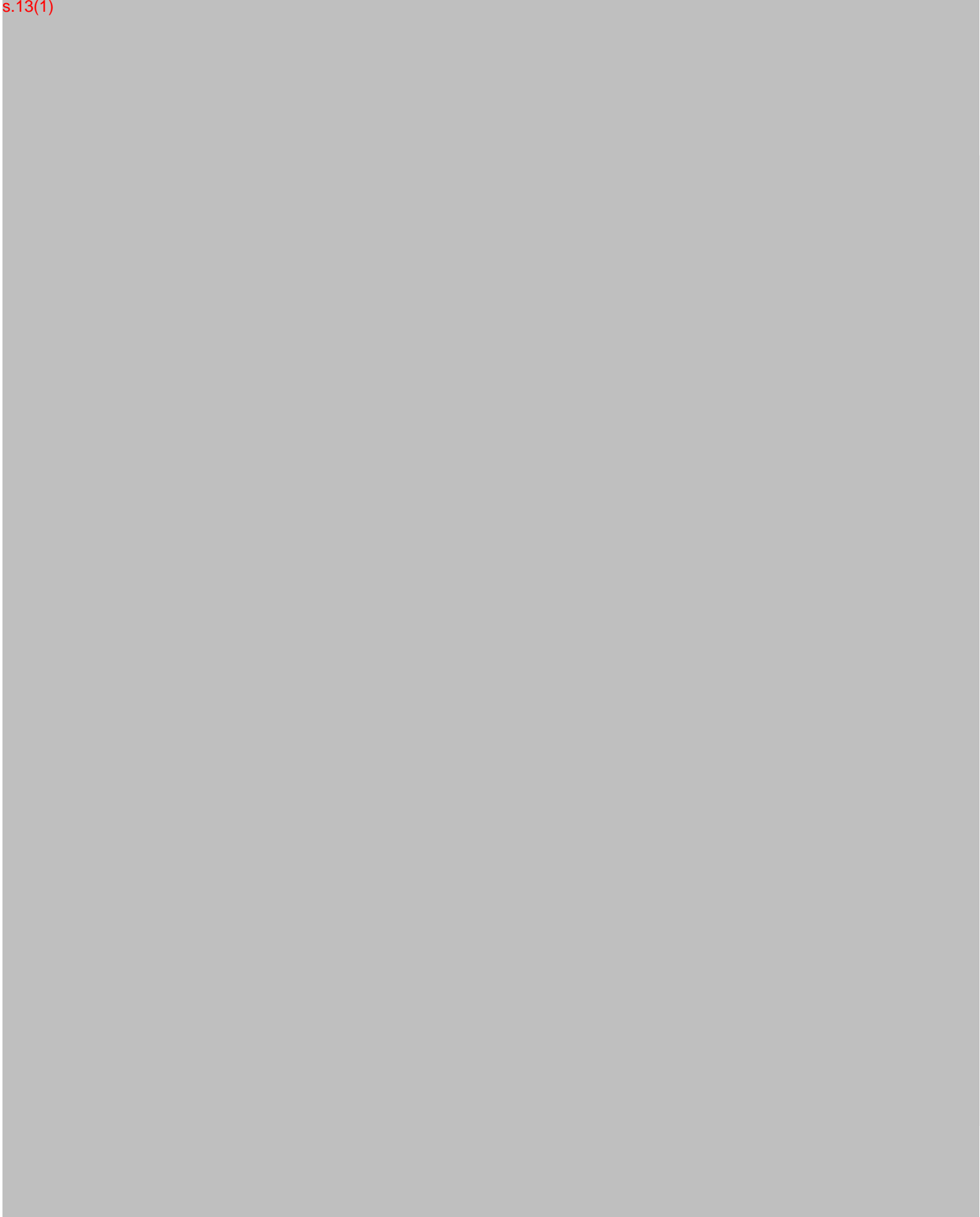
 [240410 Report and Guidelines \[focaleng.sharepoint.com\]](https://focaleng.sharepoint.com)

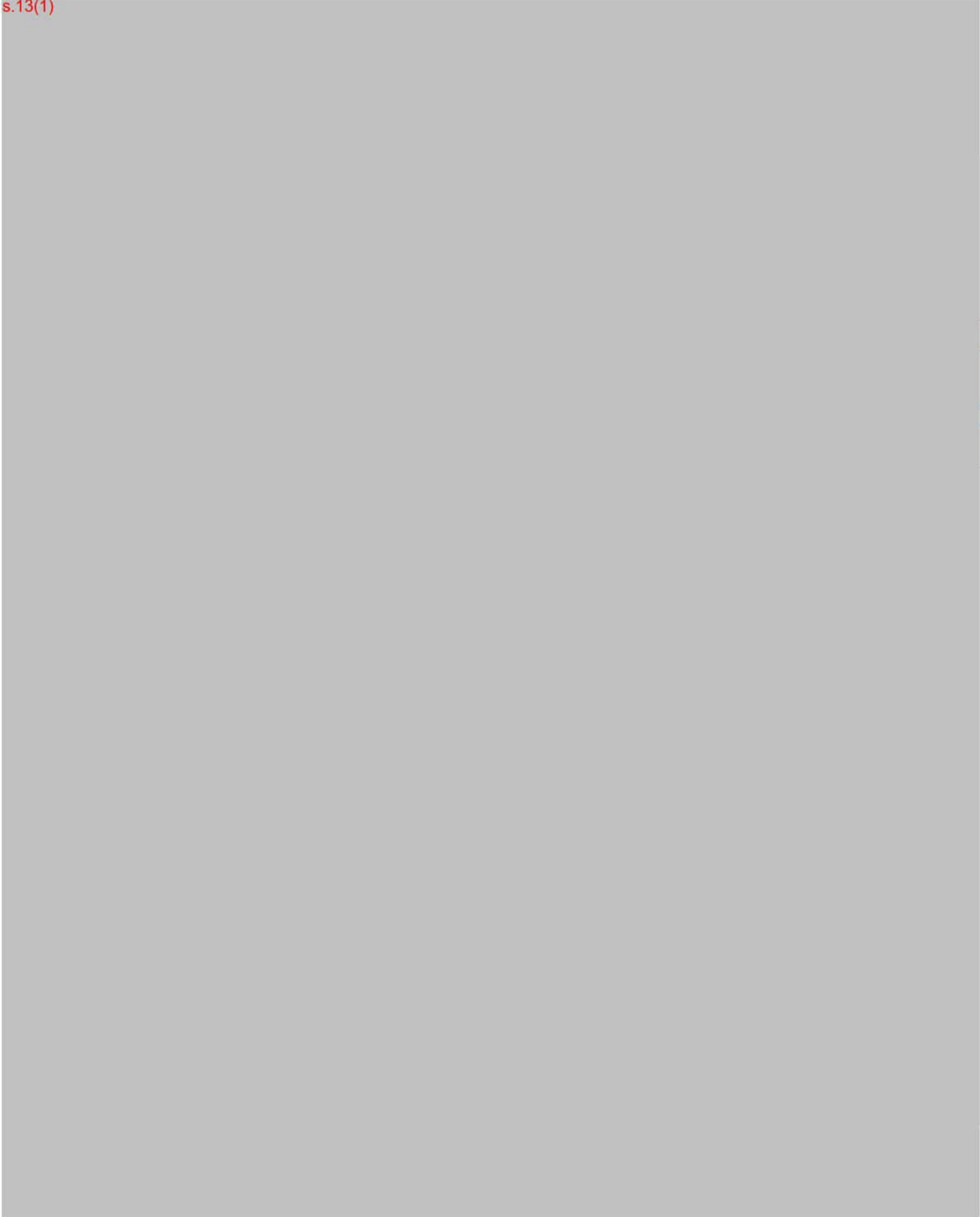
Danny Taylor, CPHC
Associate | he/him
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danny@focaleng.com

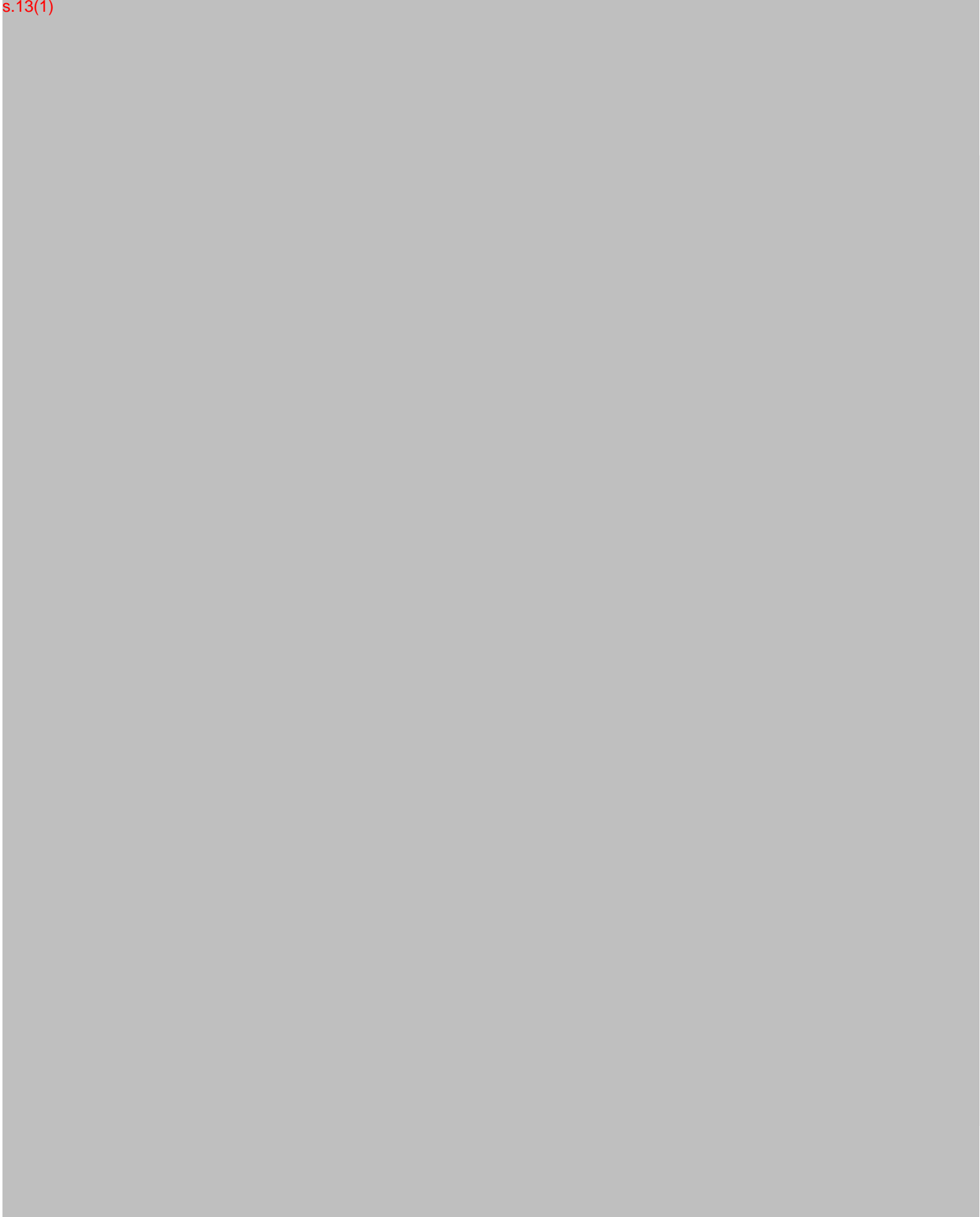


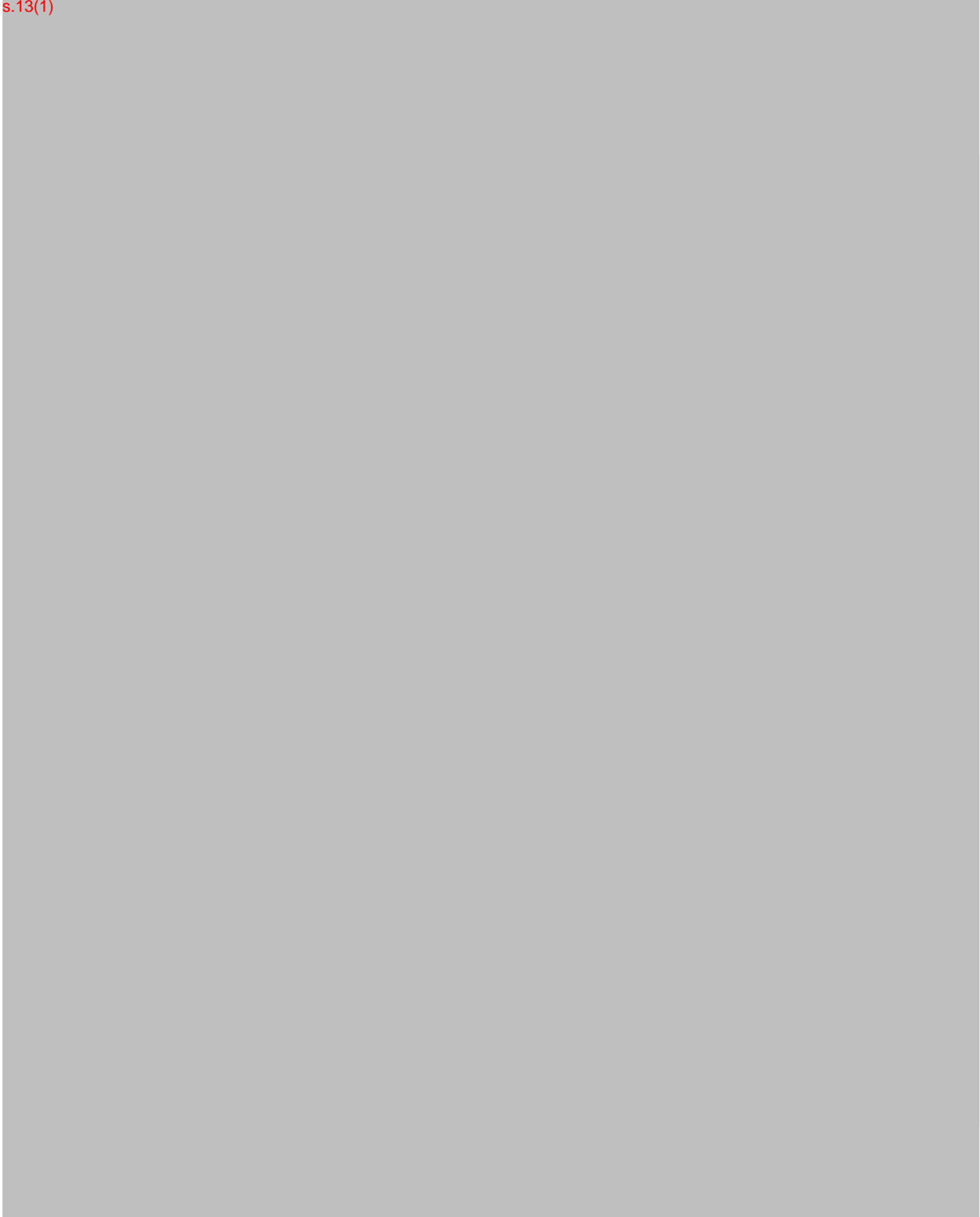


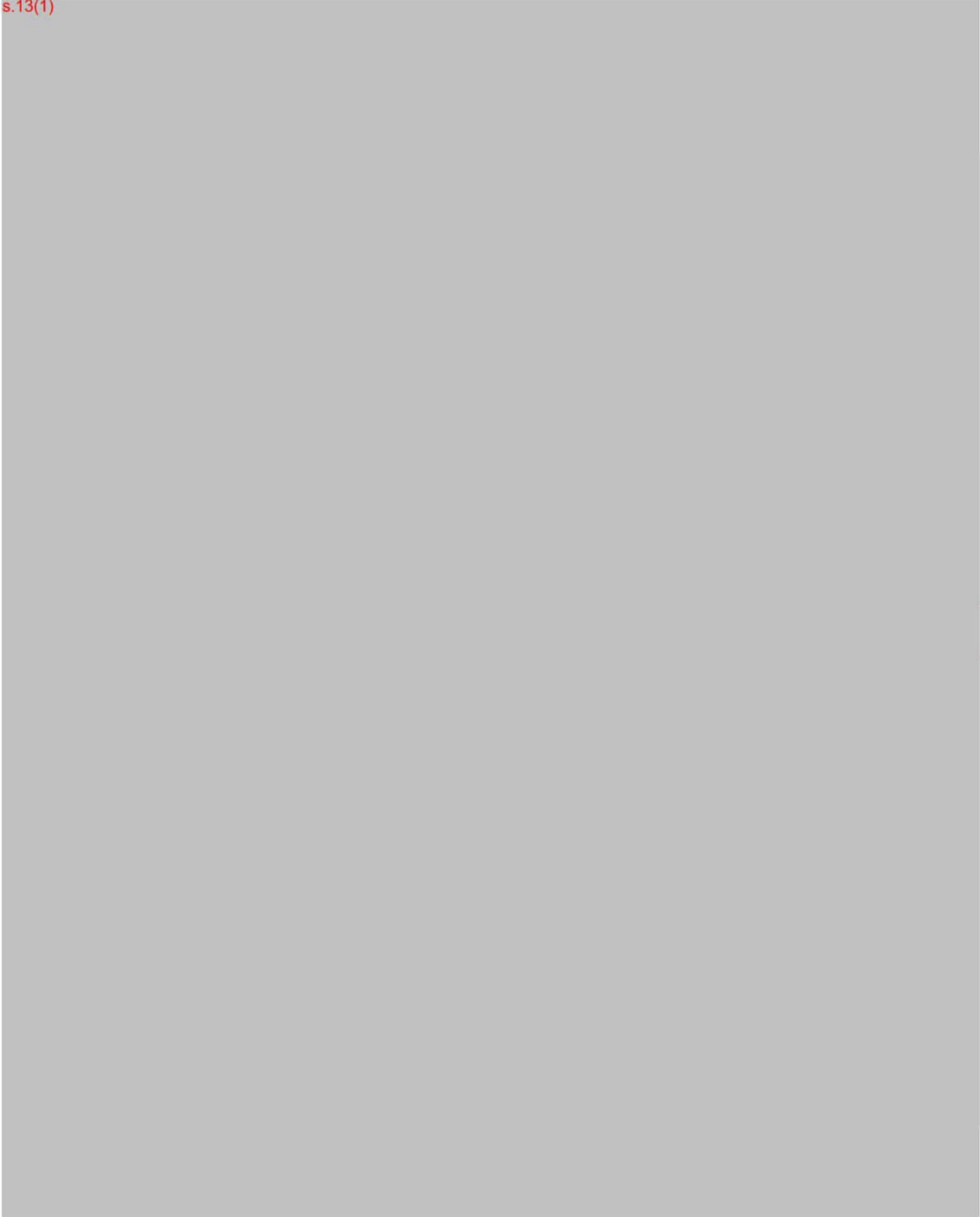


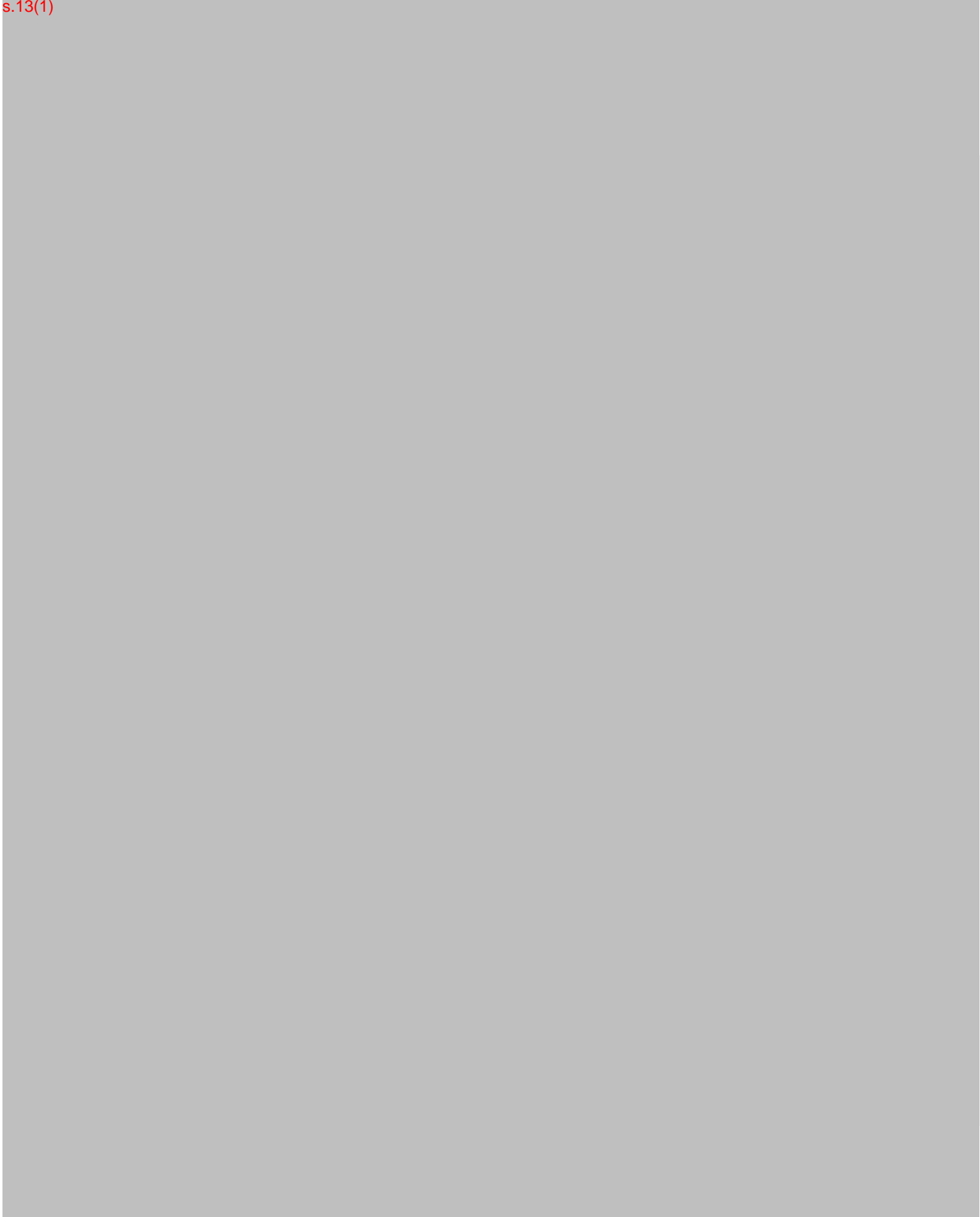


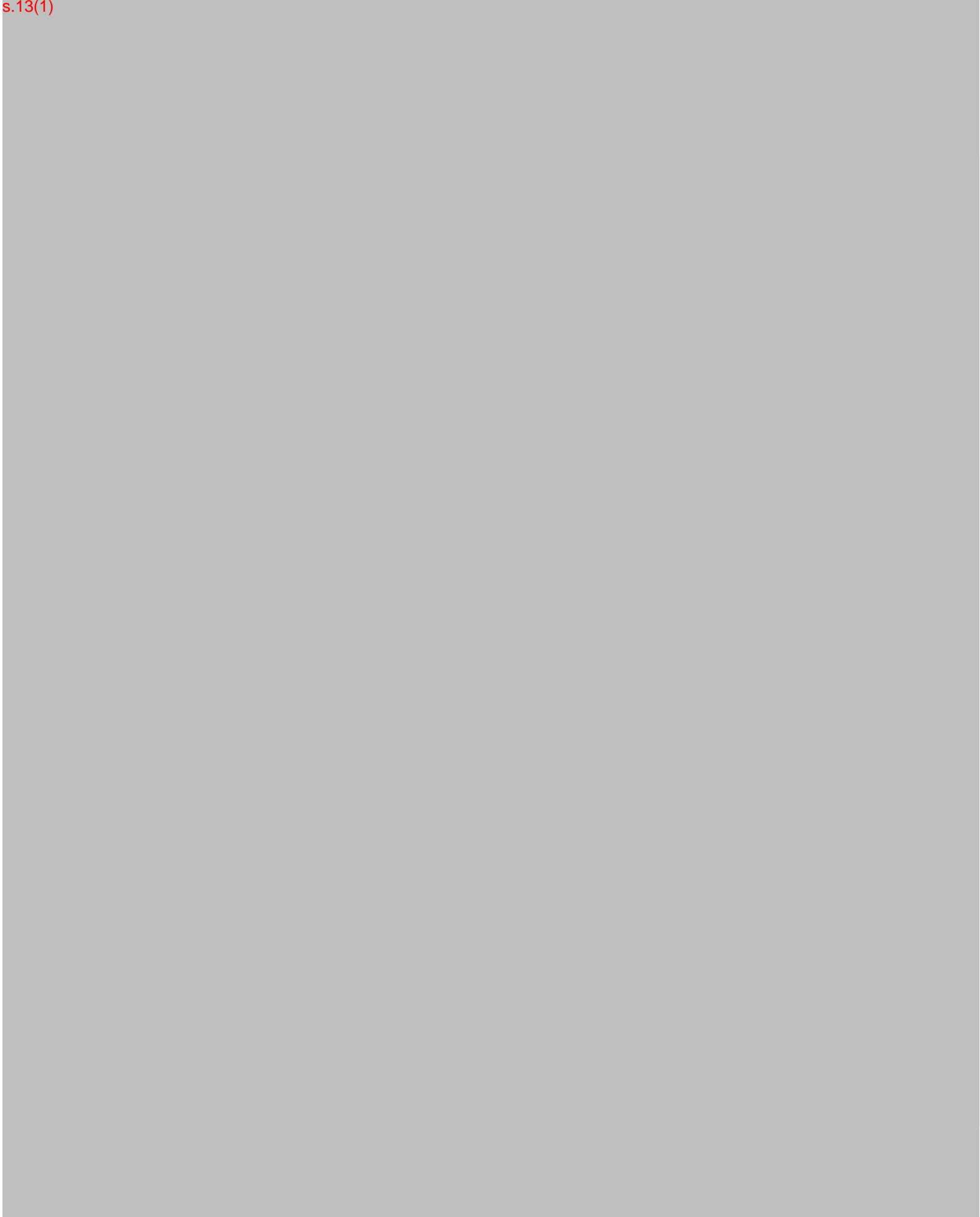


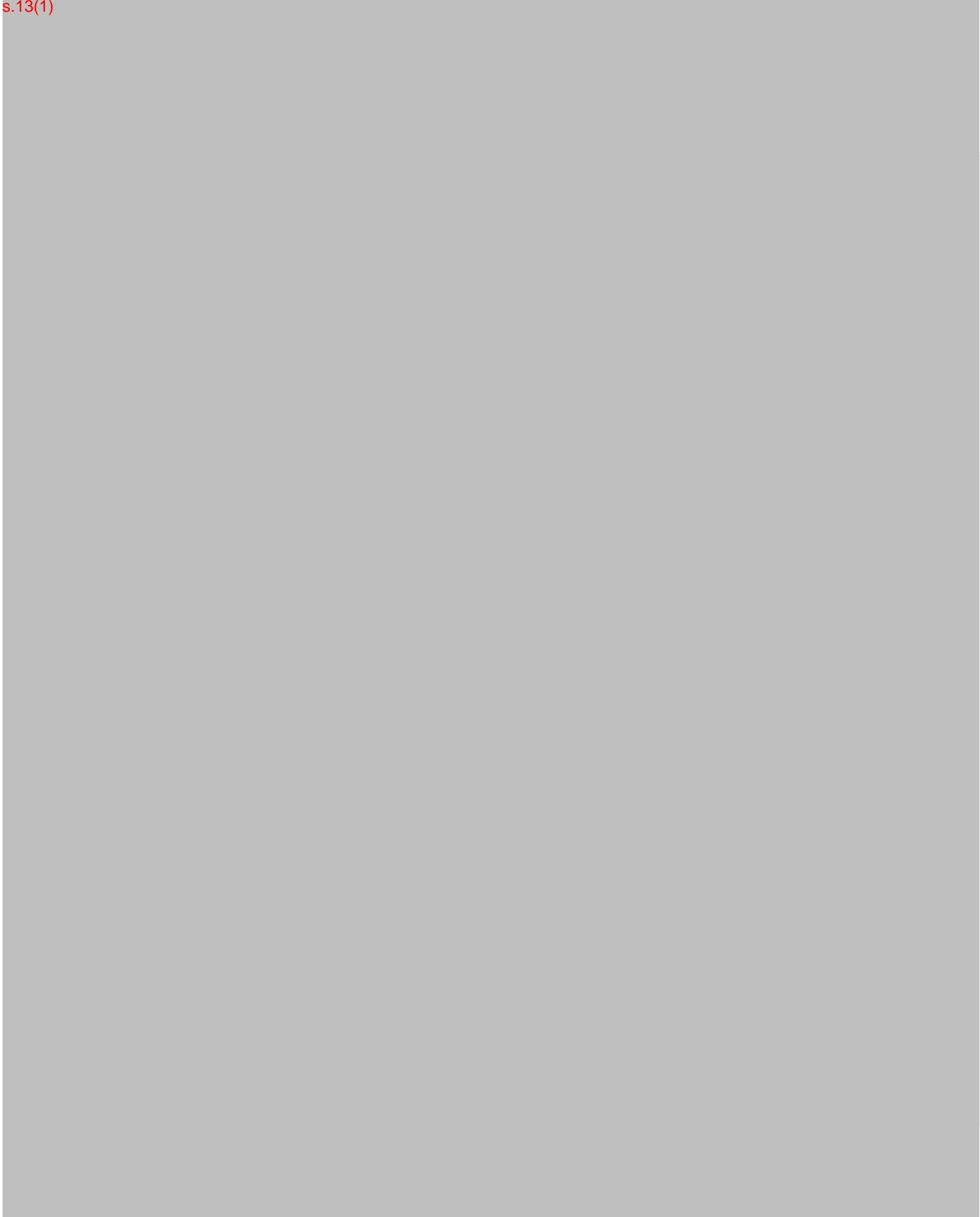


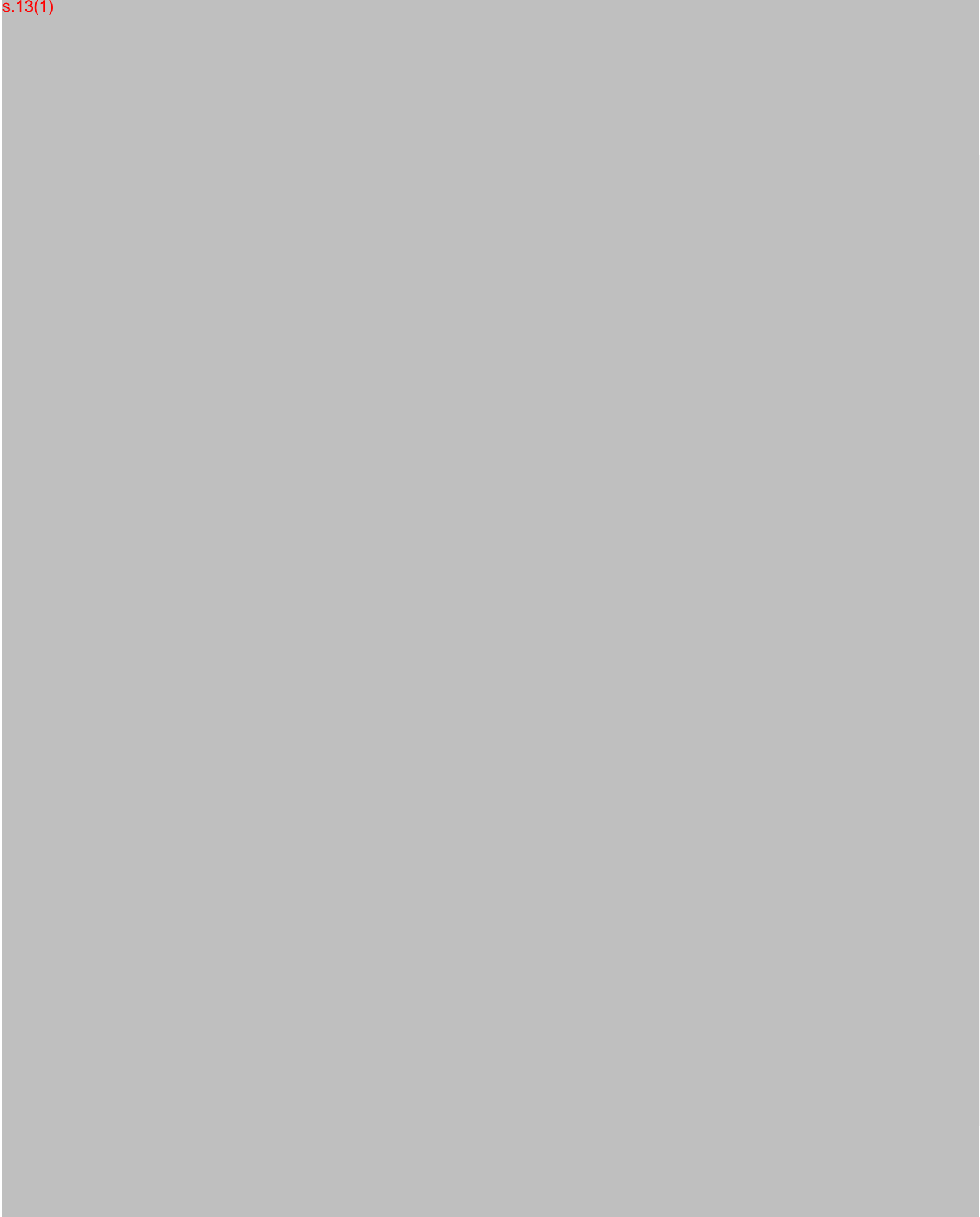


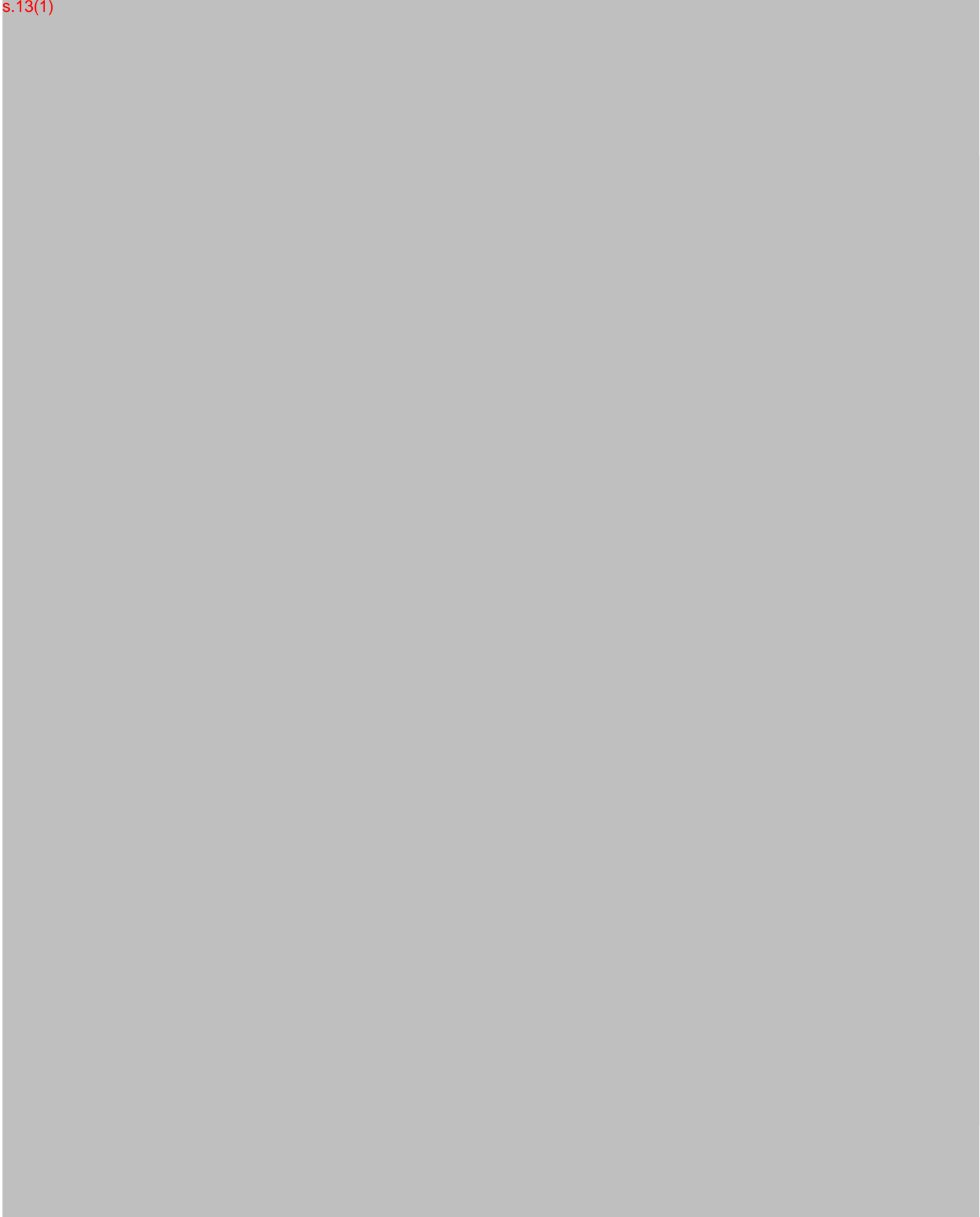


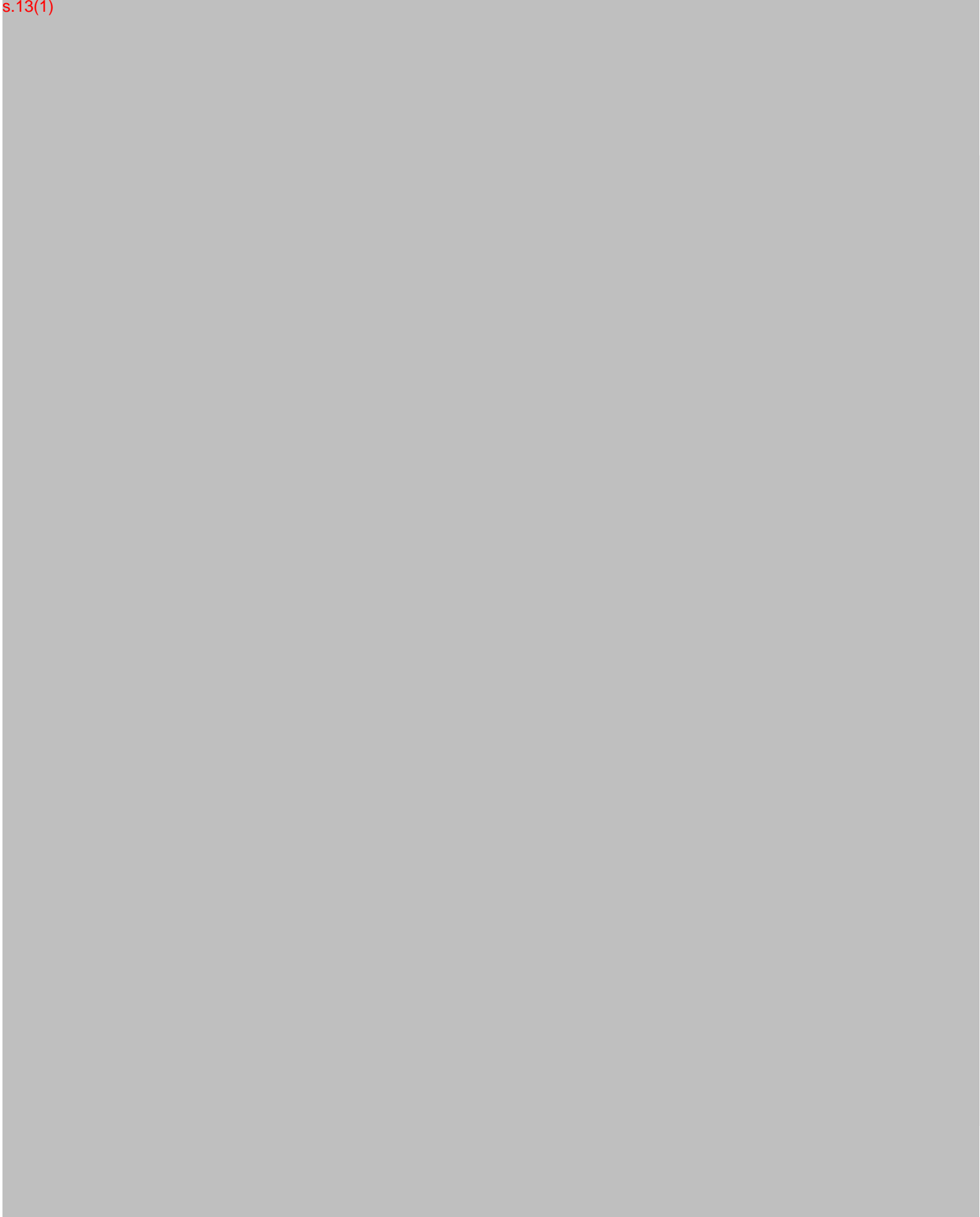


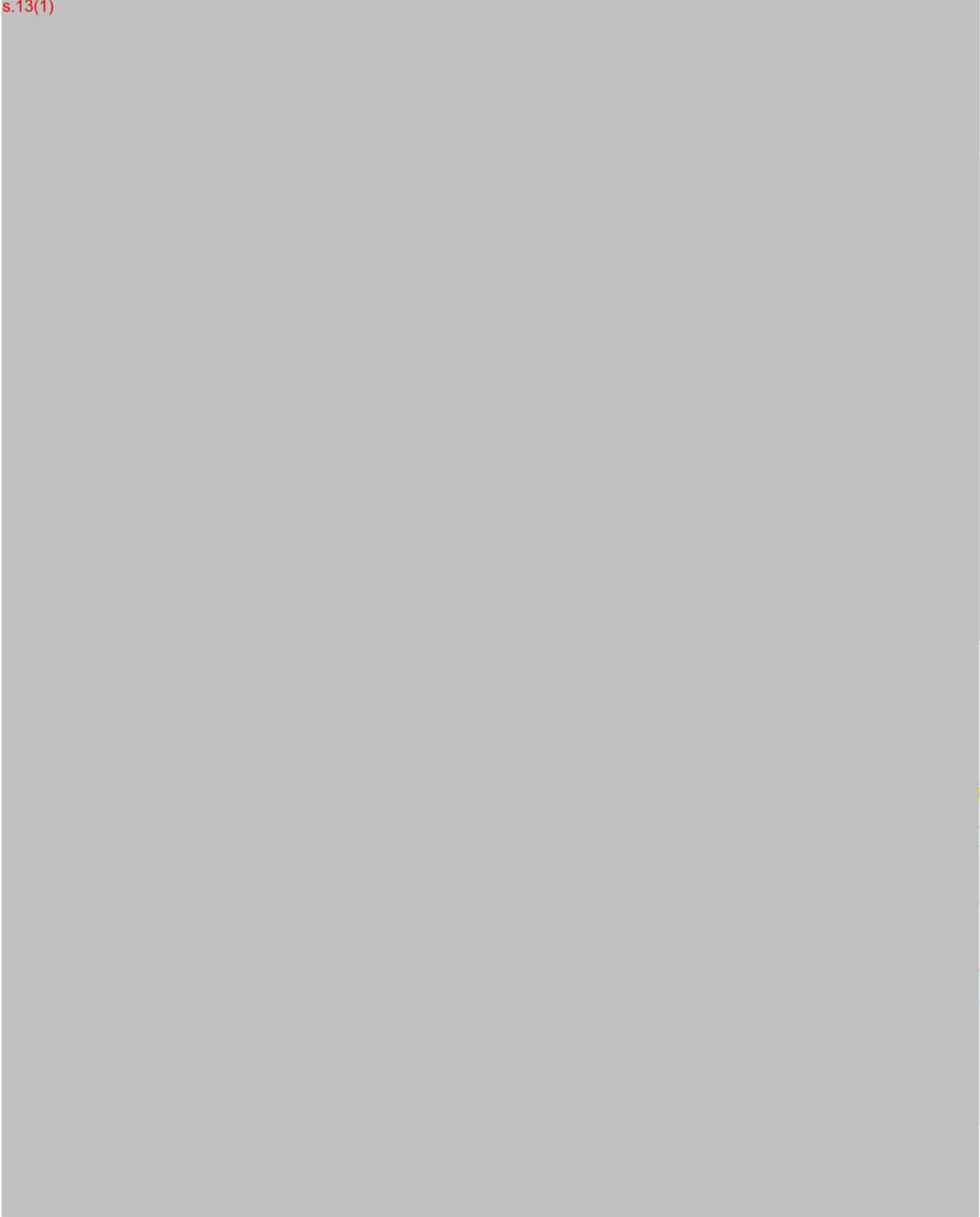


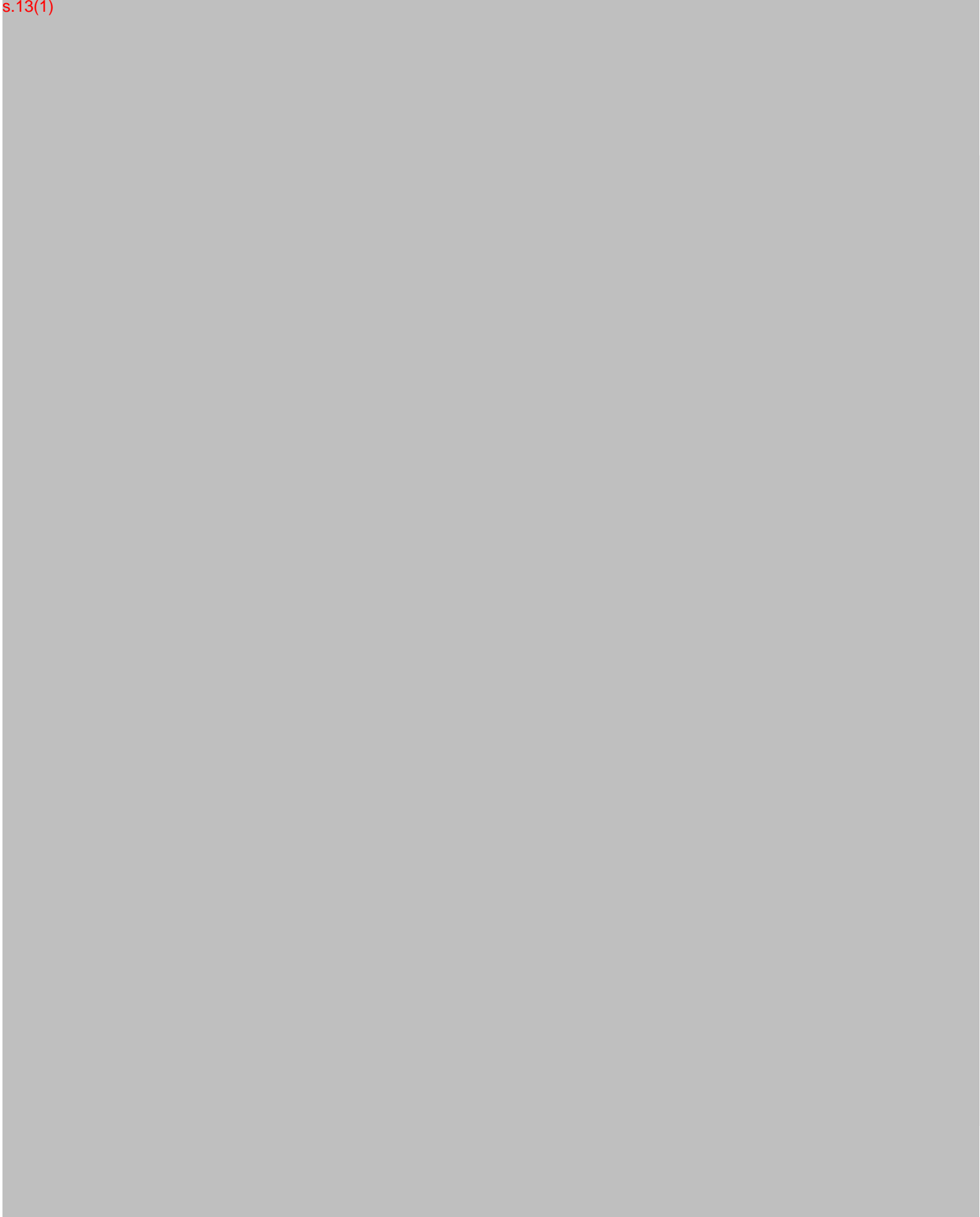


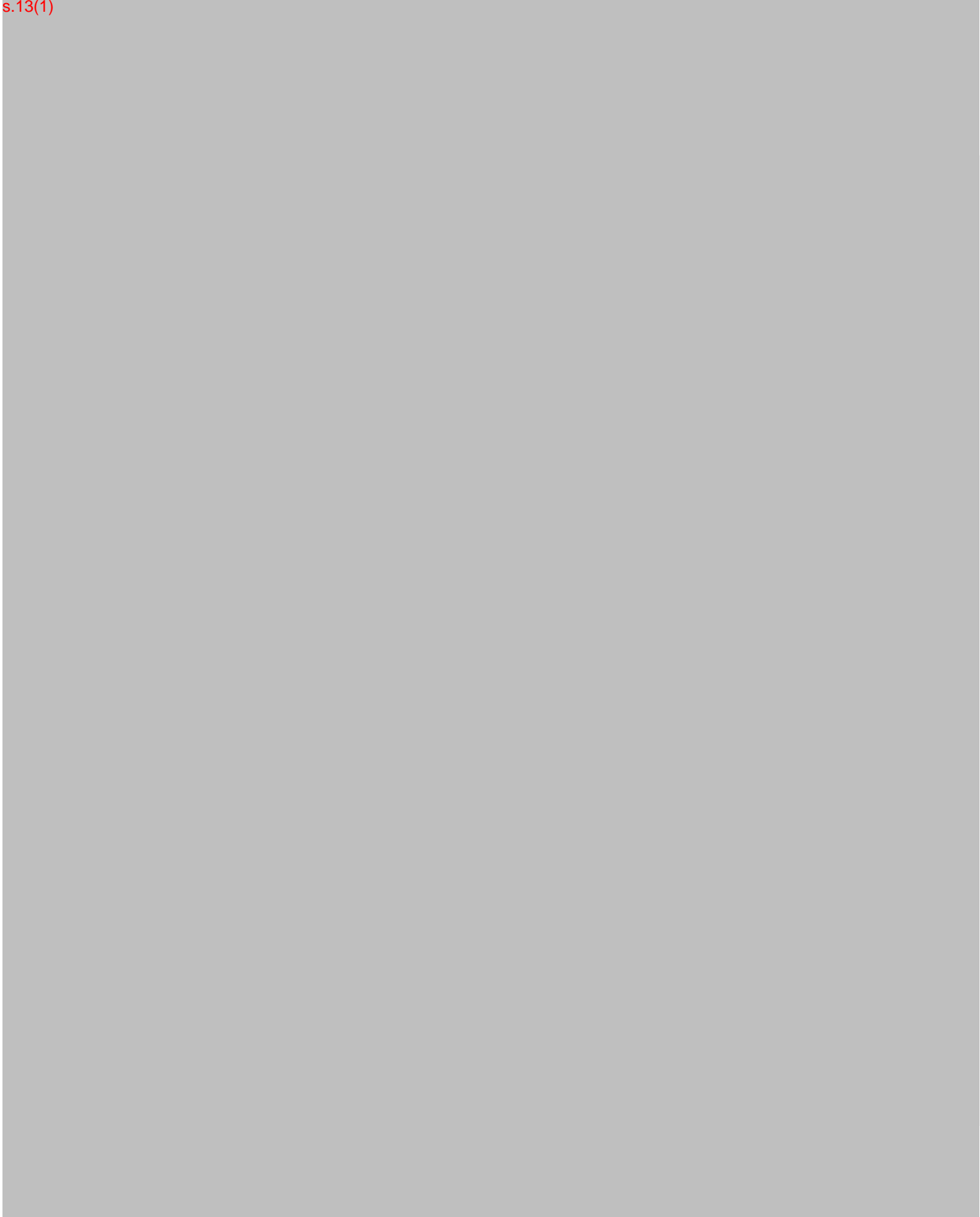


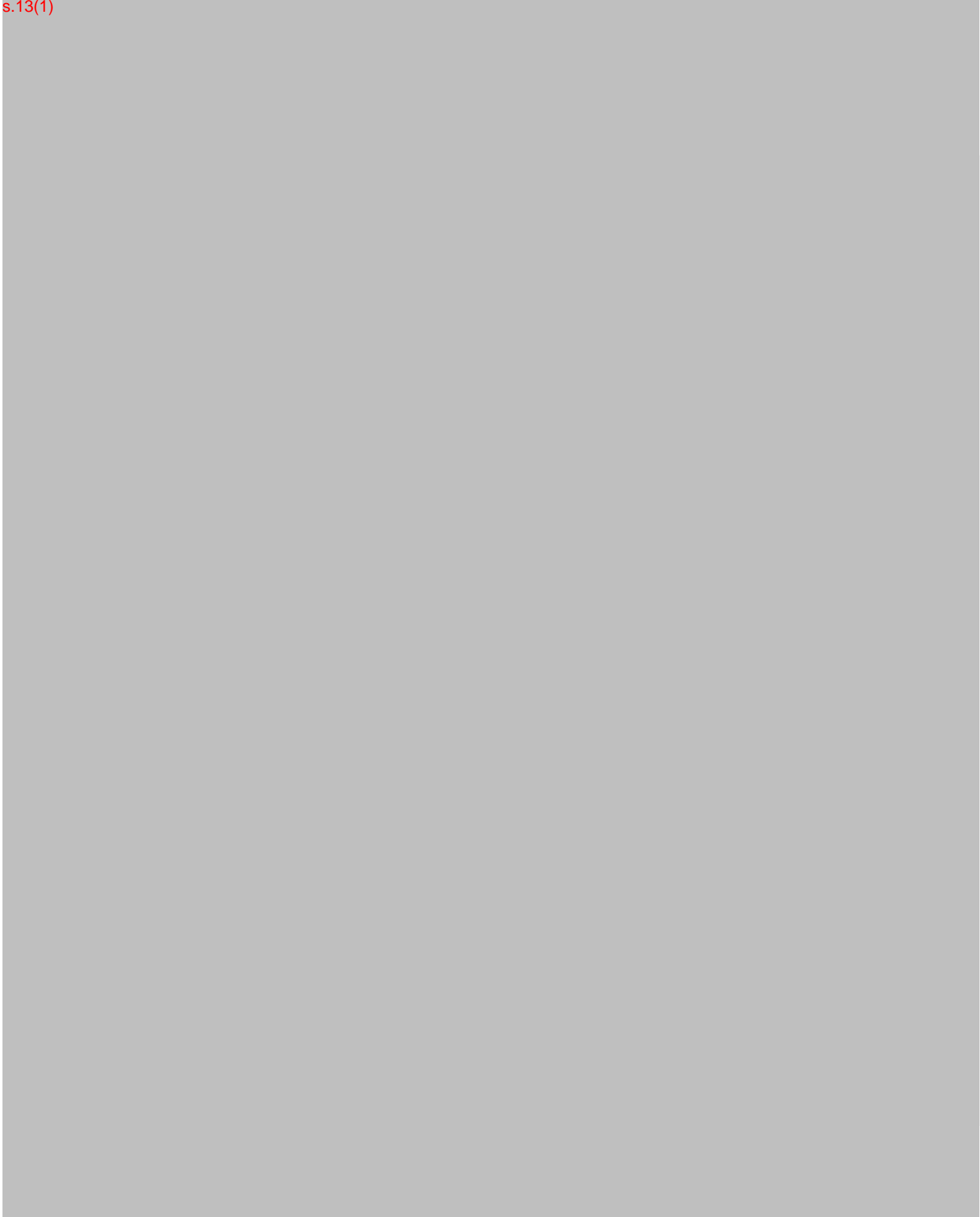


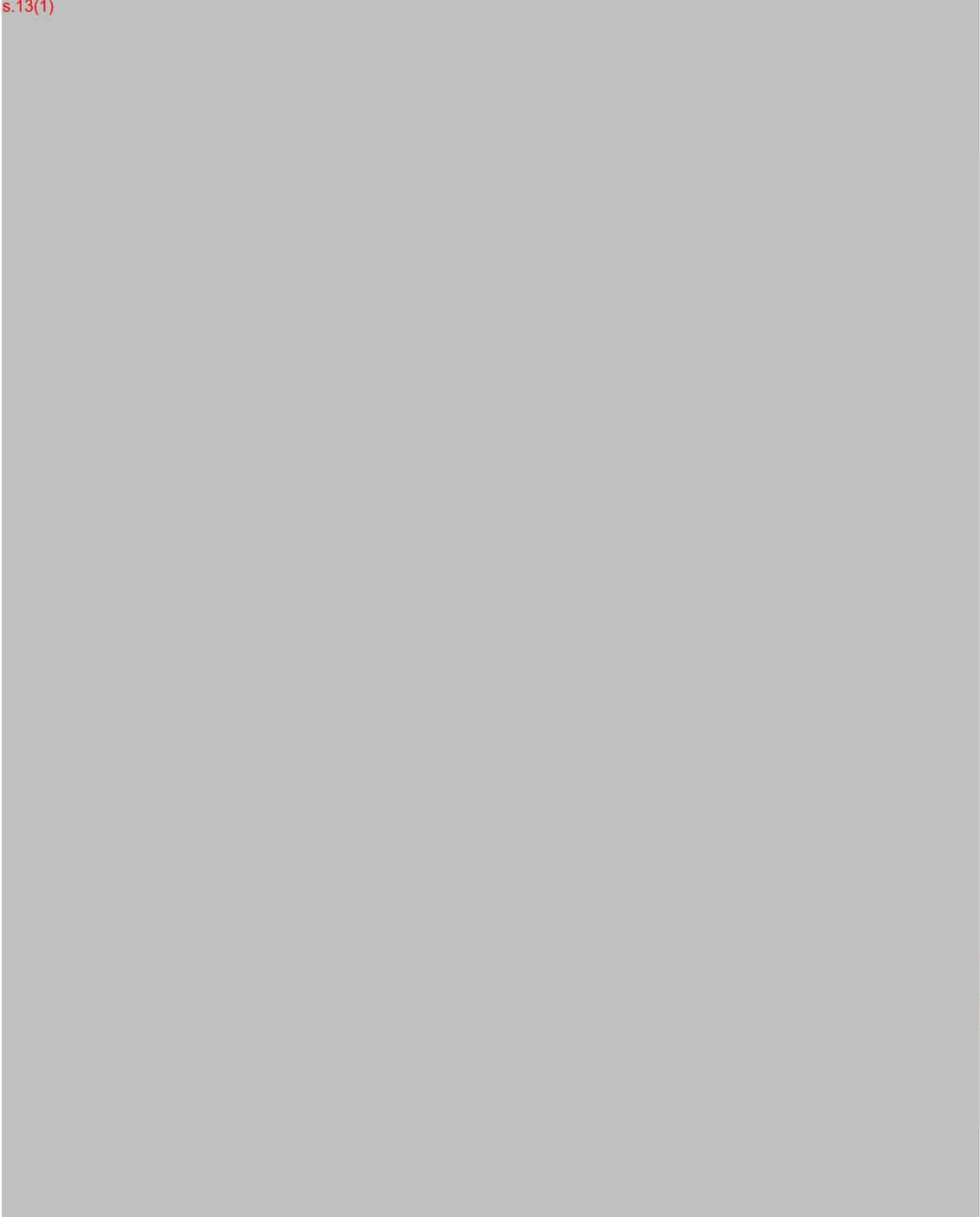


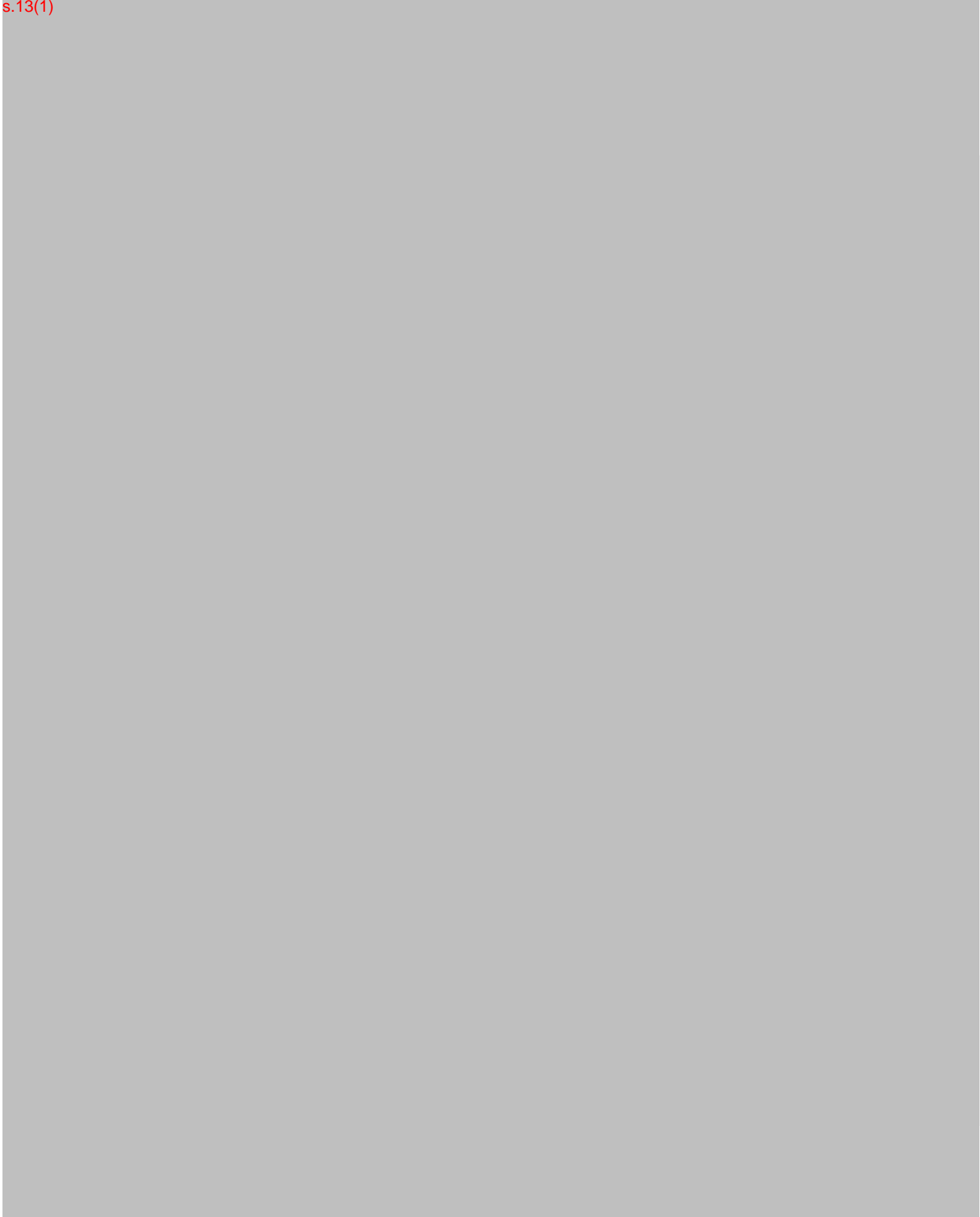


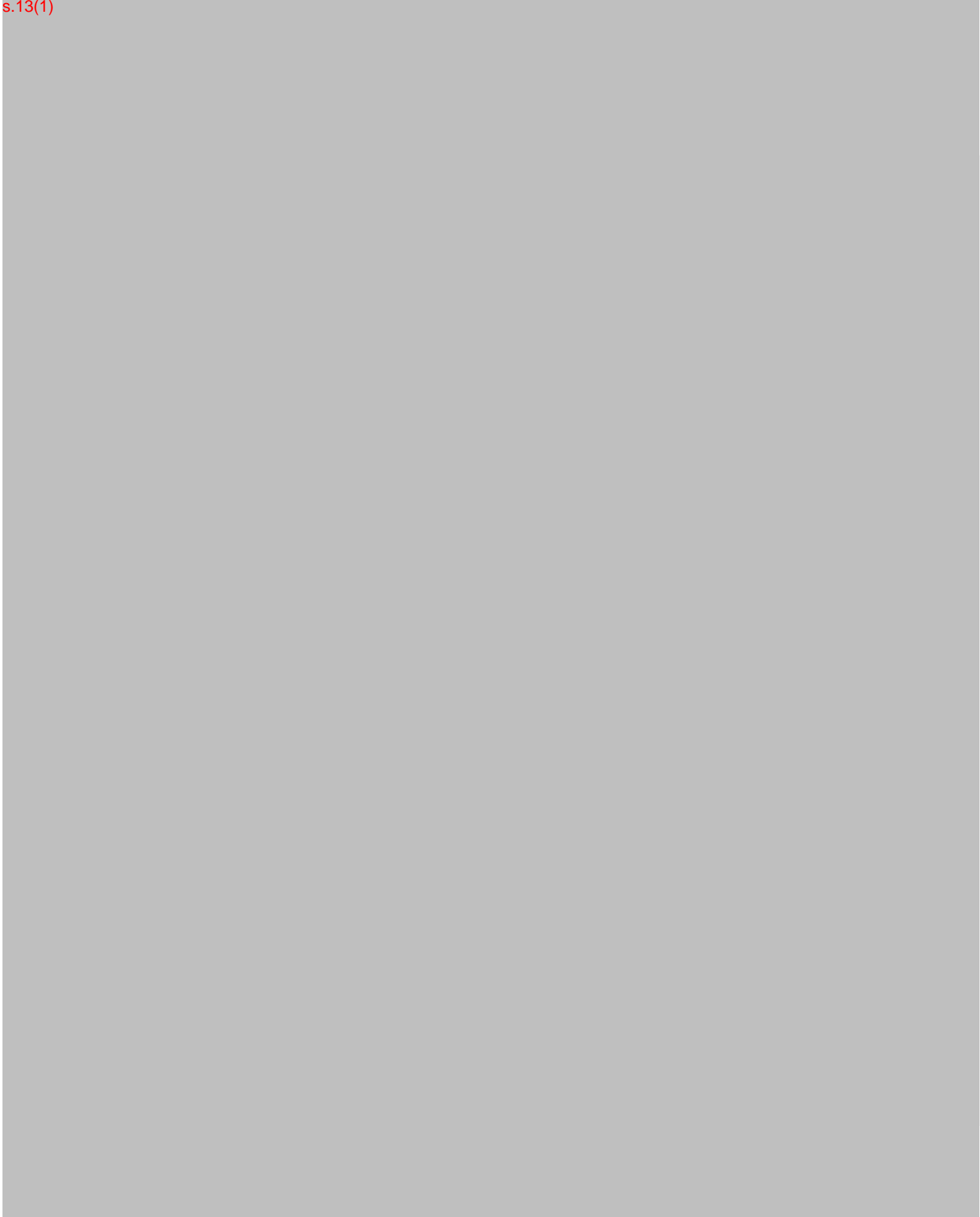


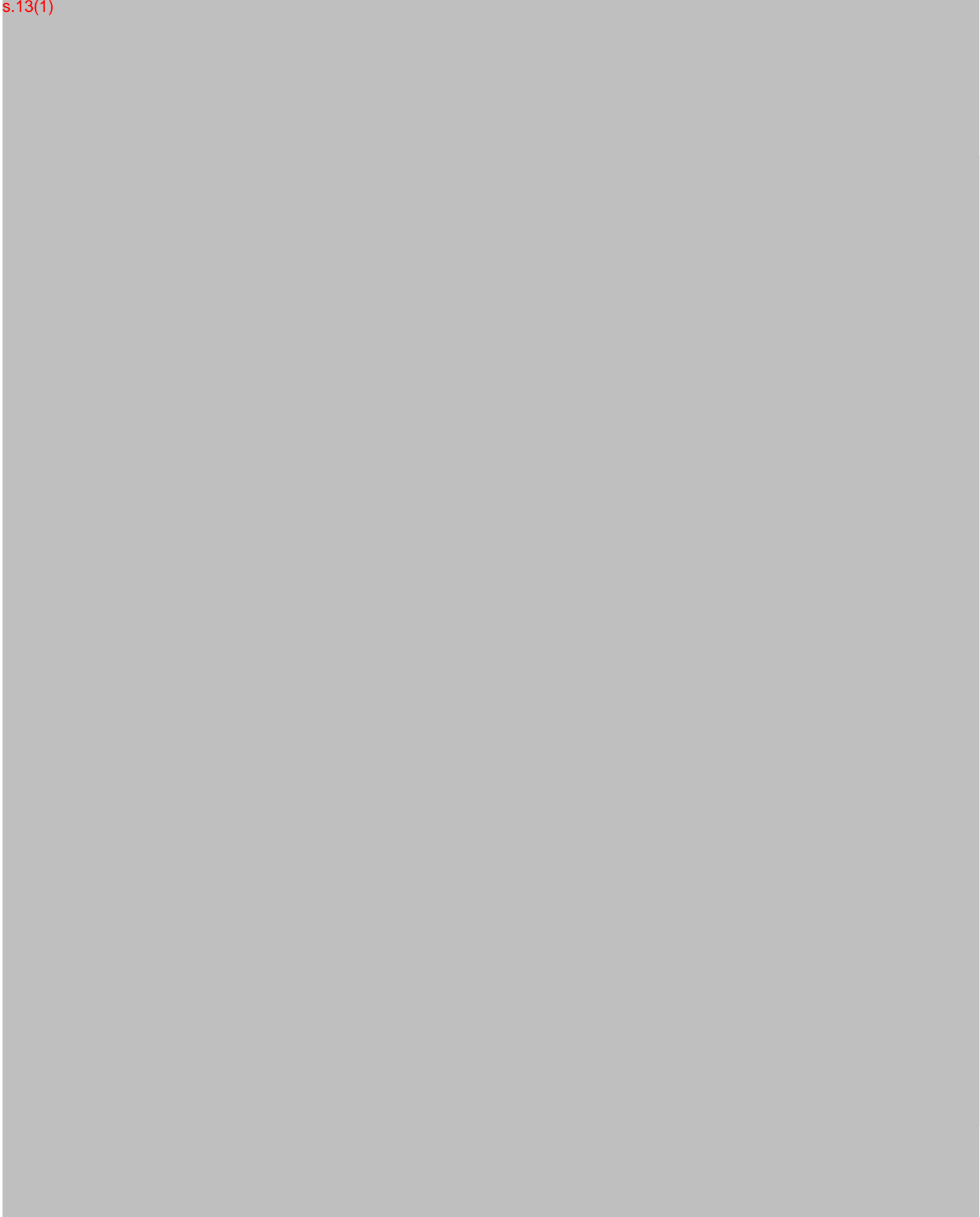


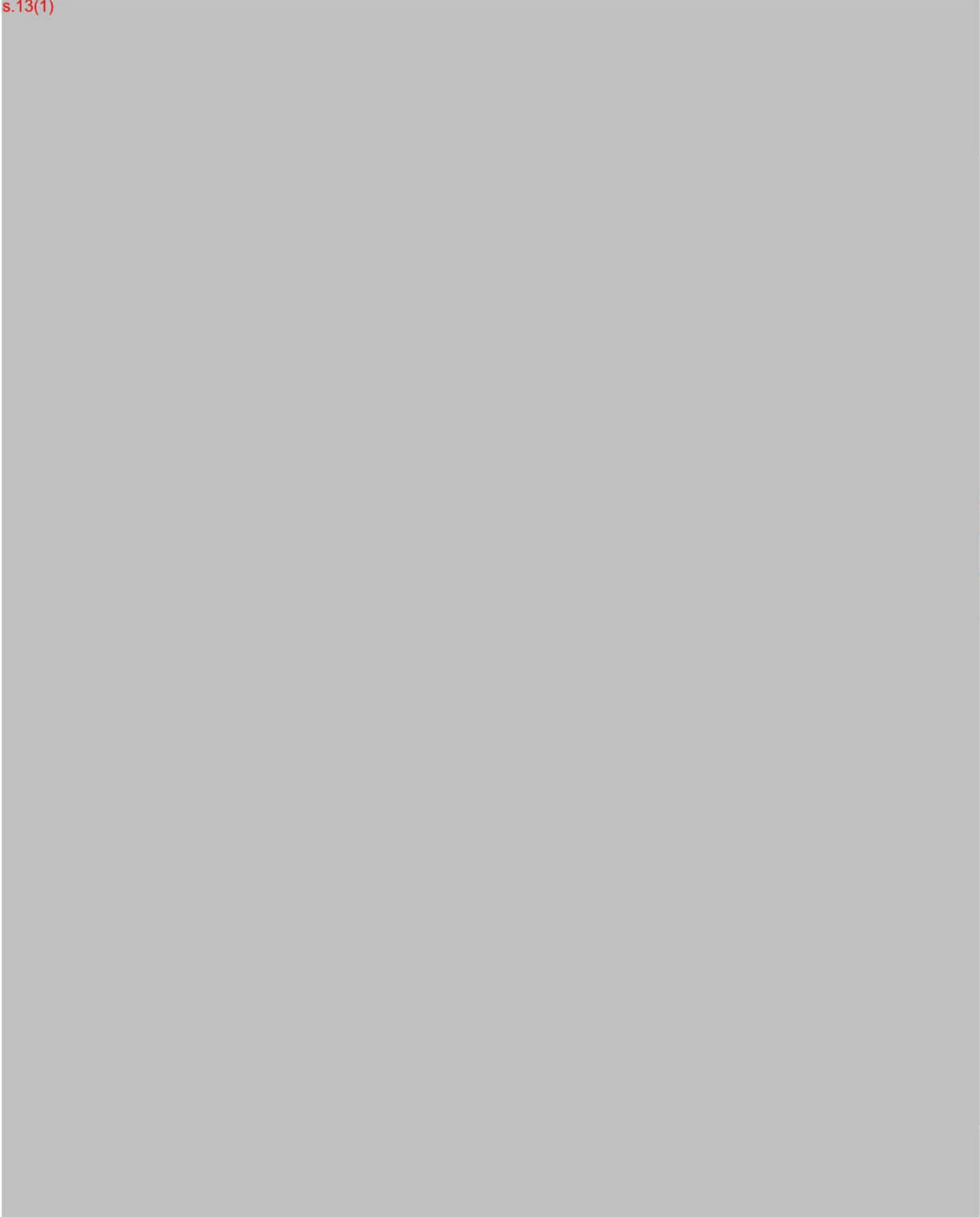


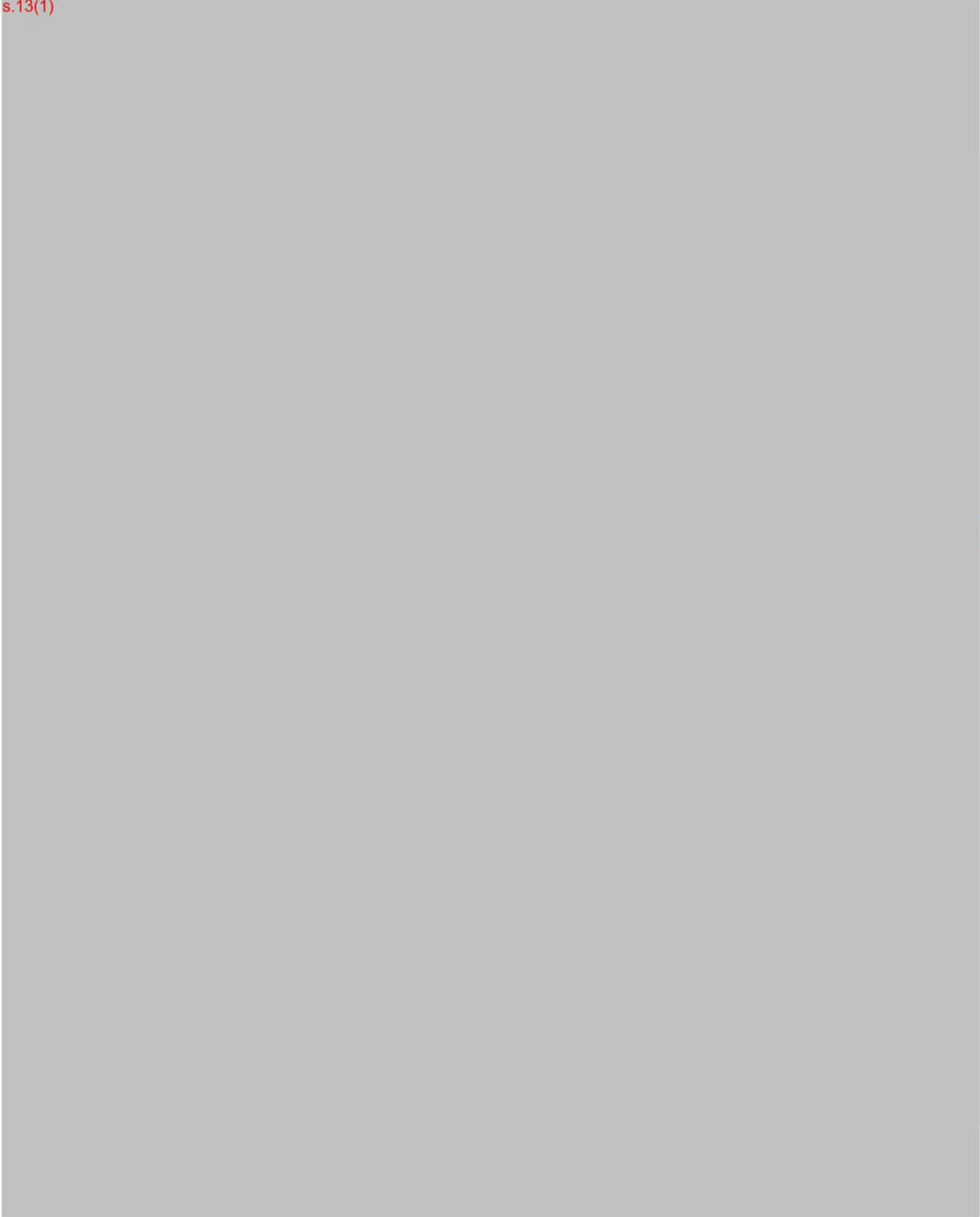


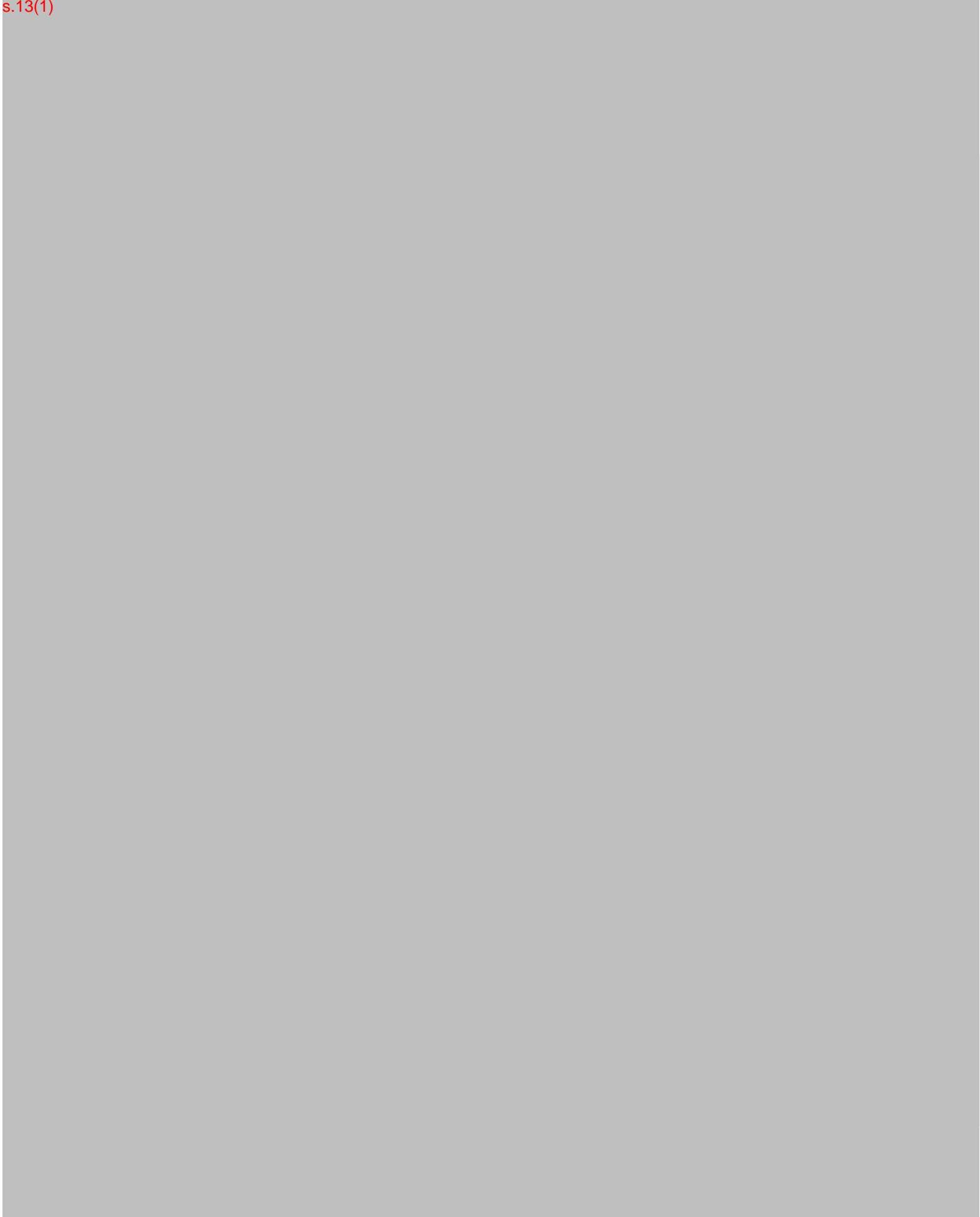


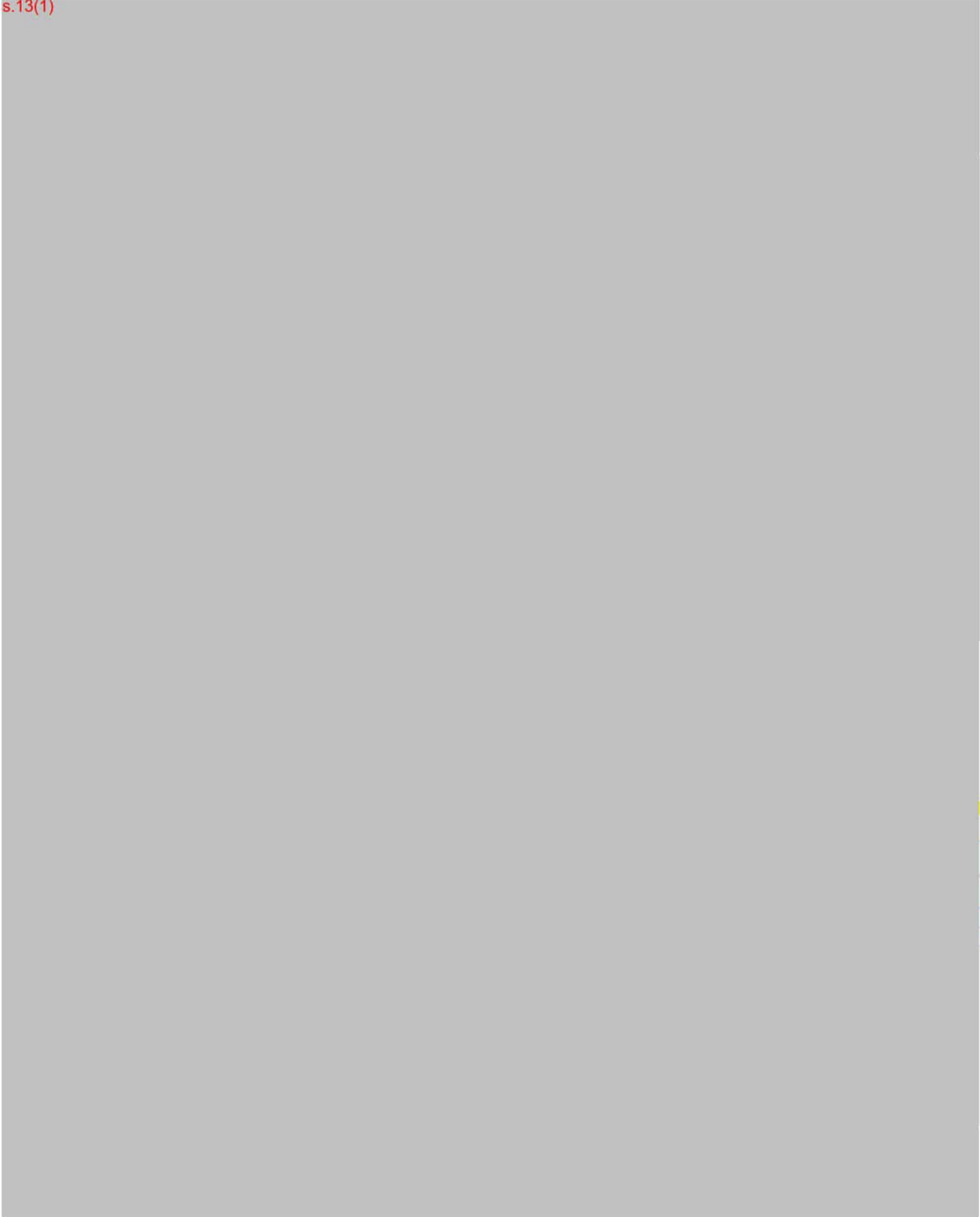


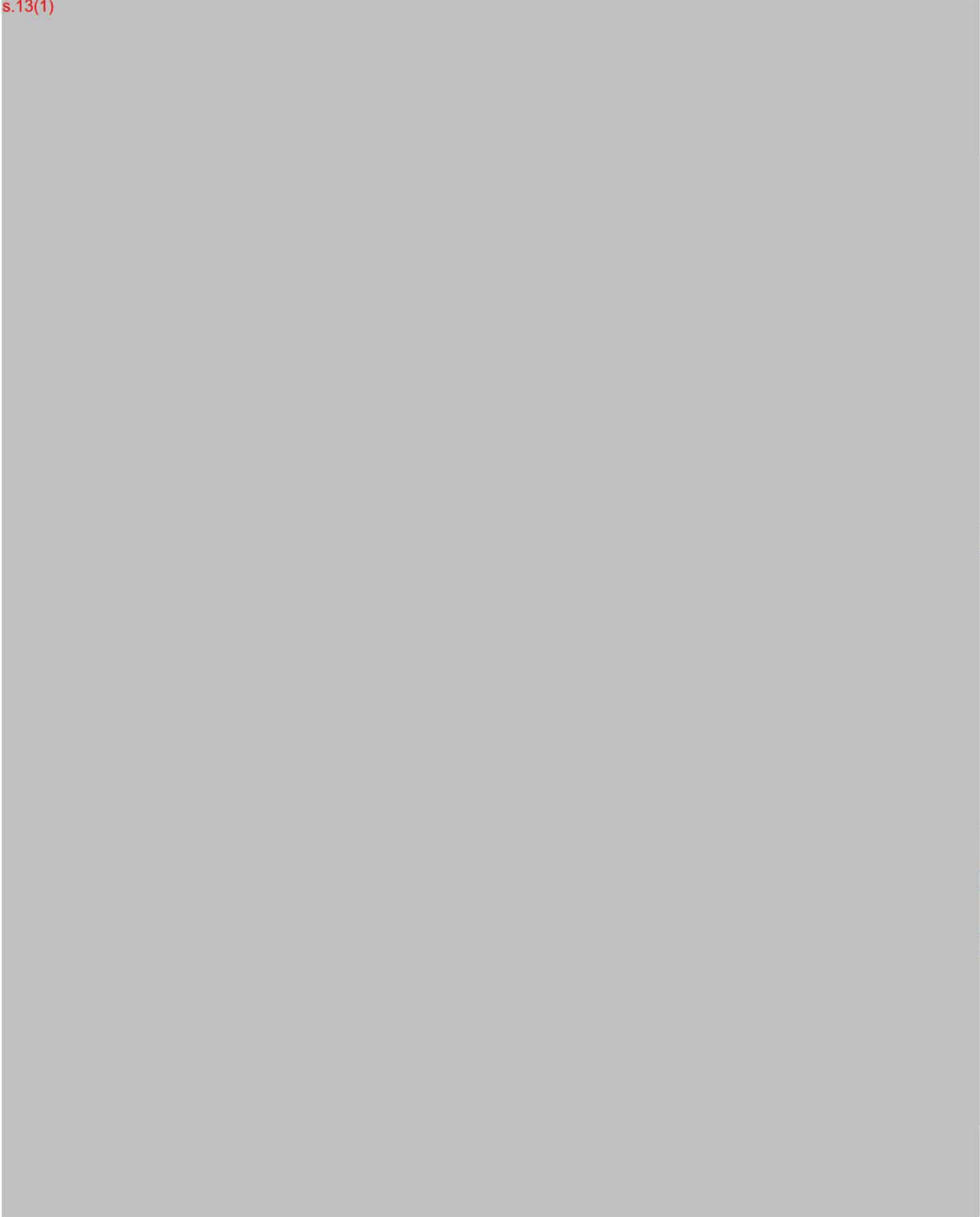


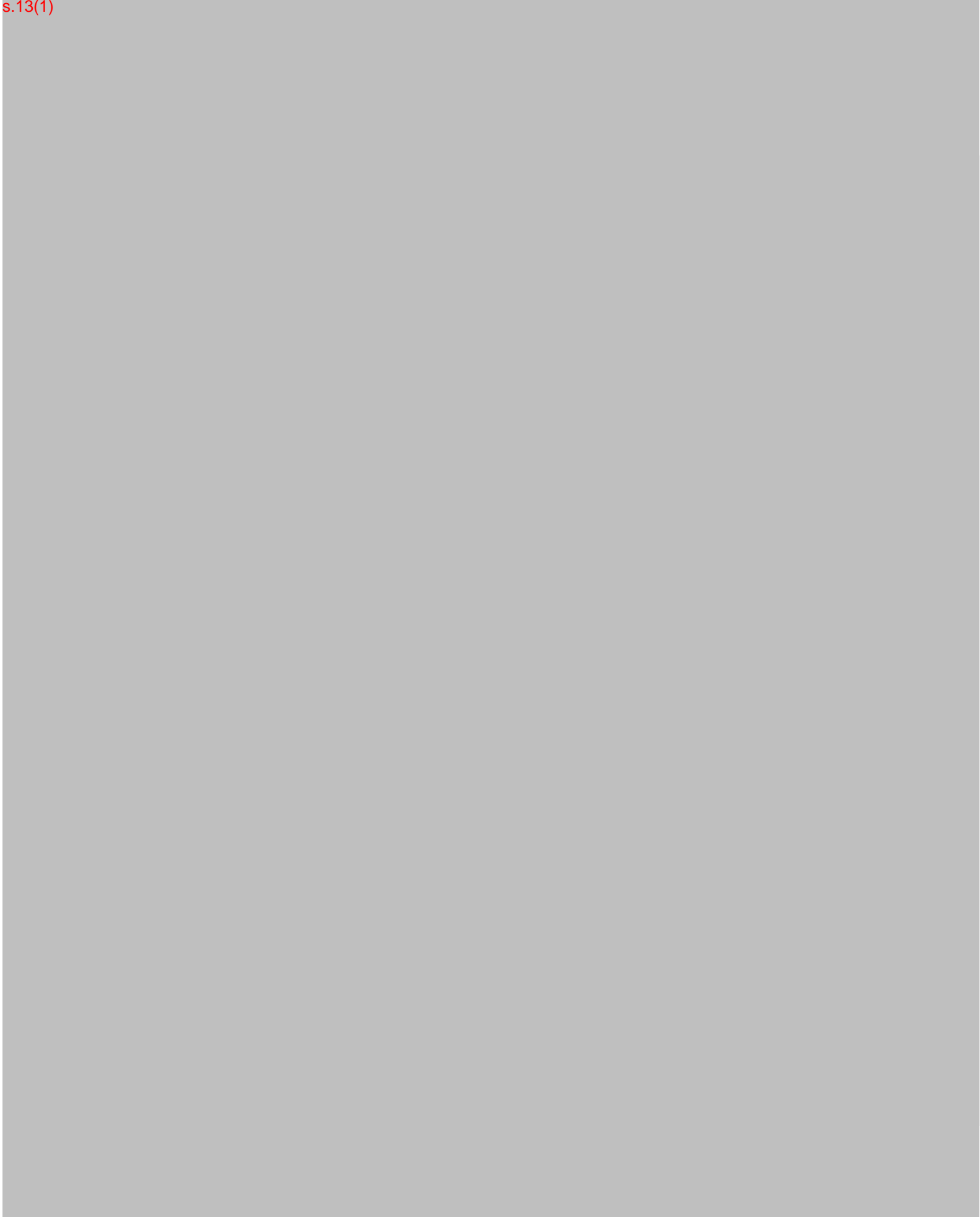


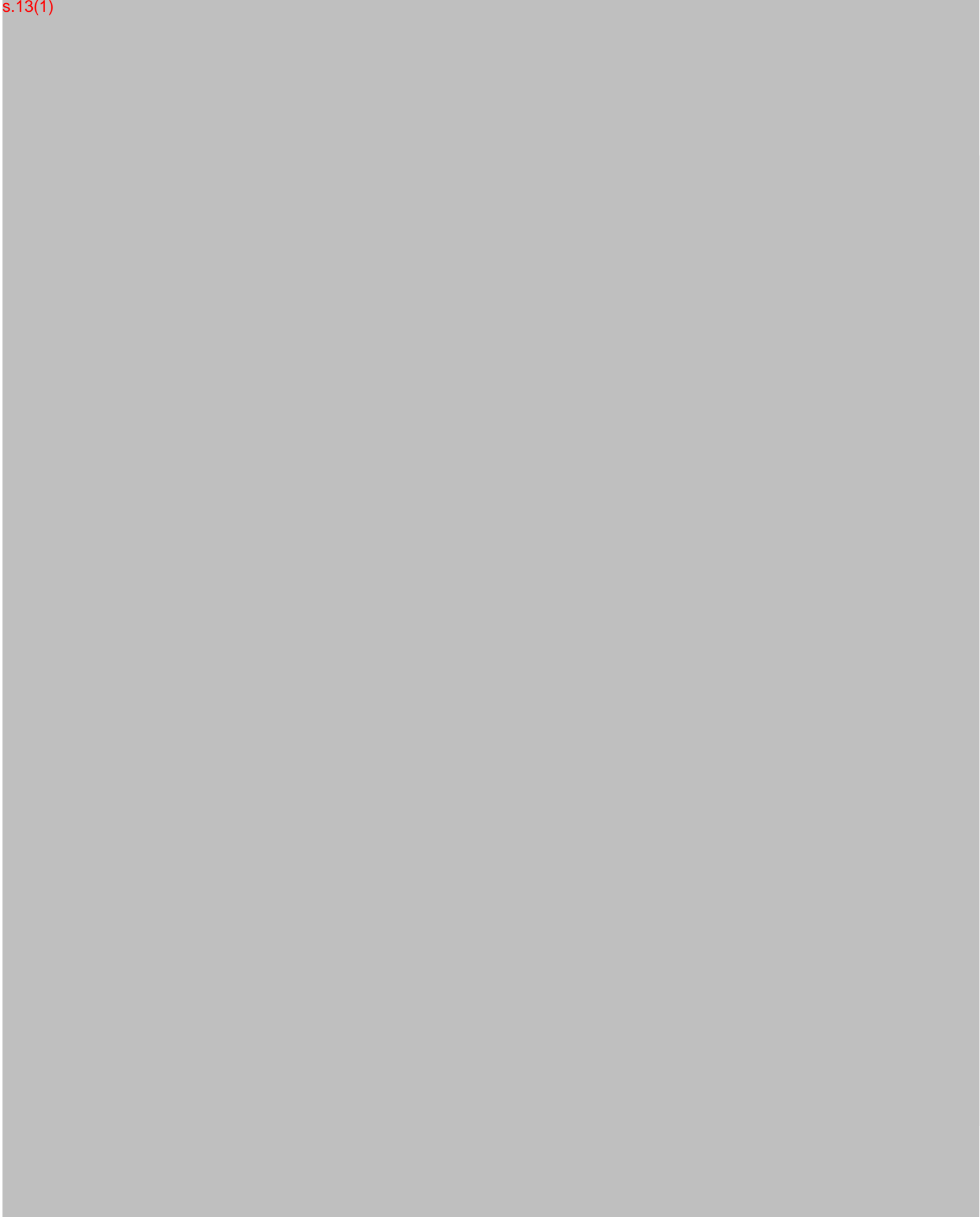


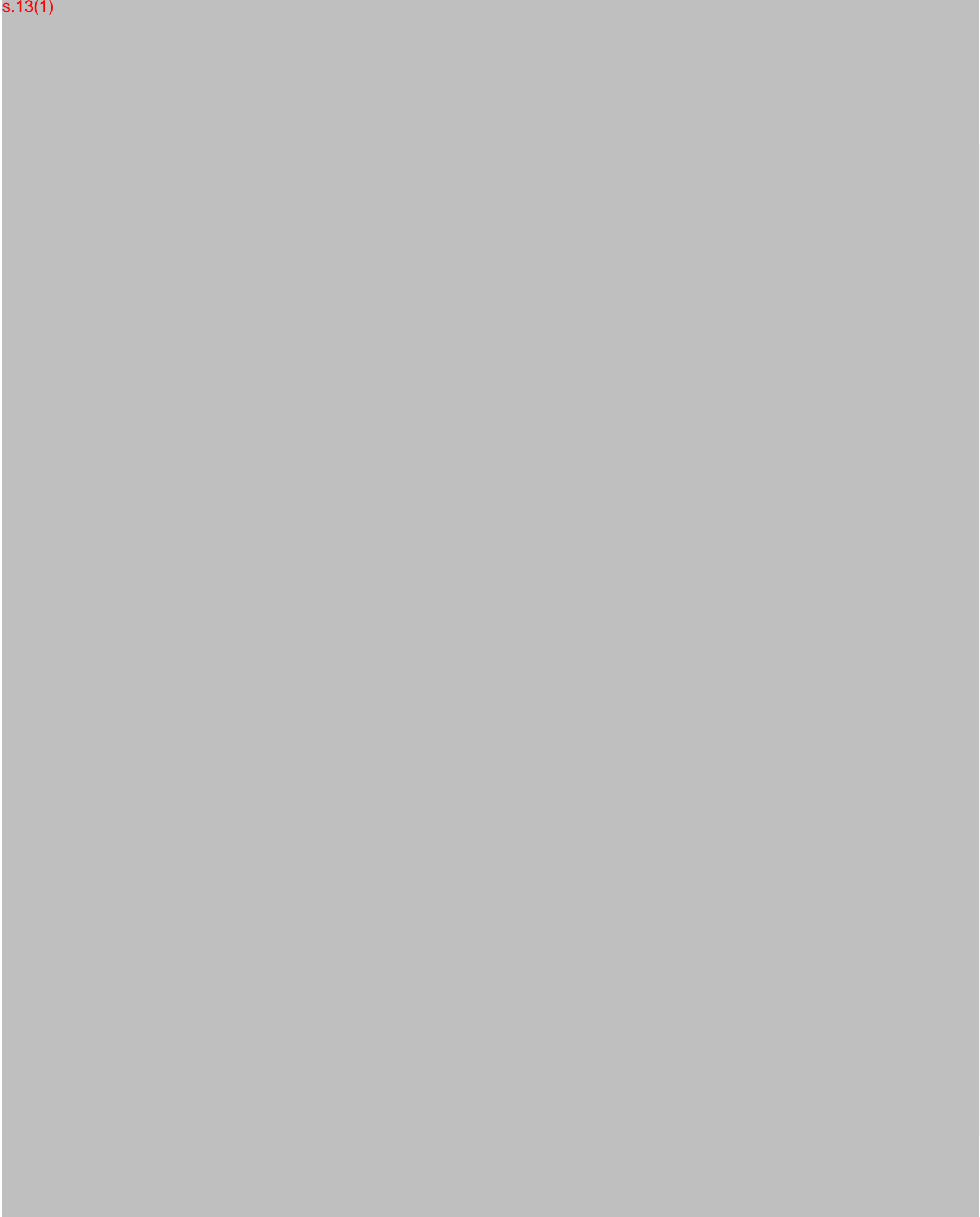


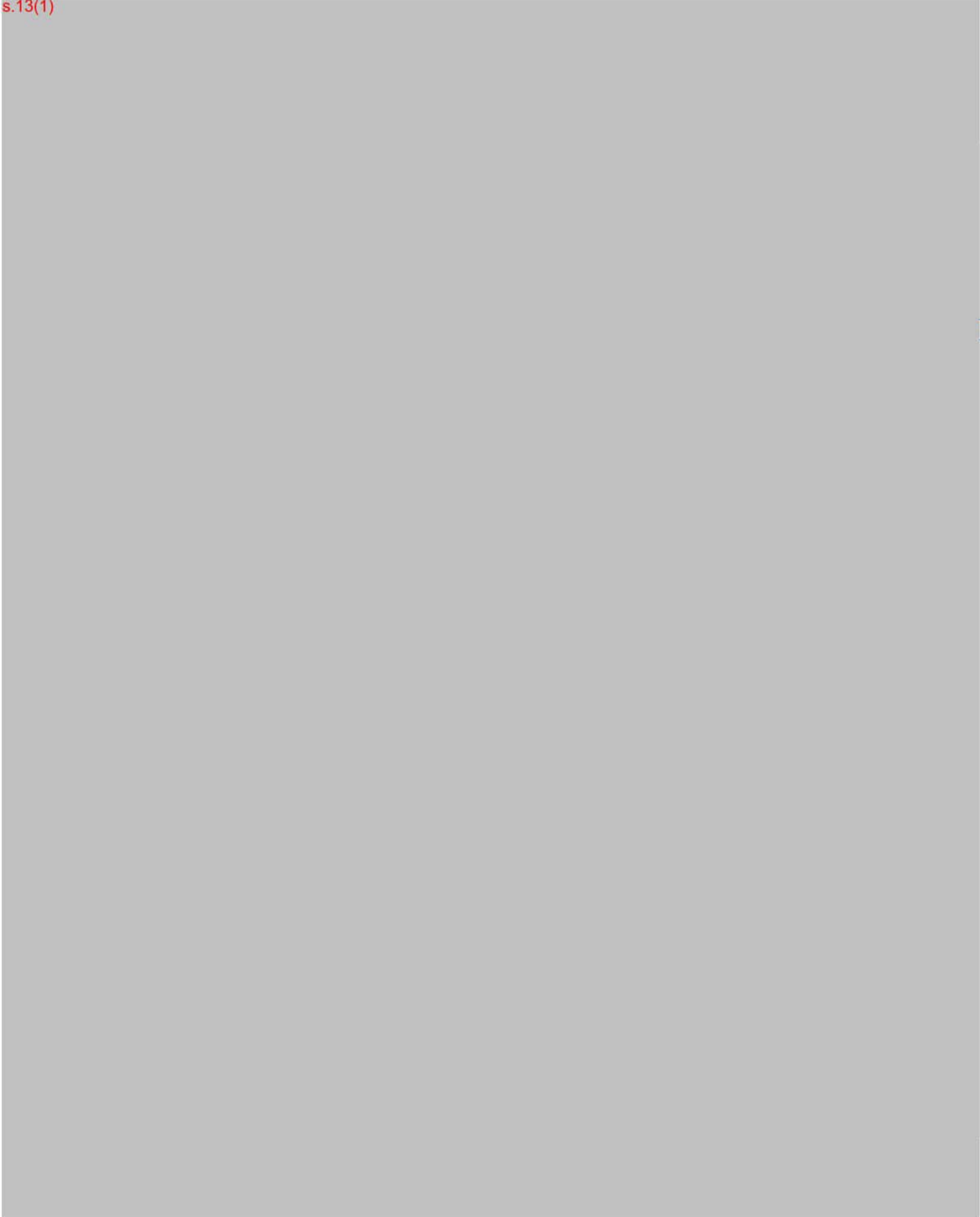


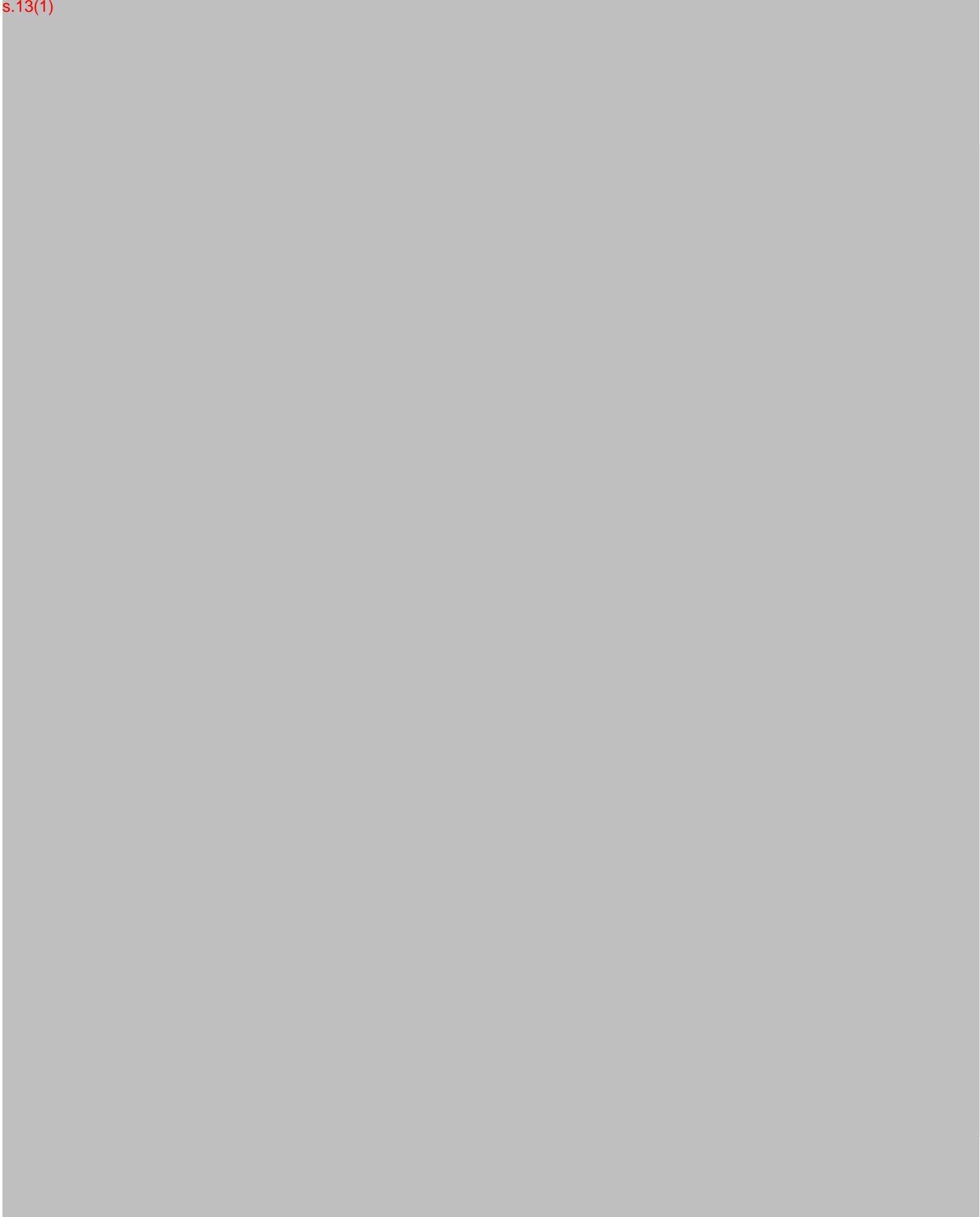


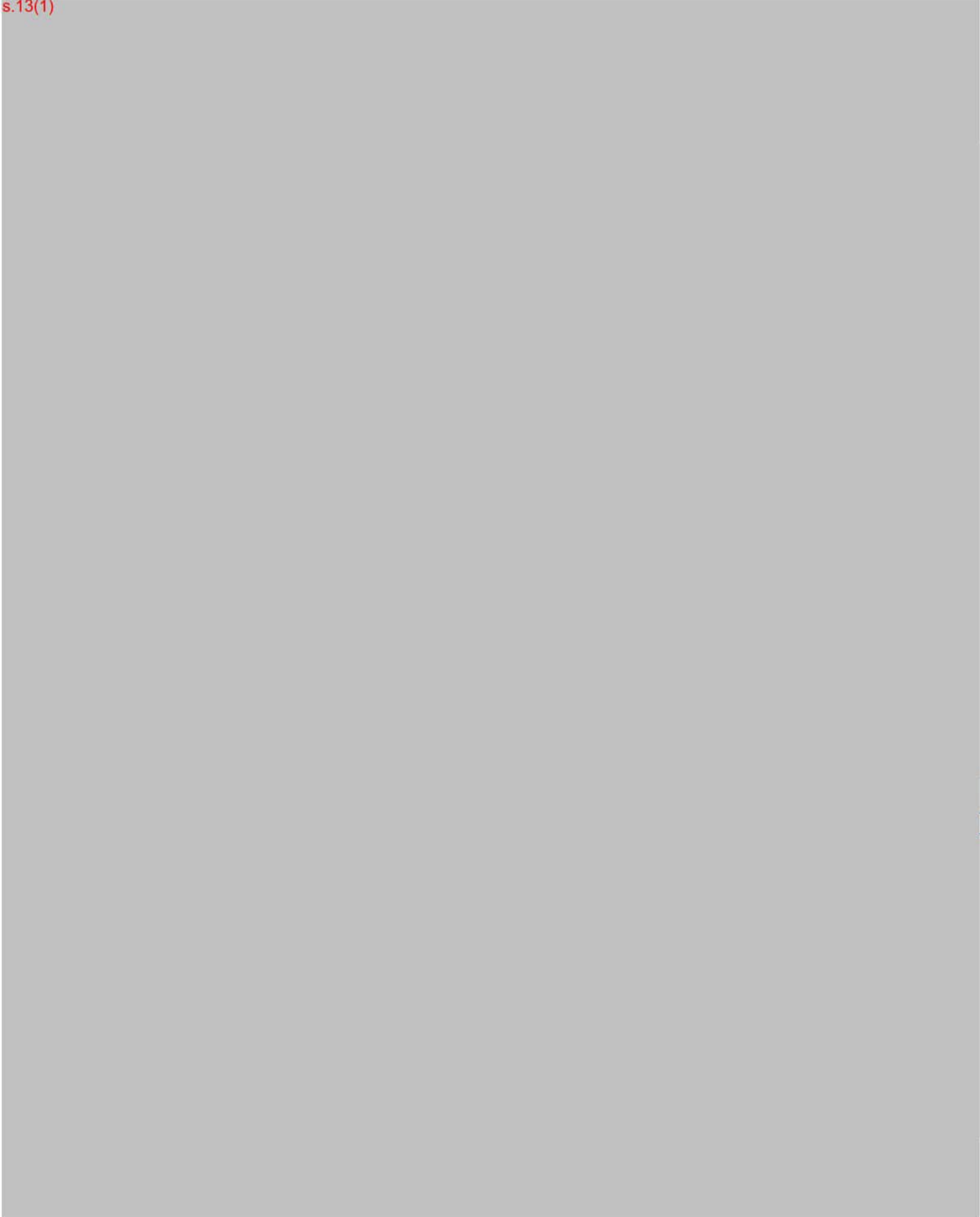


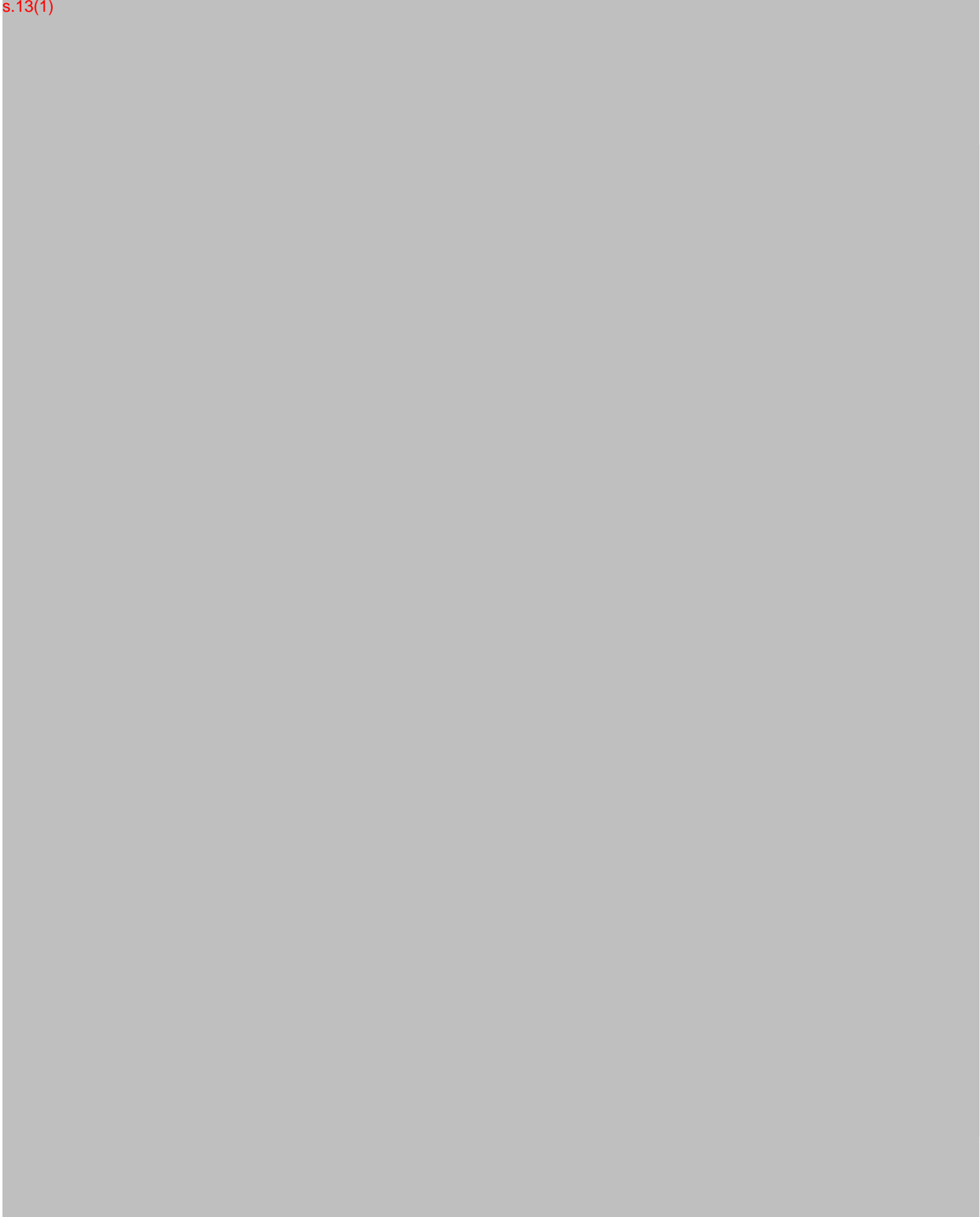


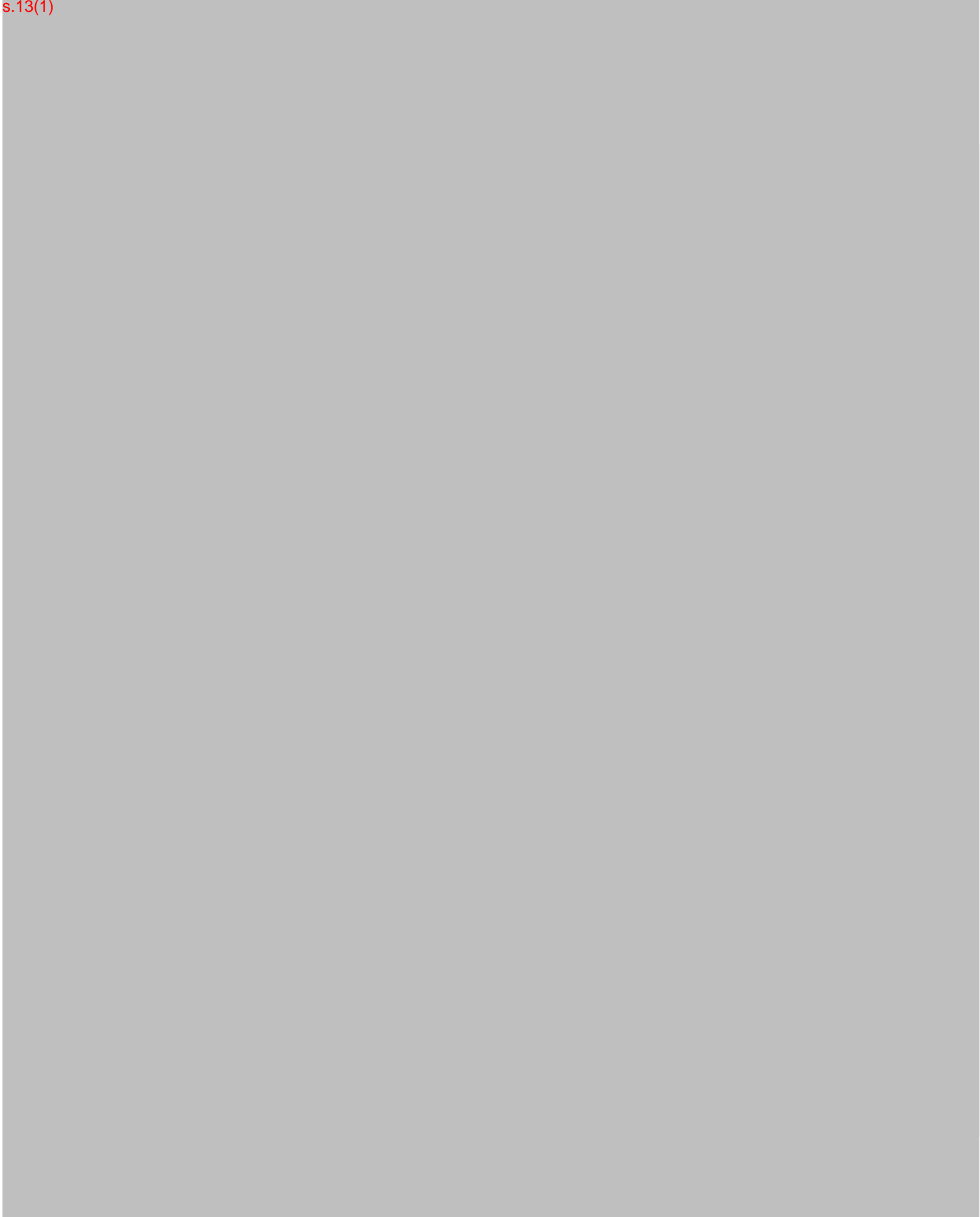


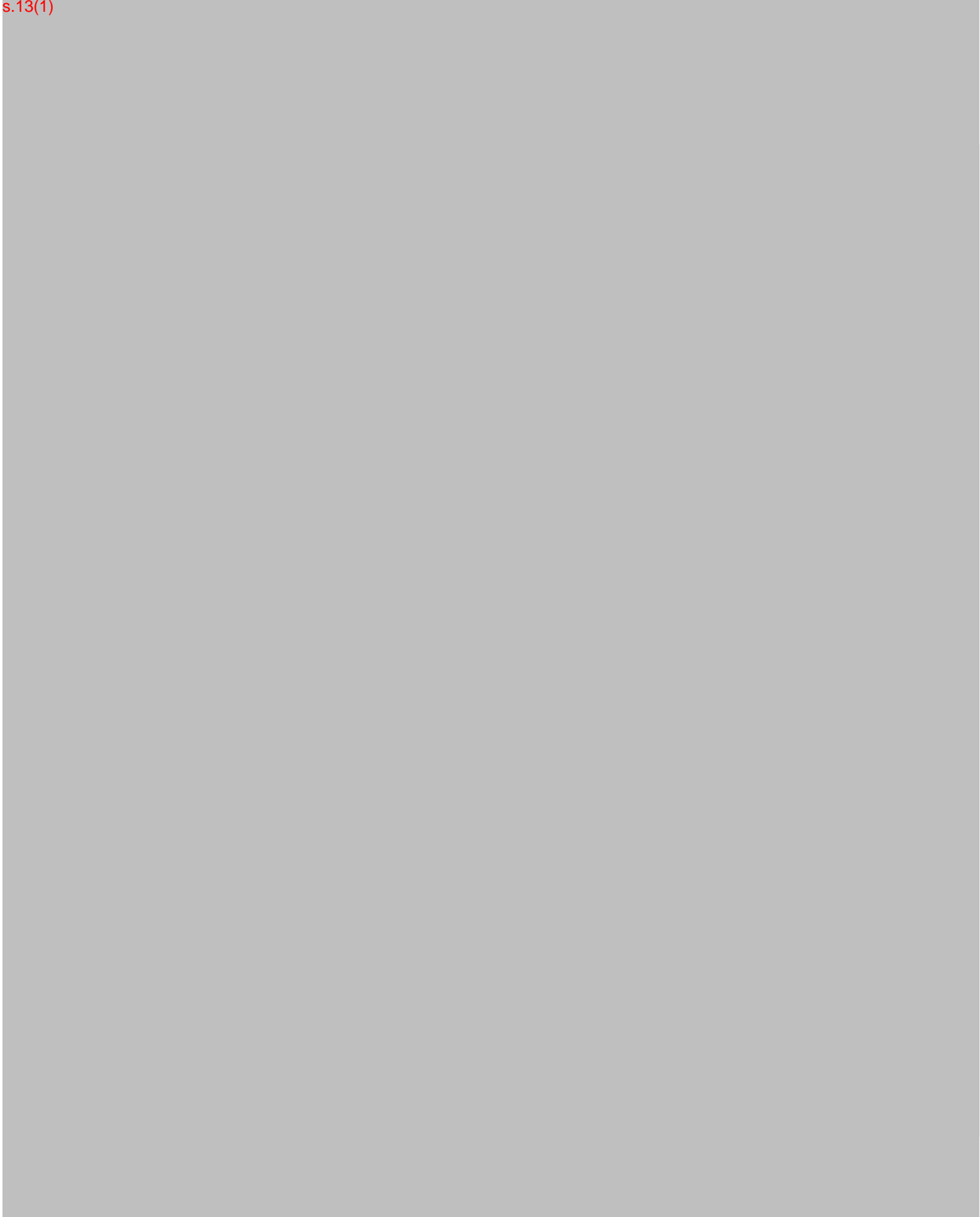


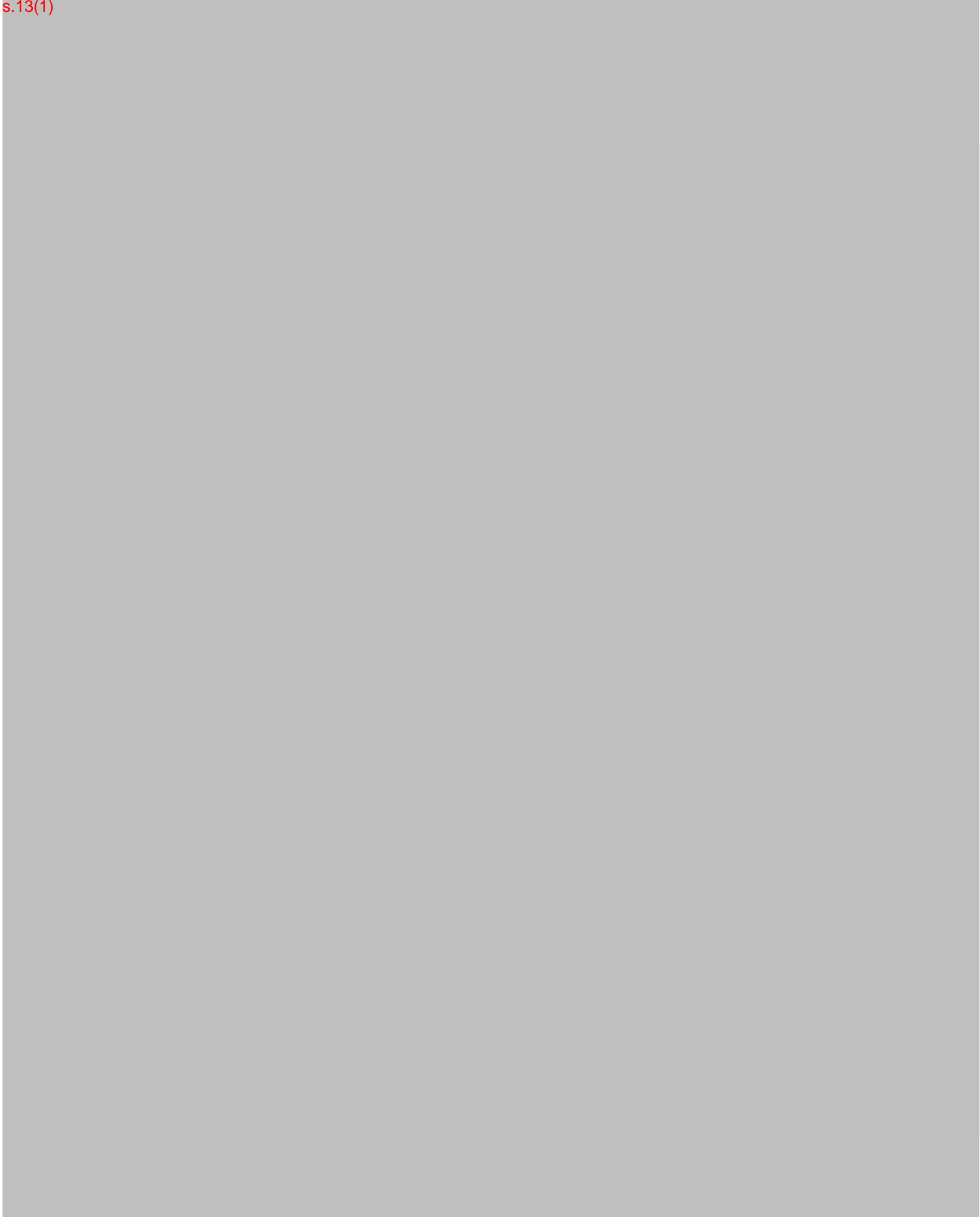


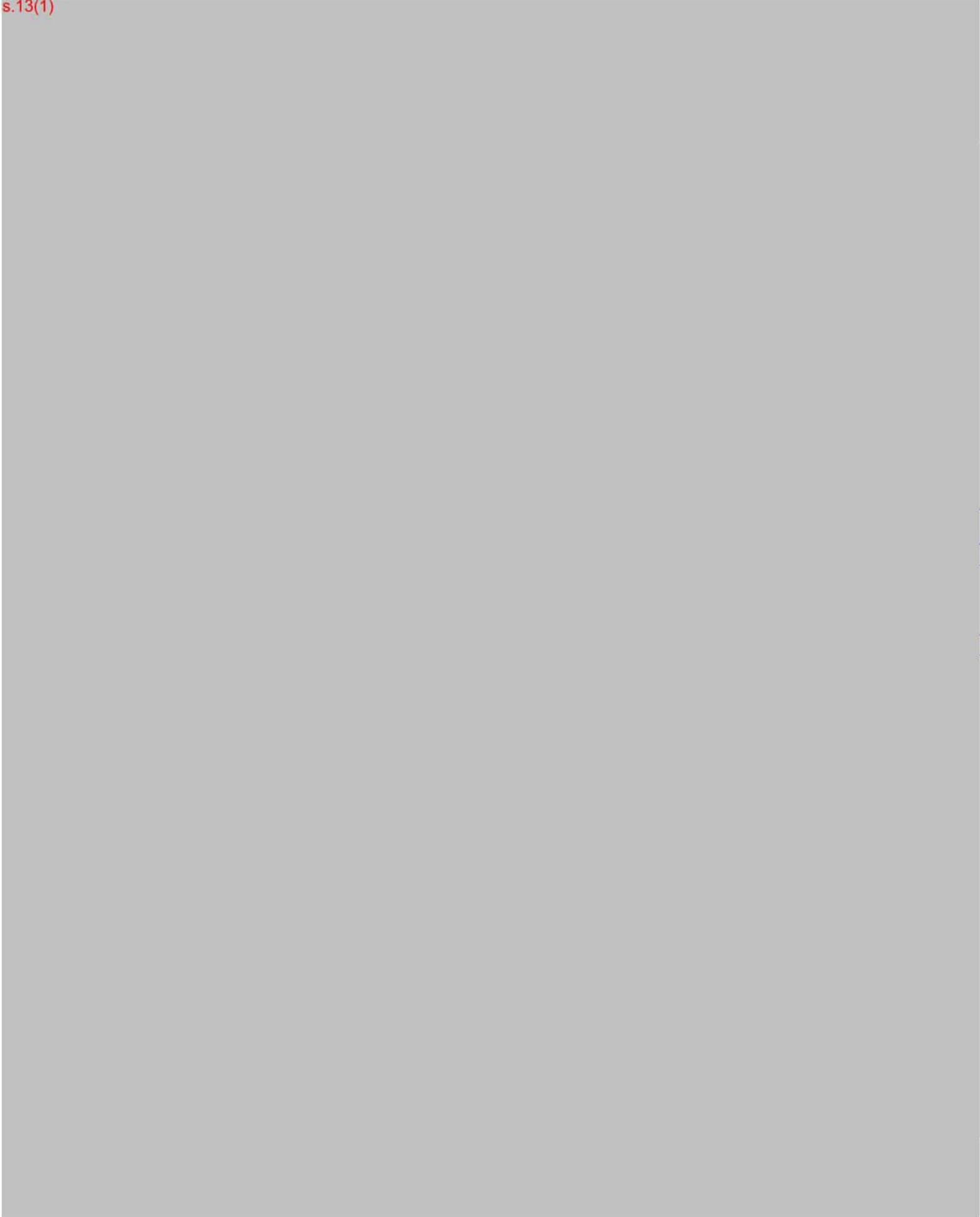


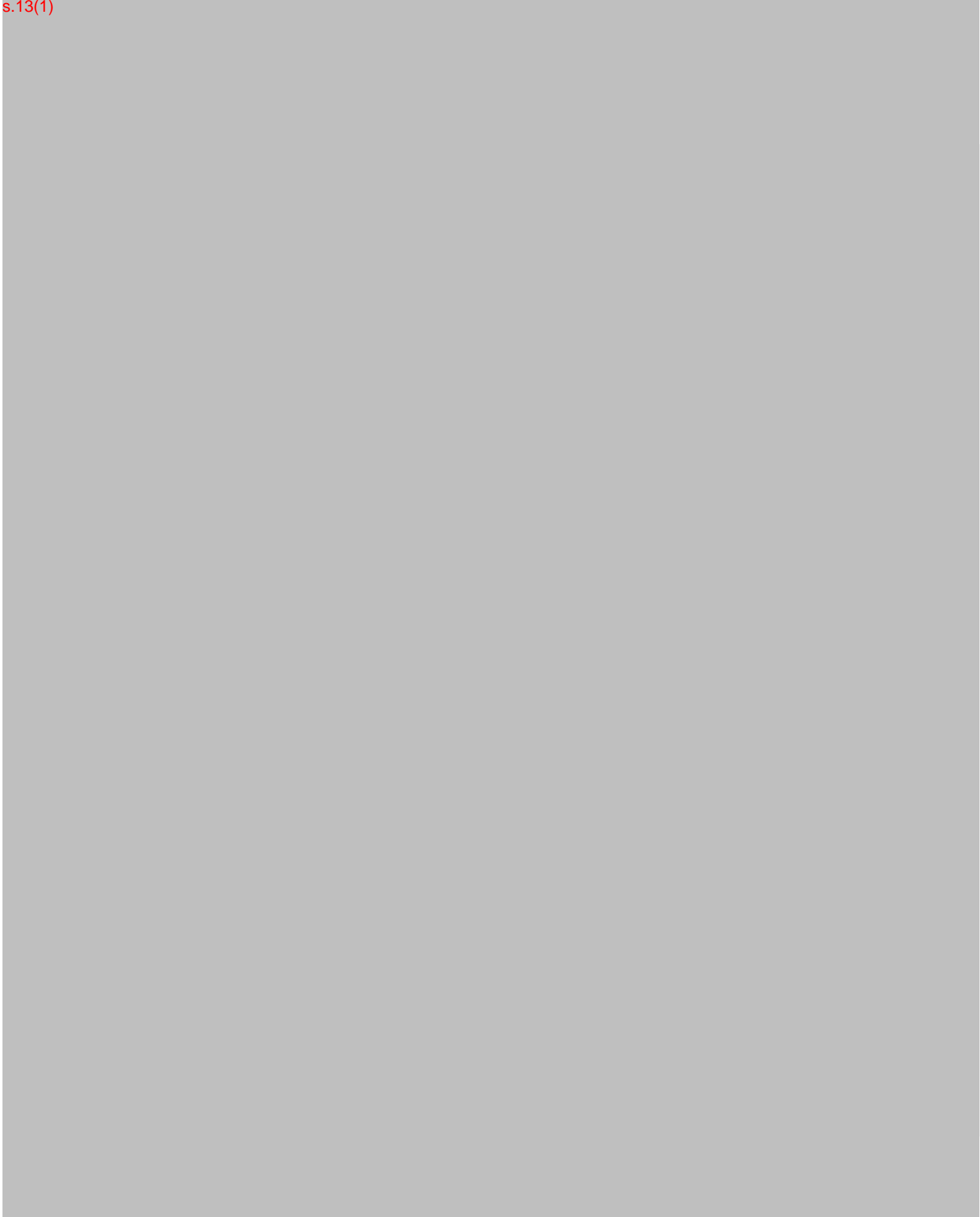


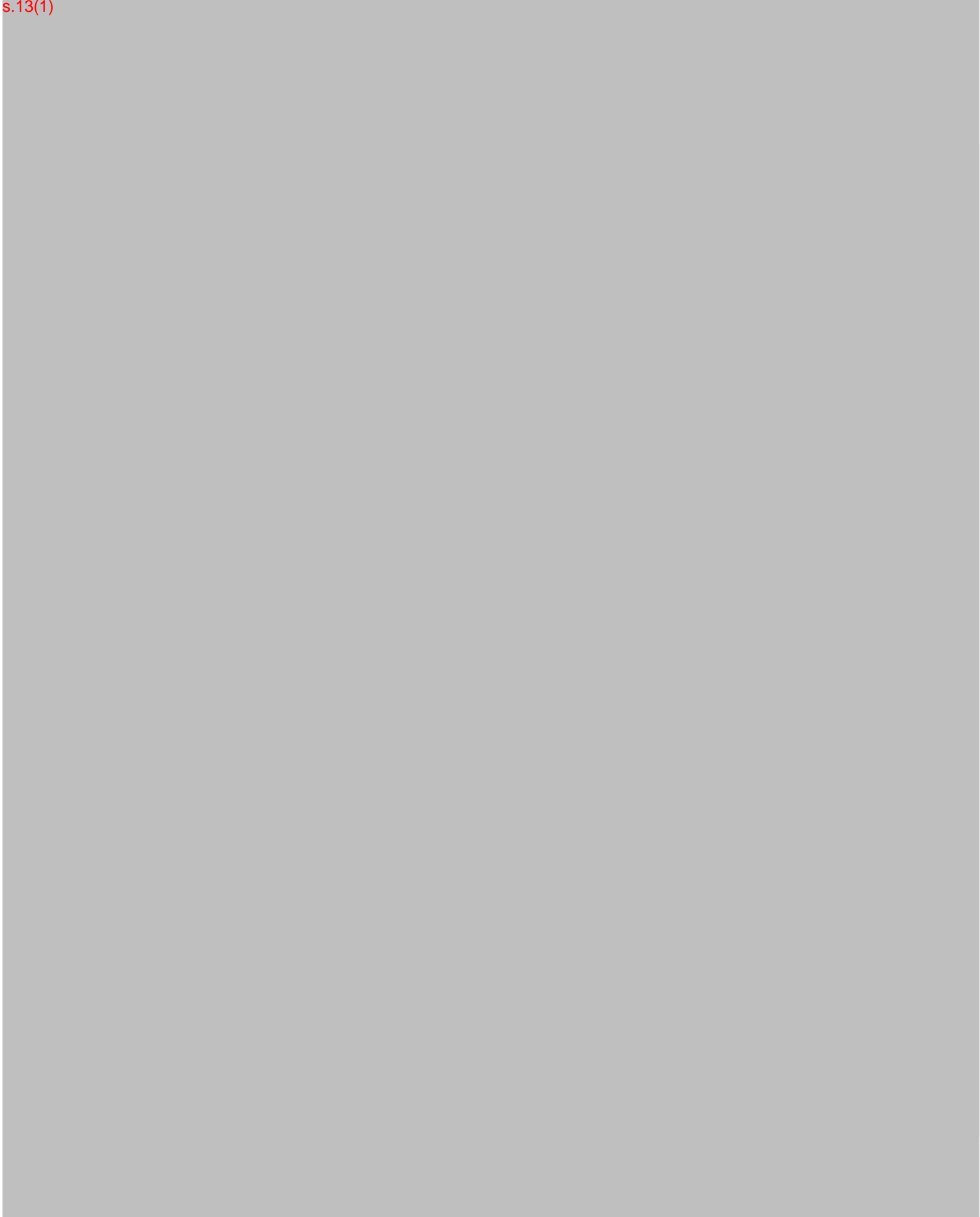


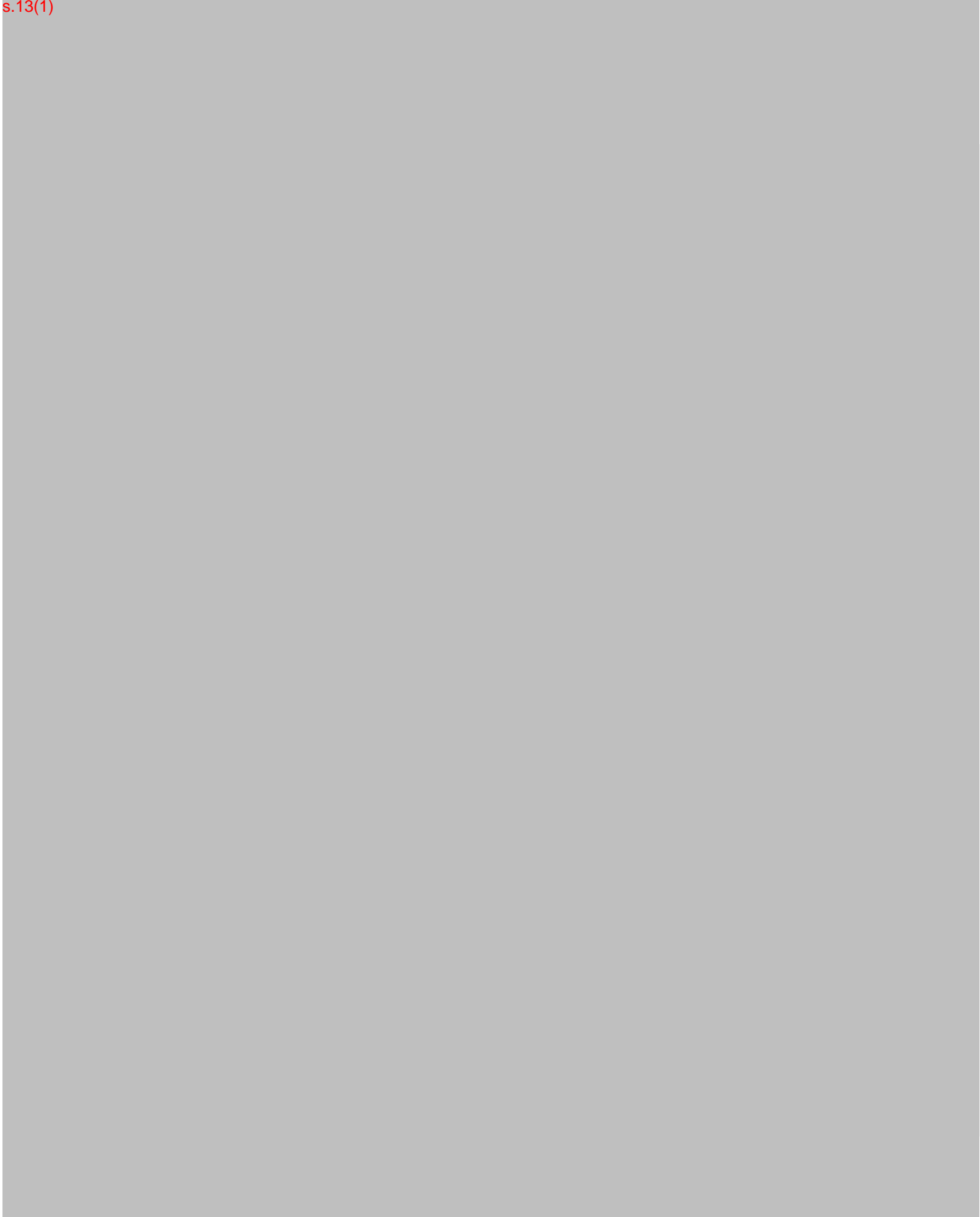


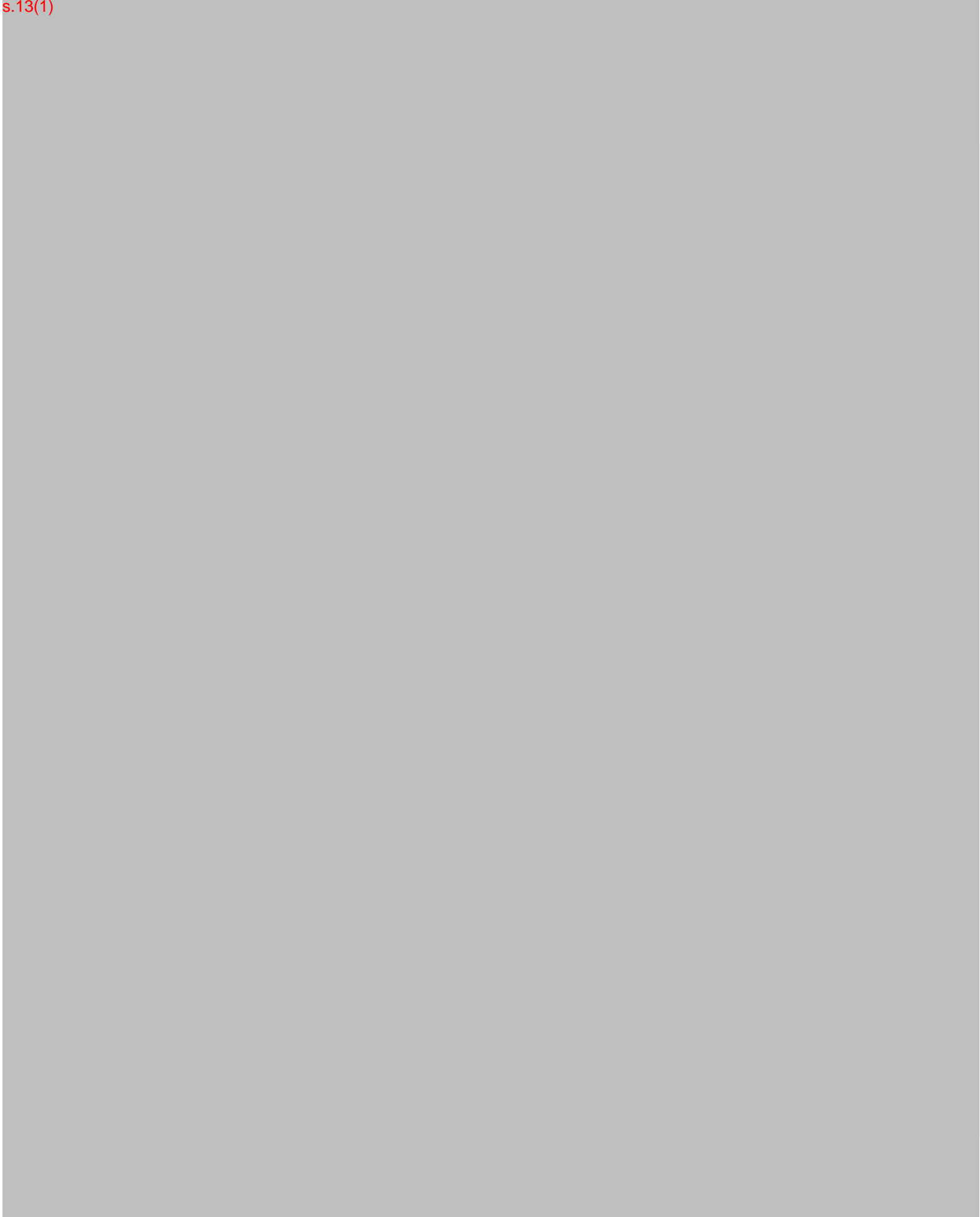


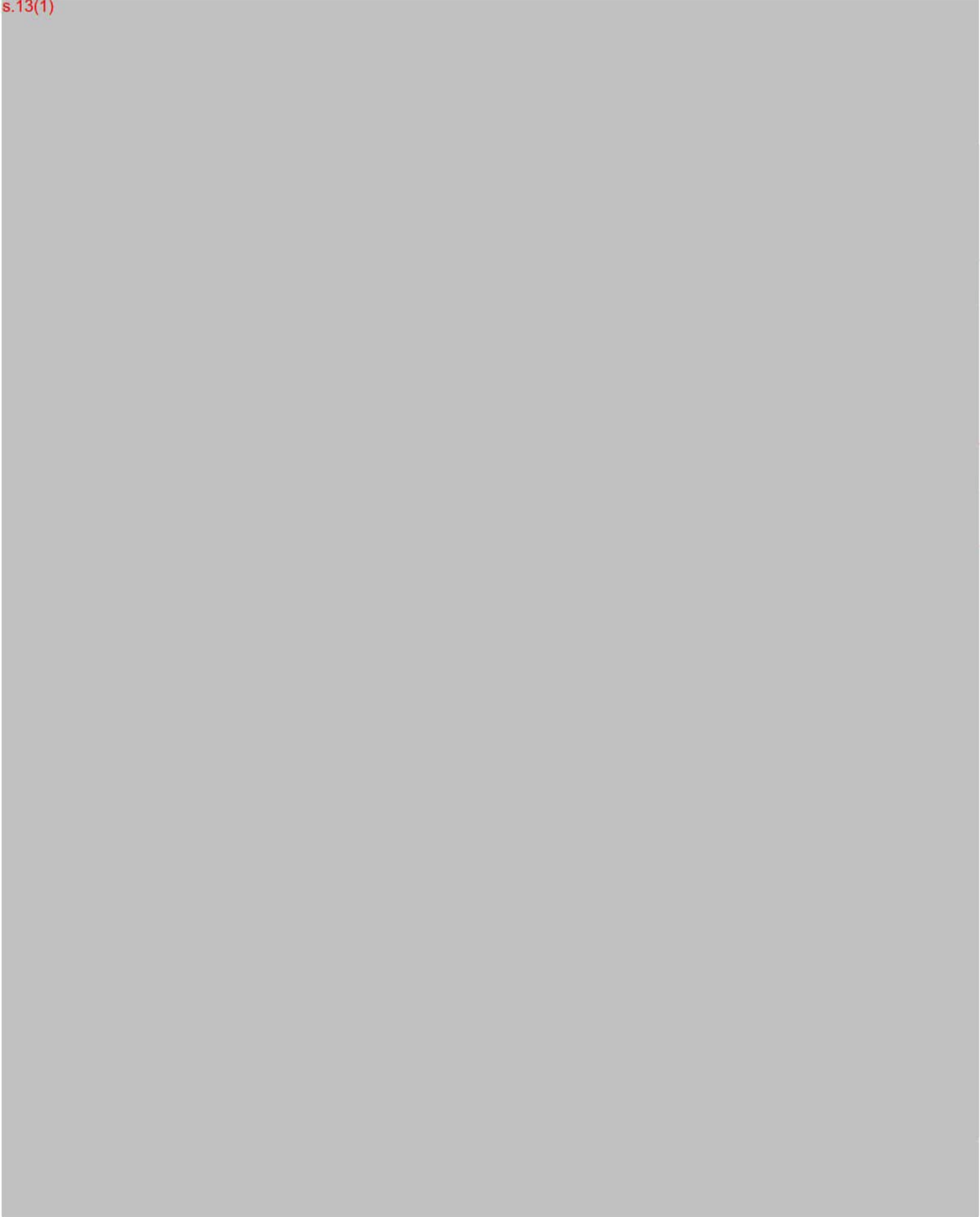


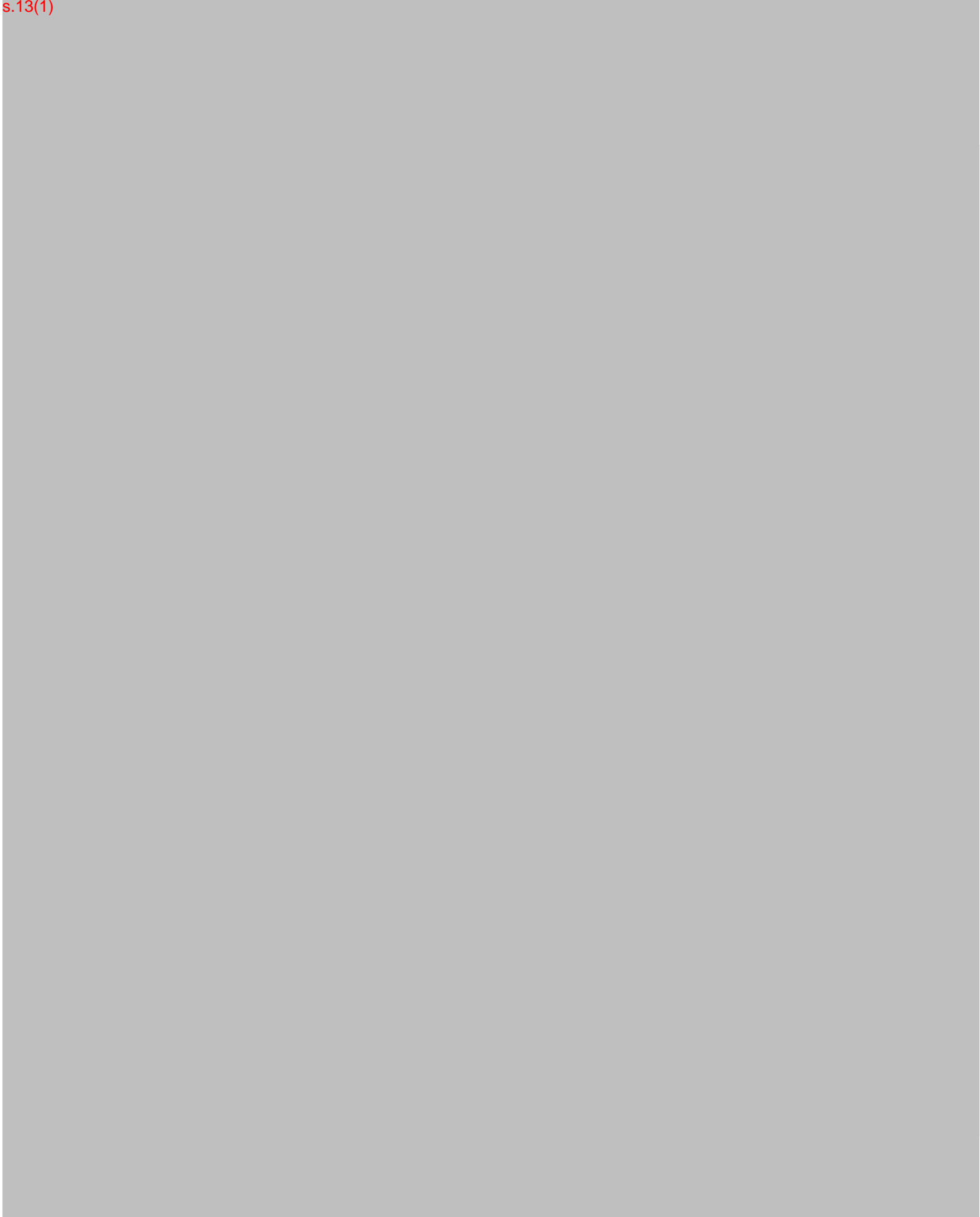


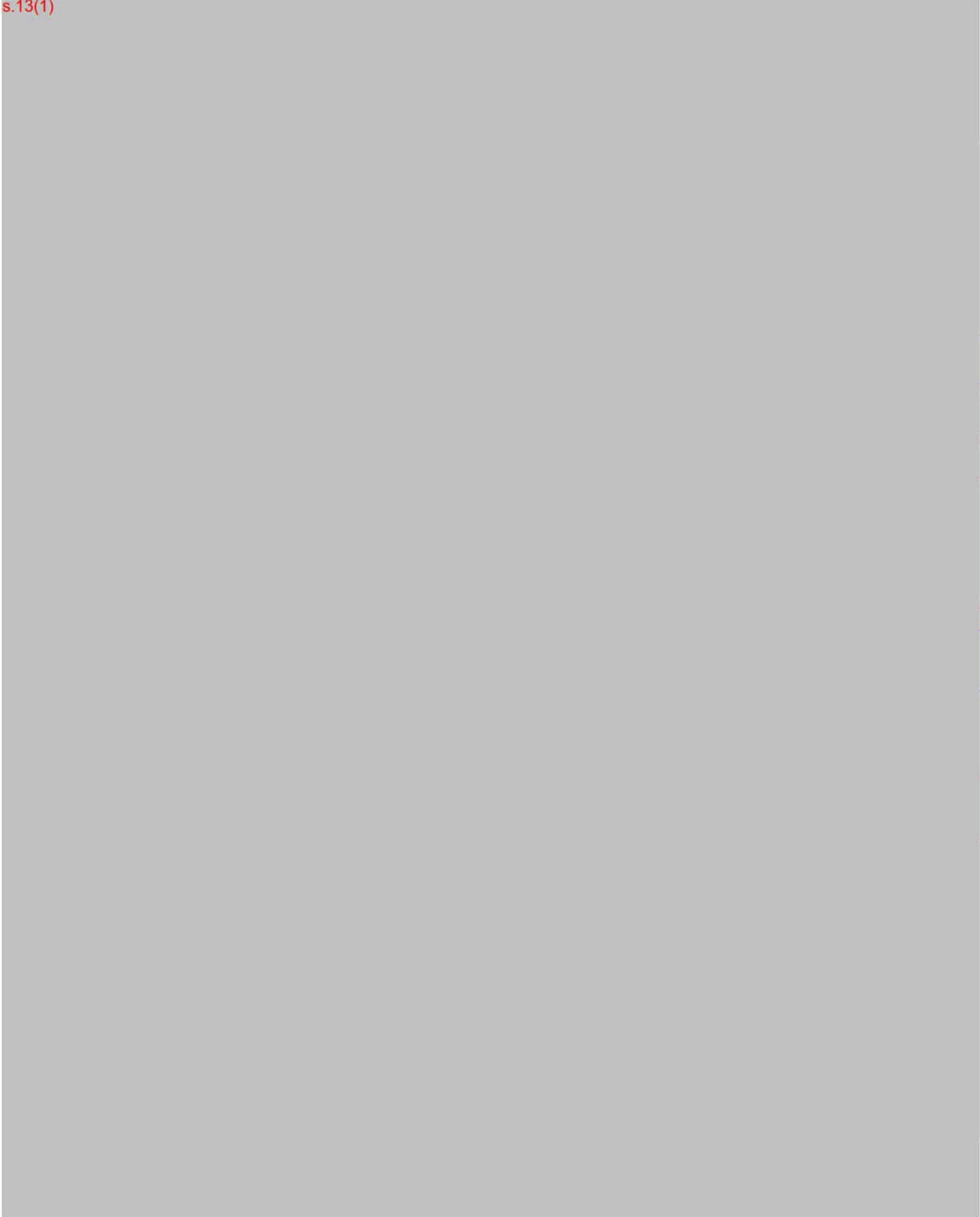


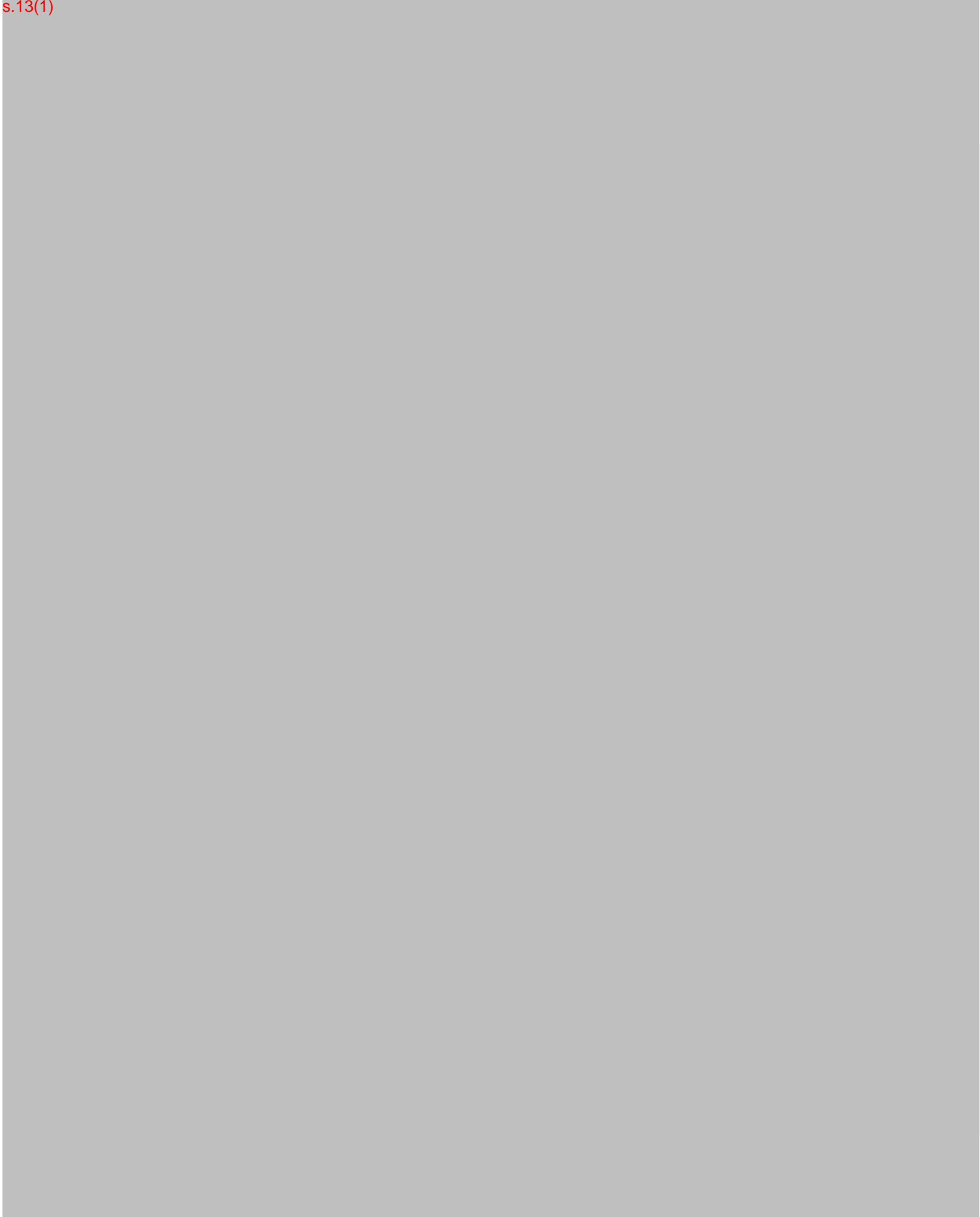


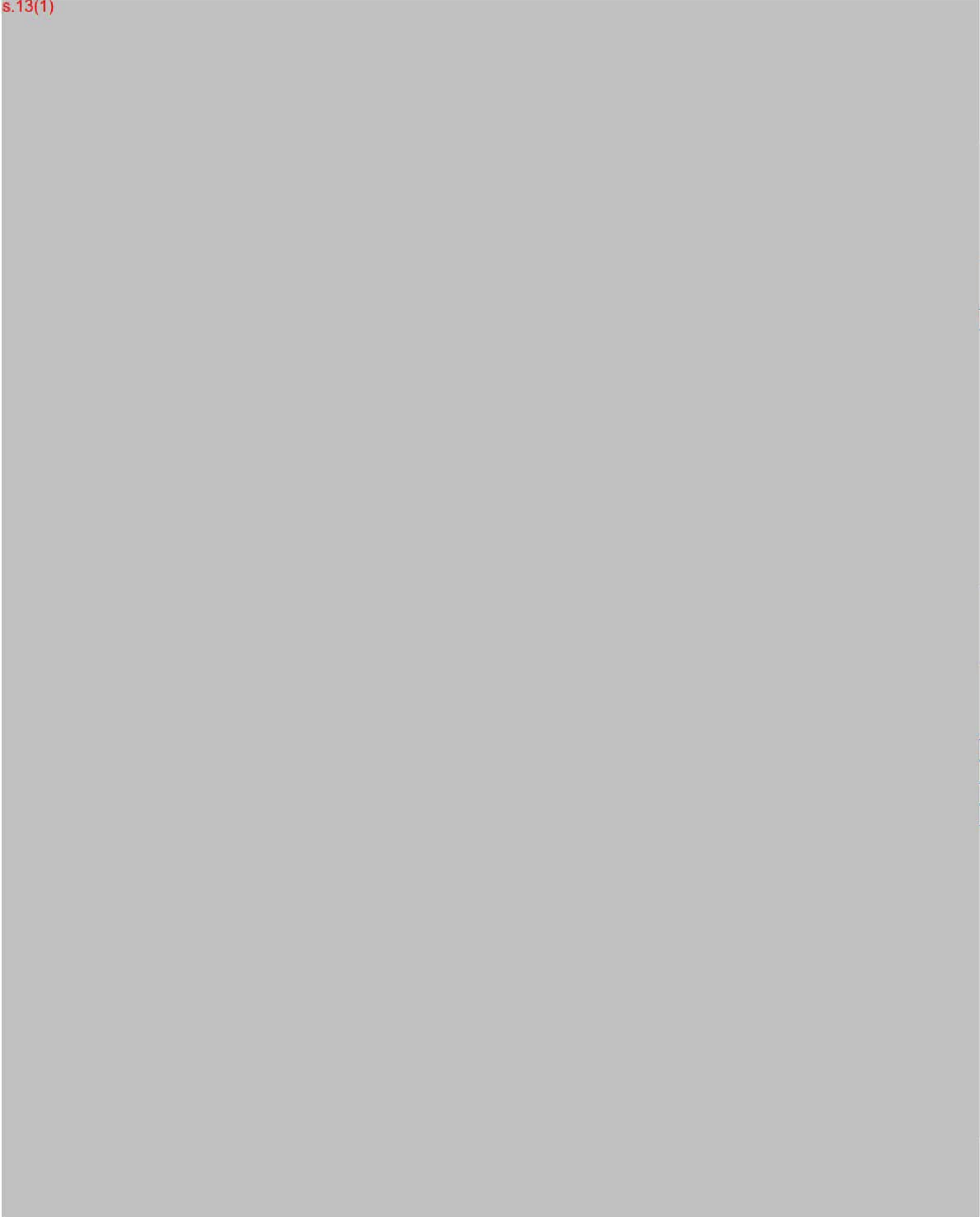


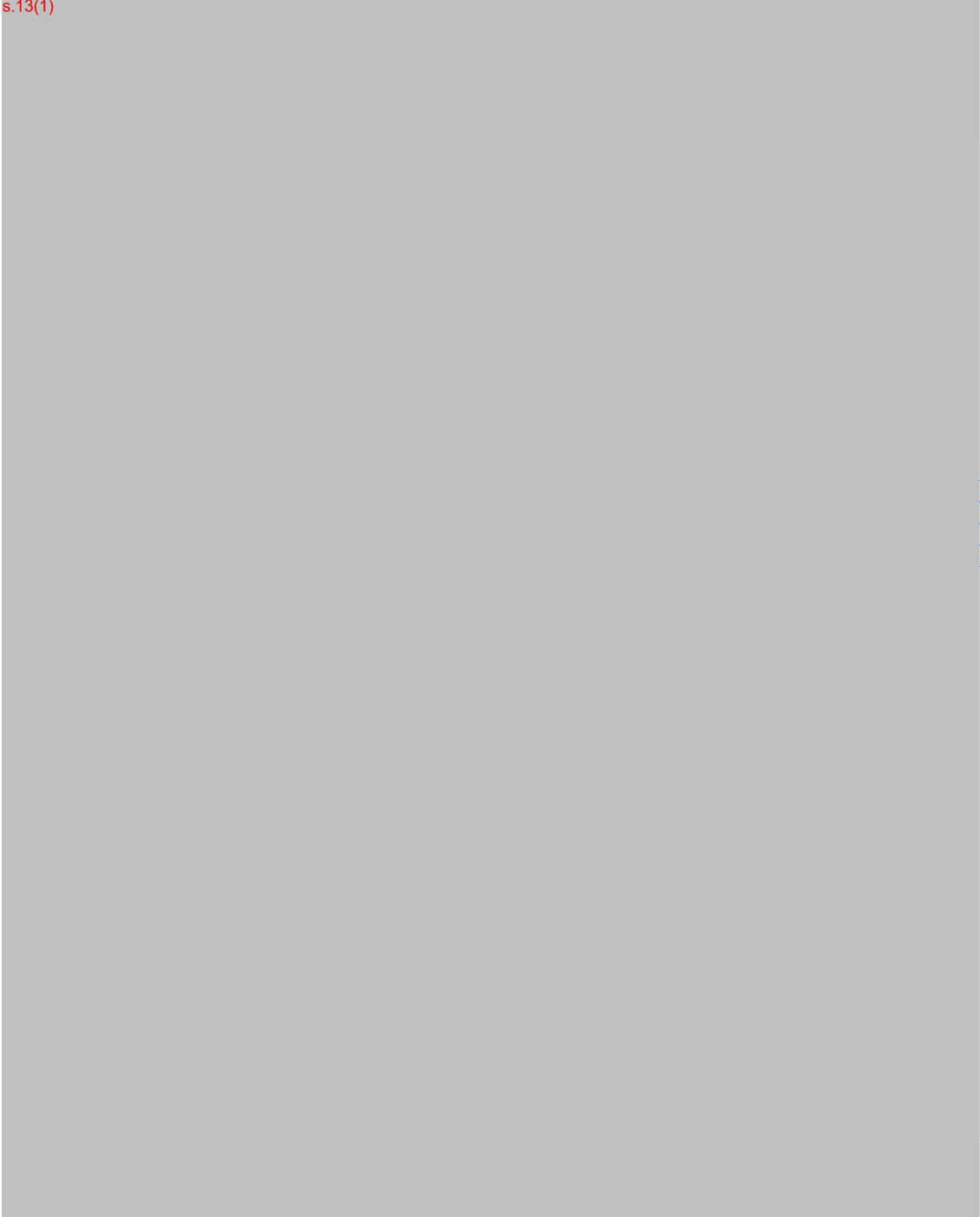


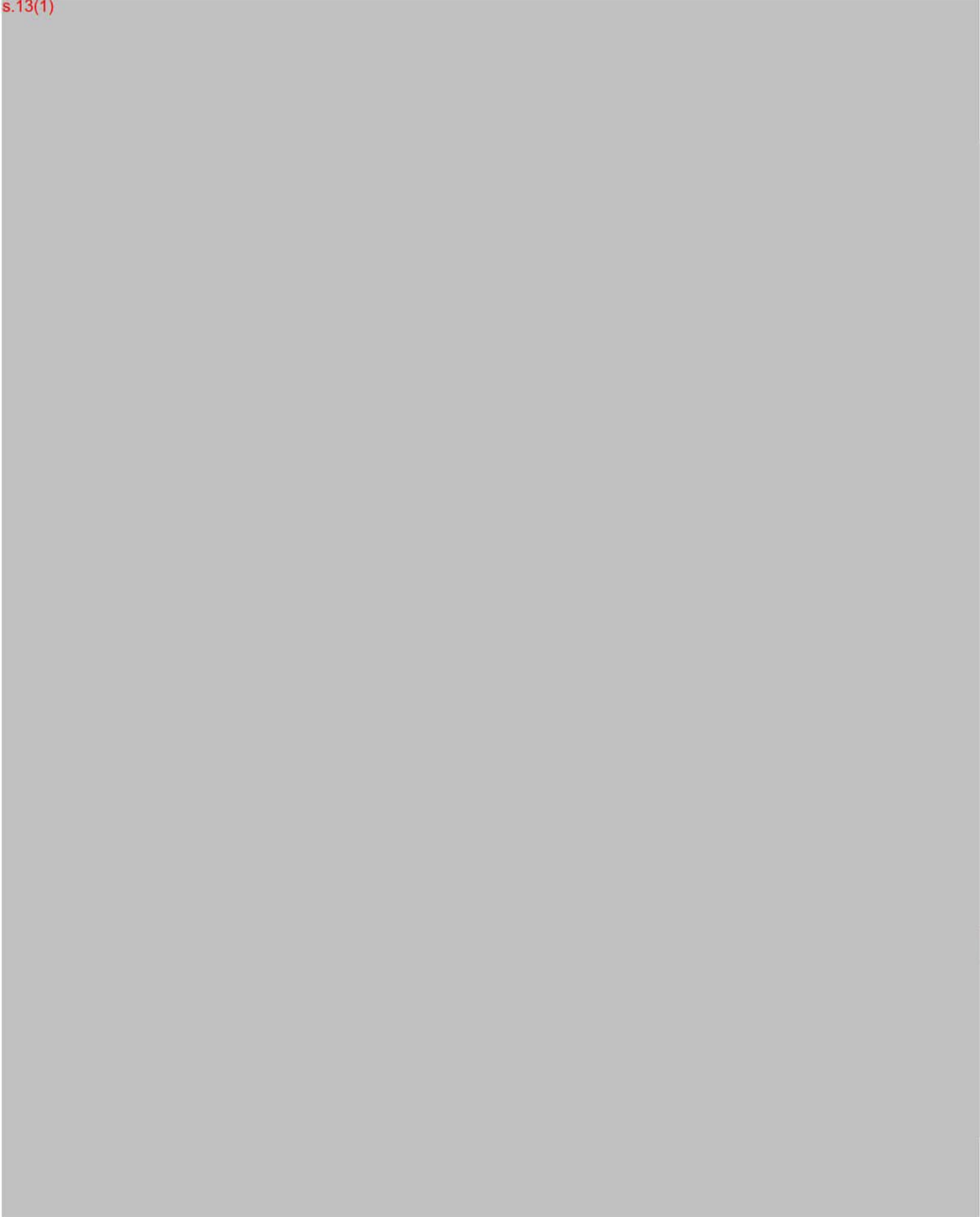


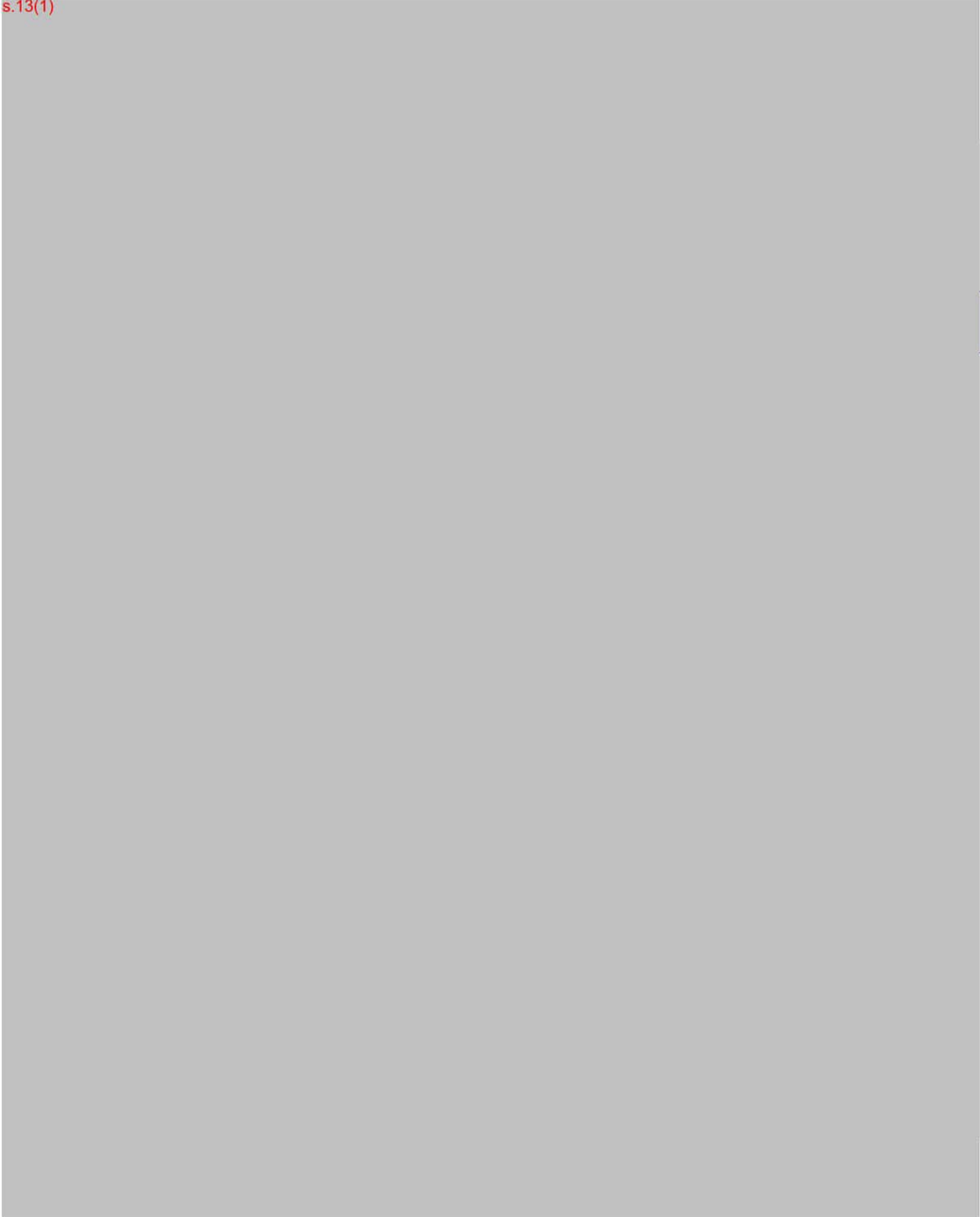


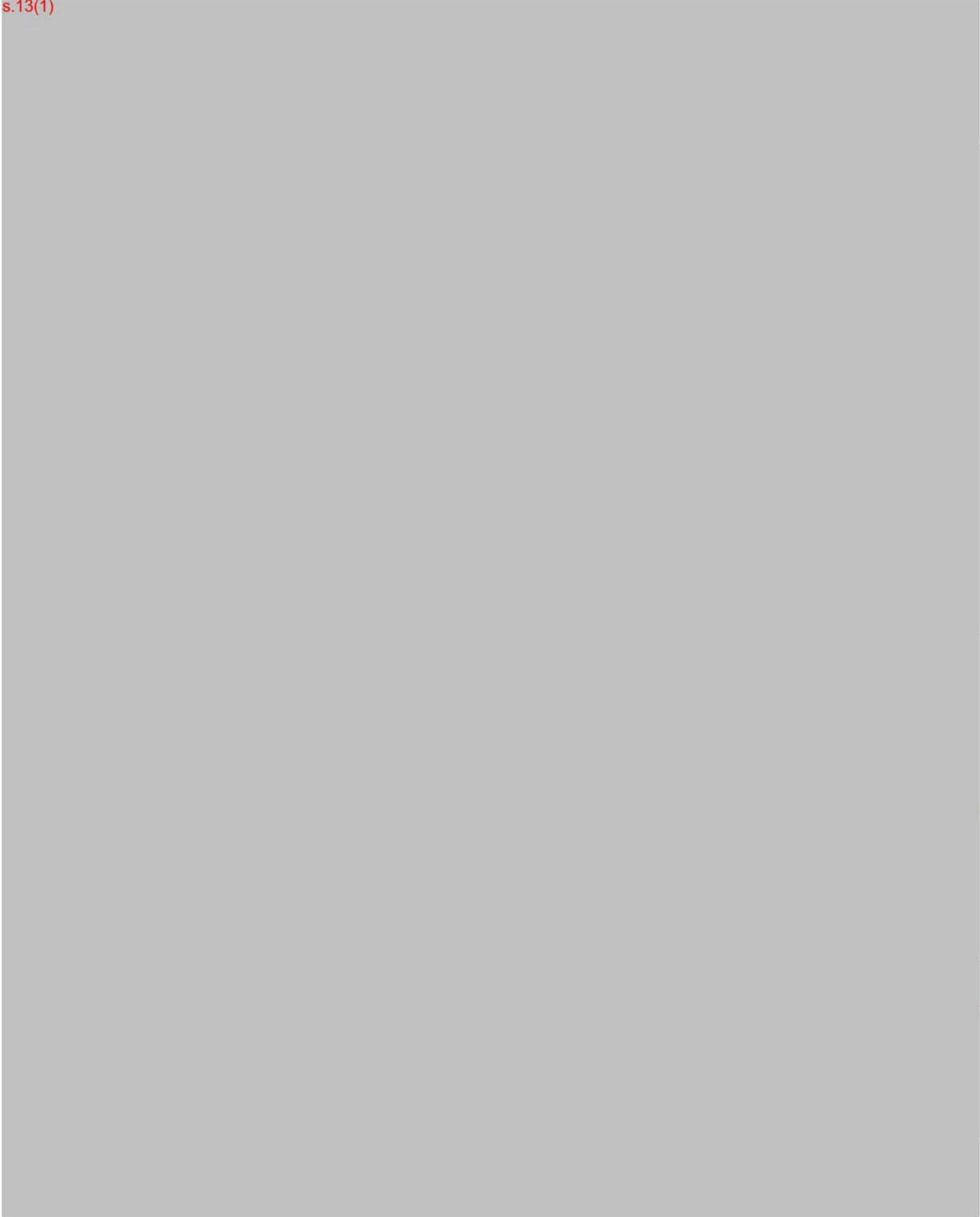


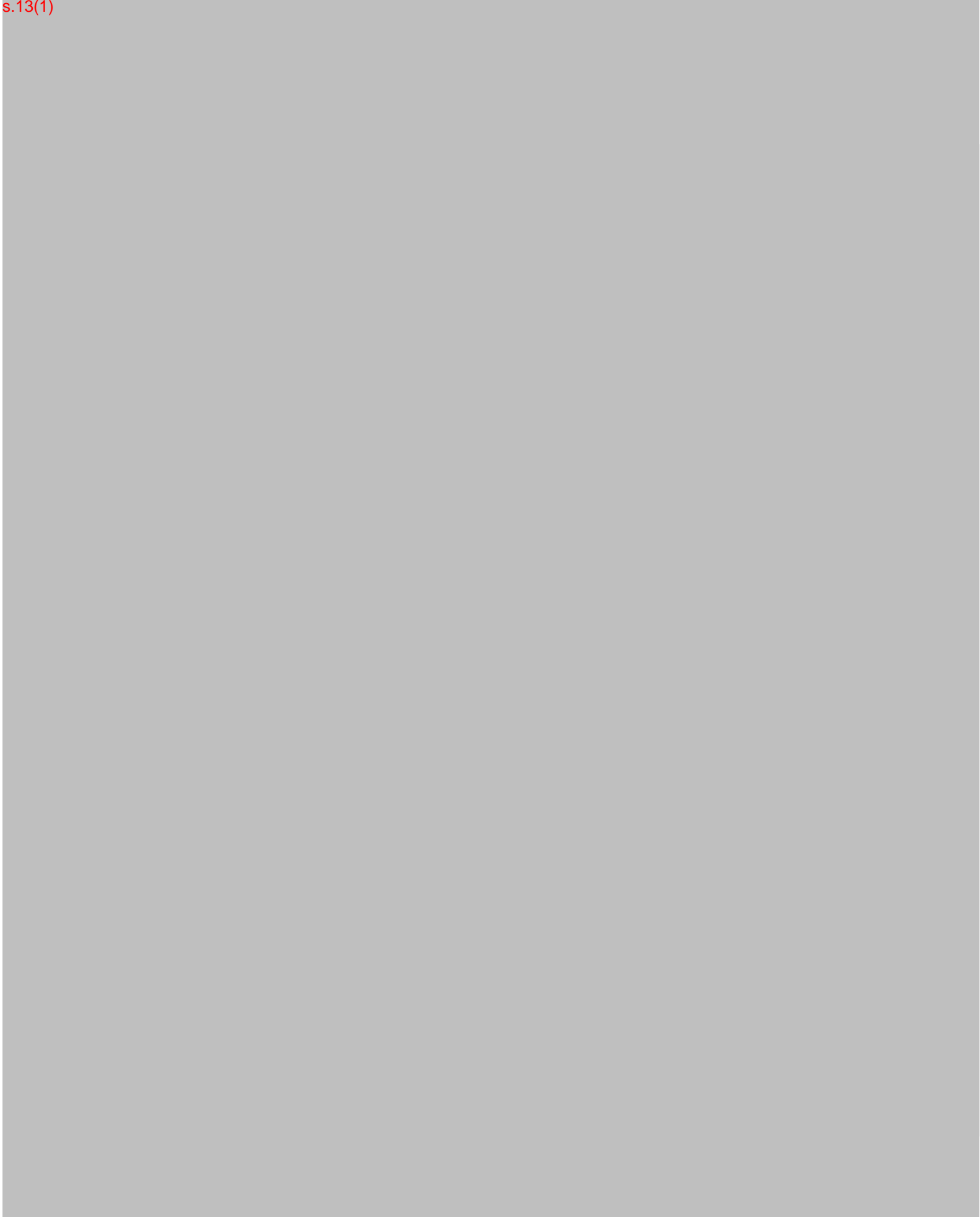


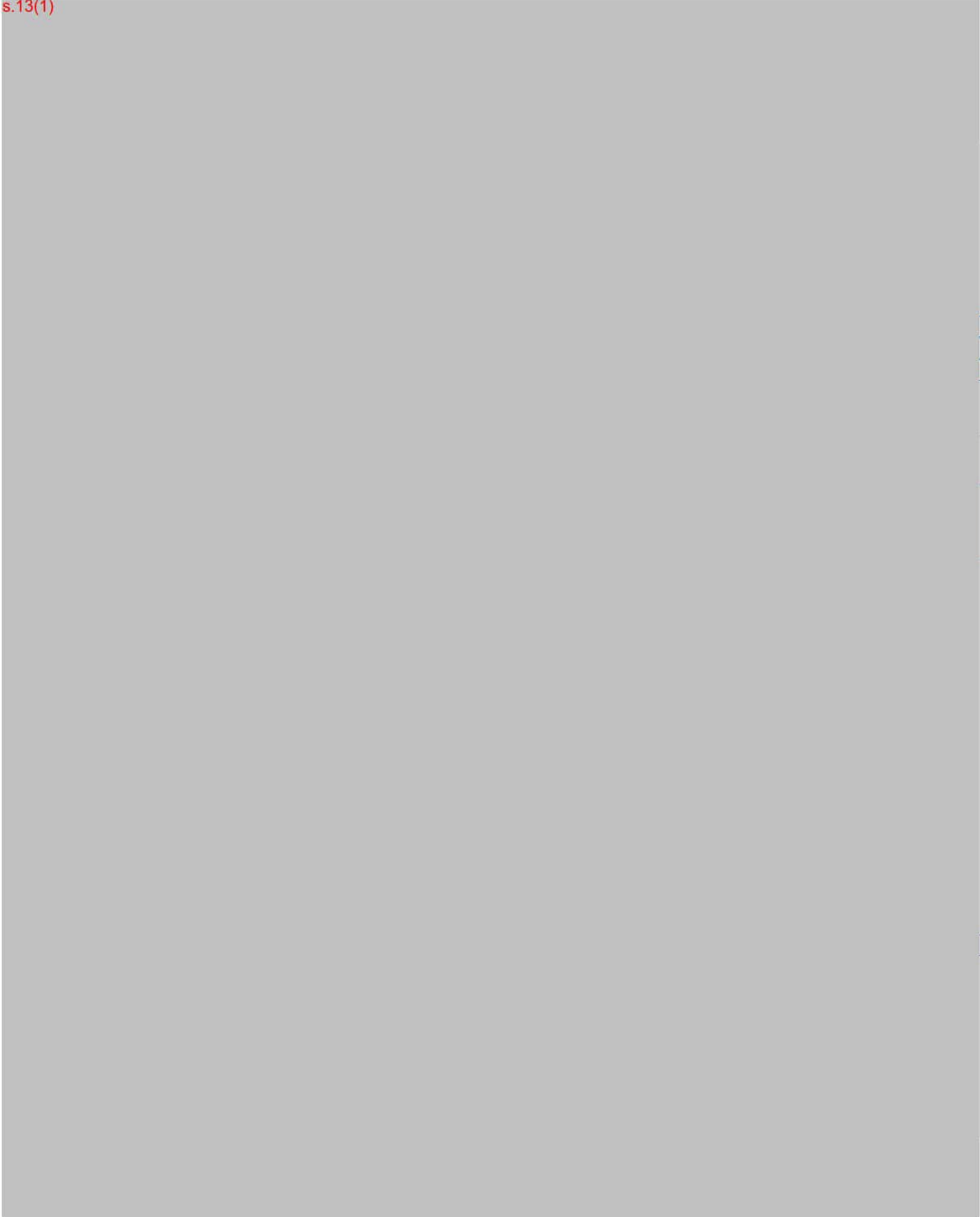


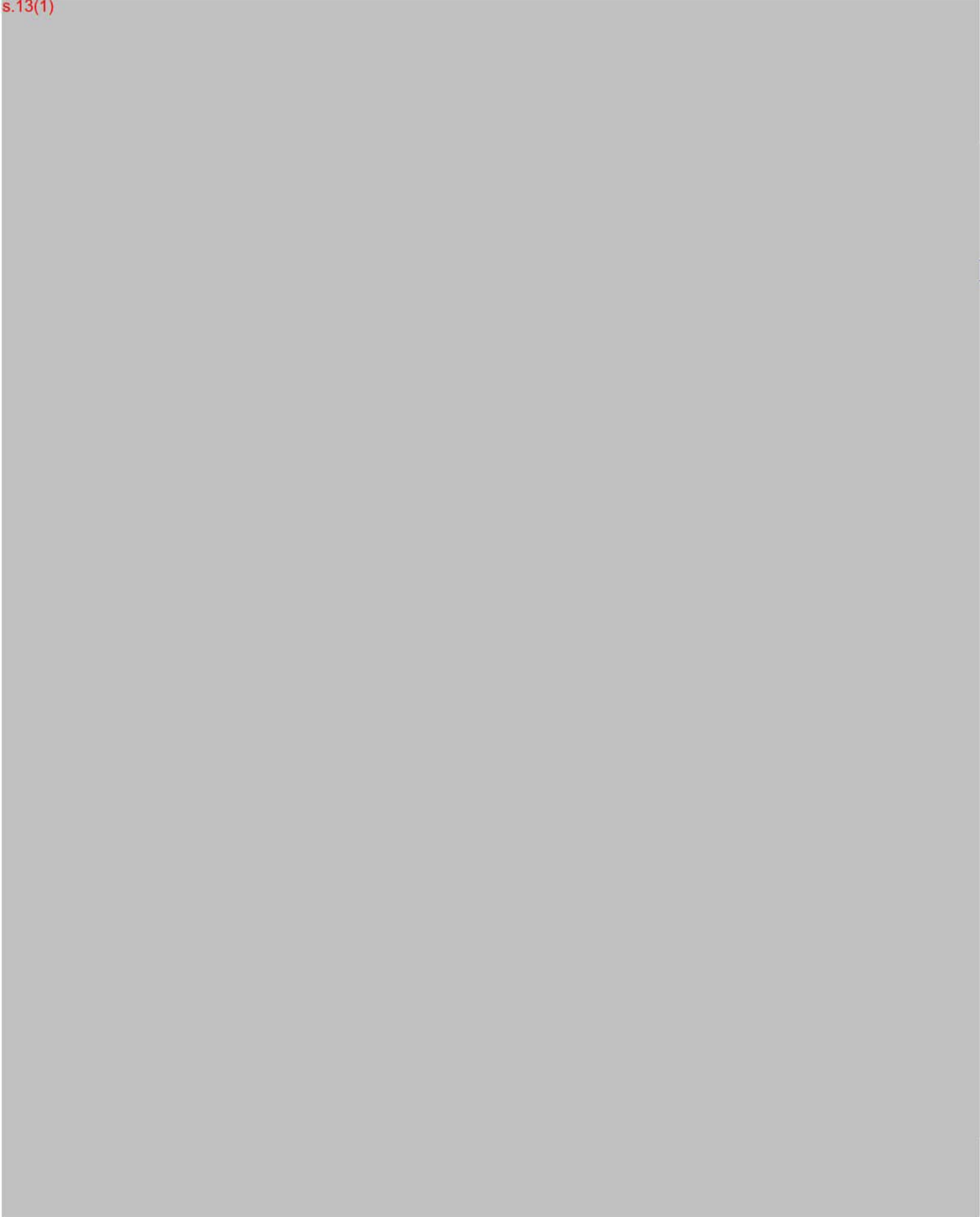


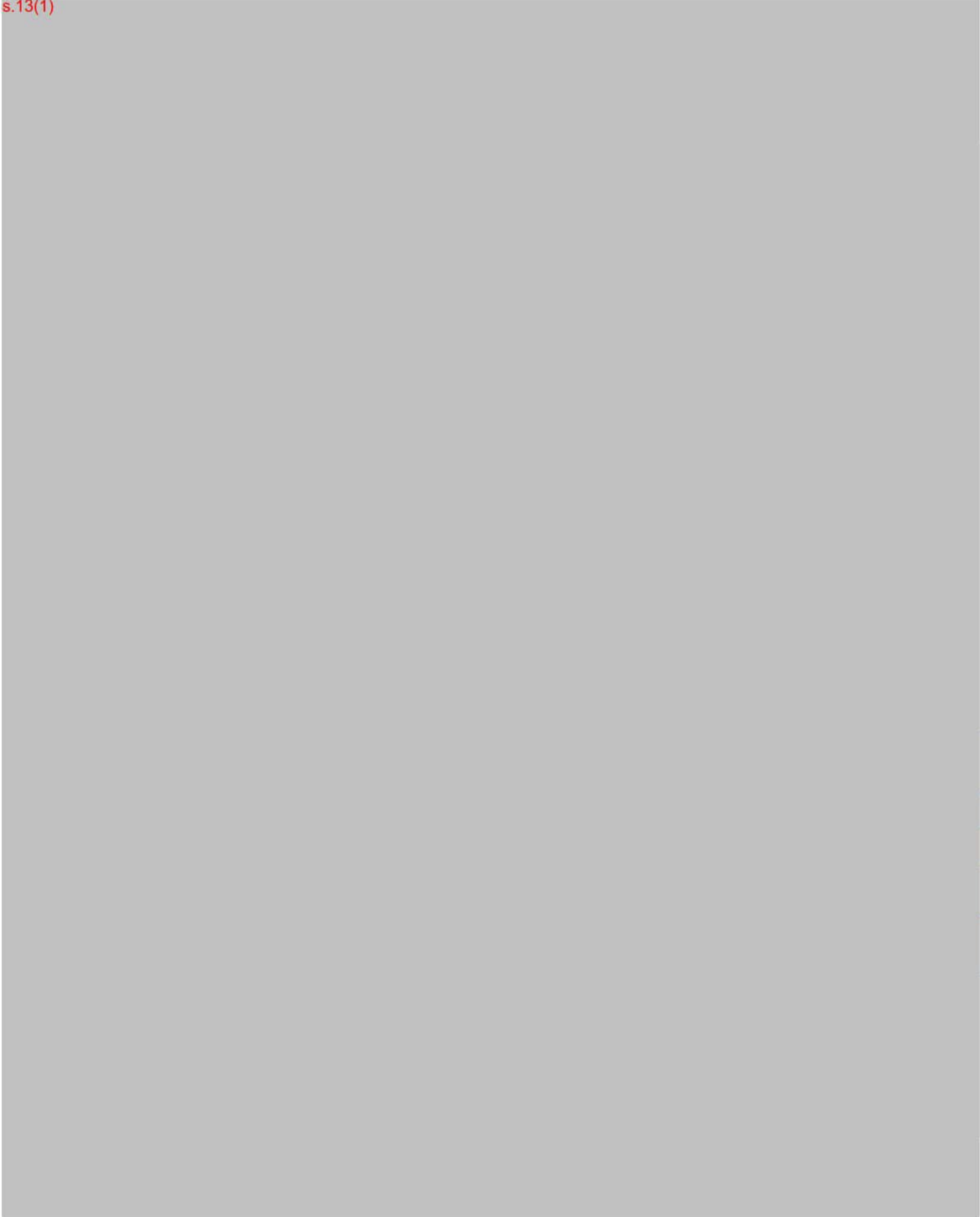


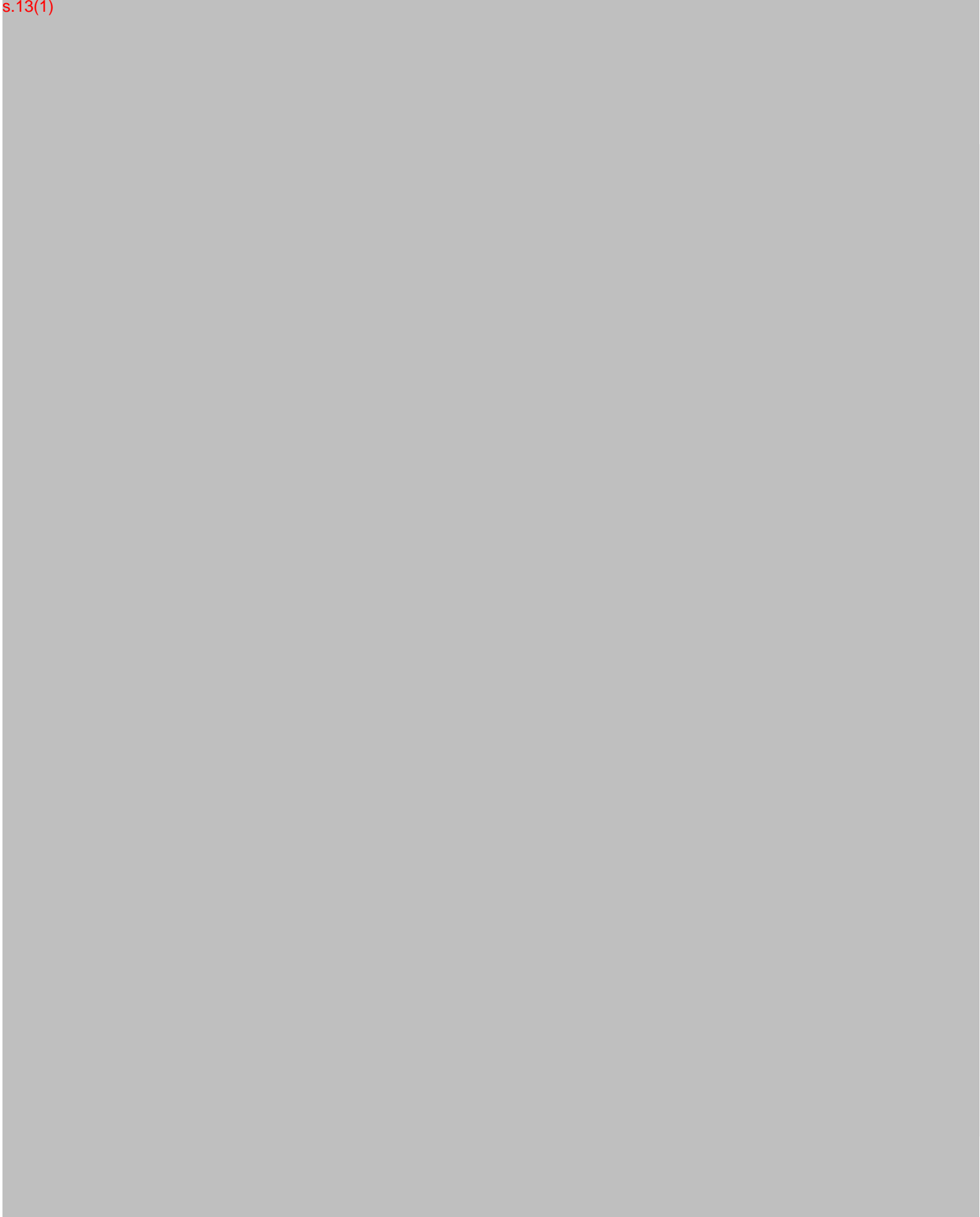


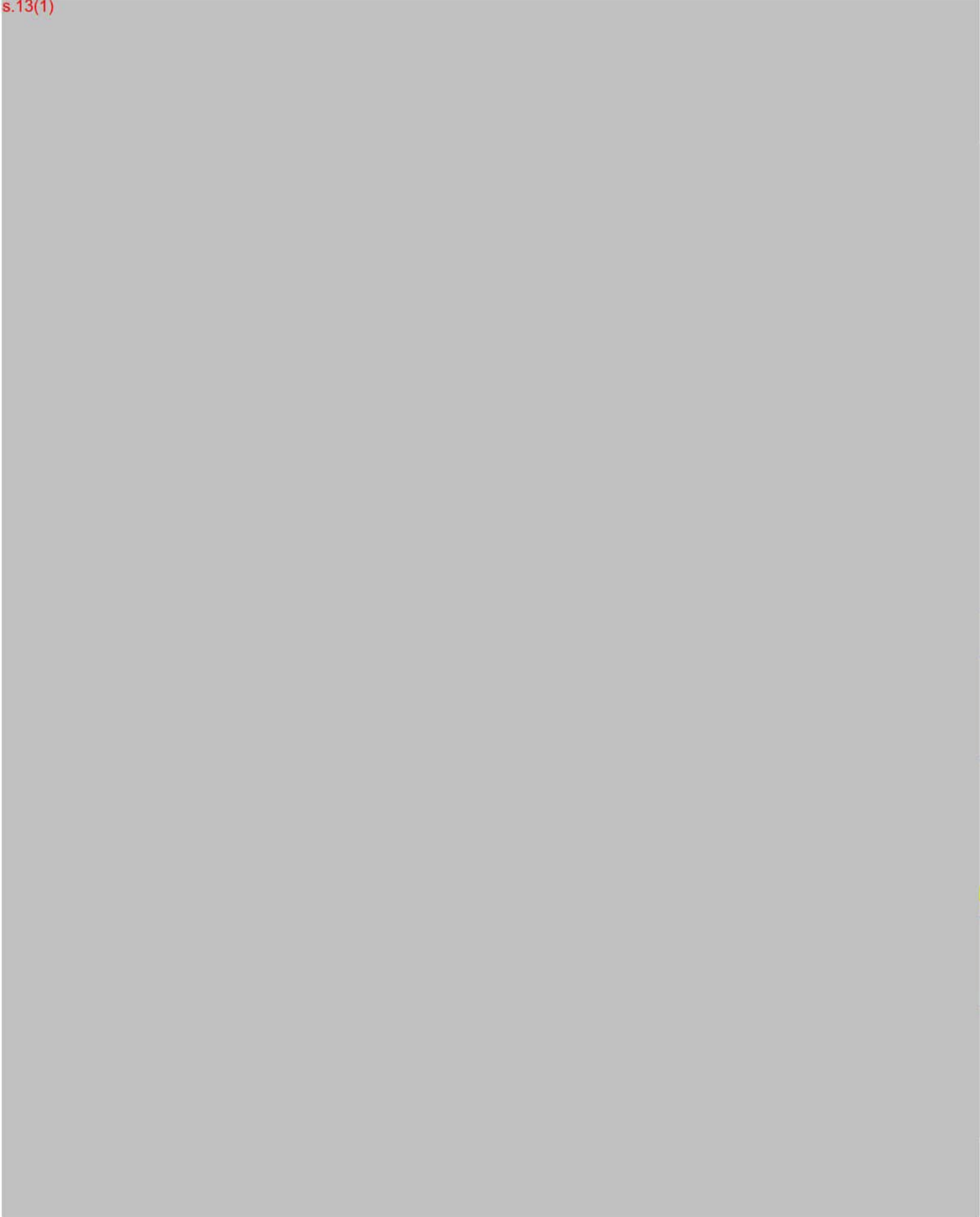


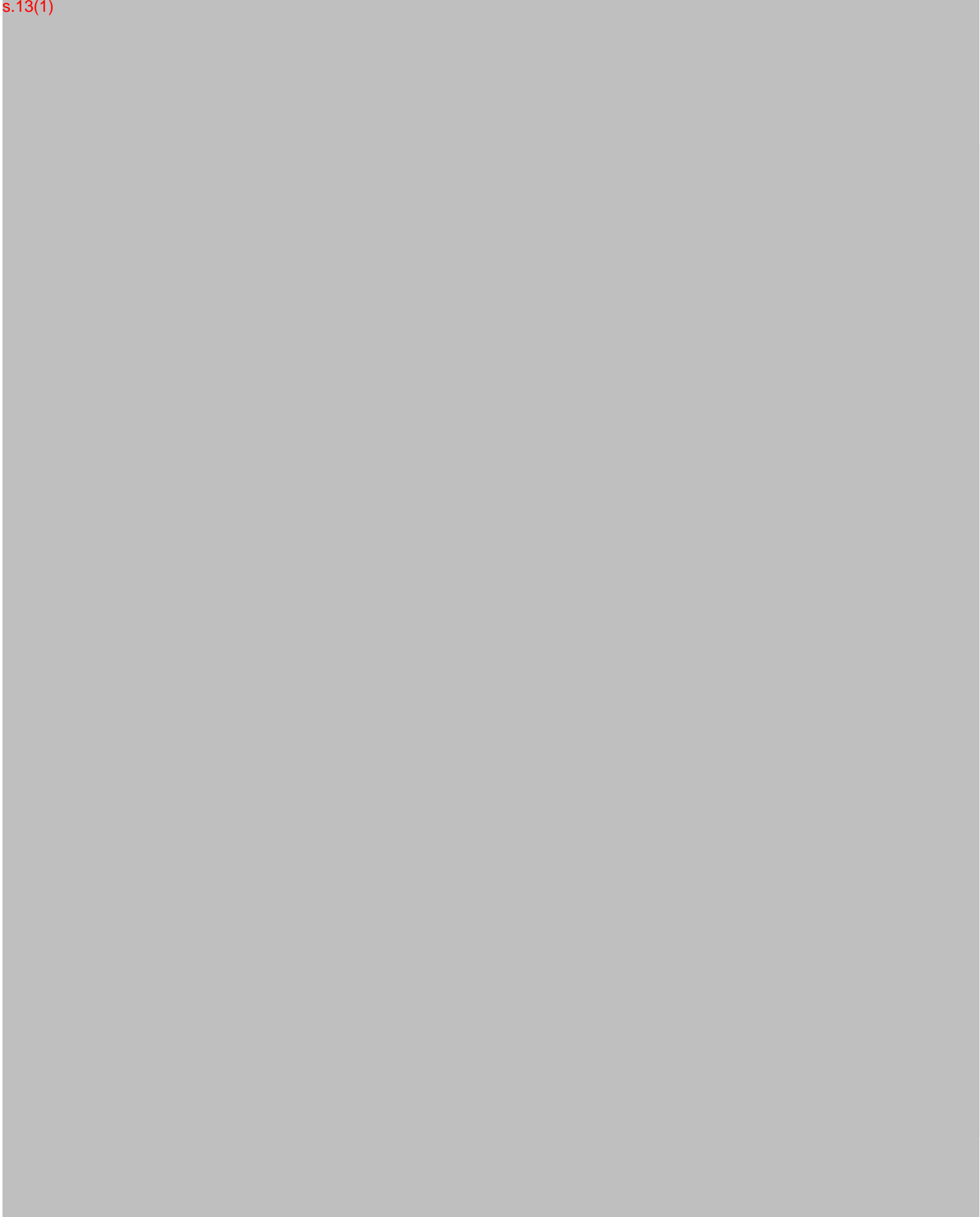


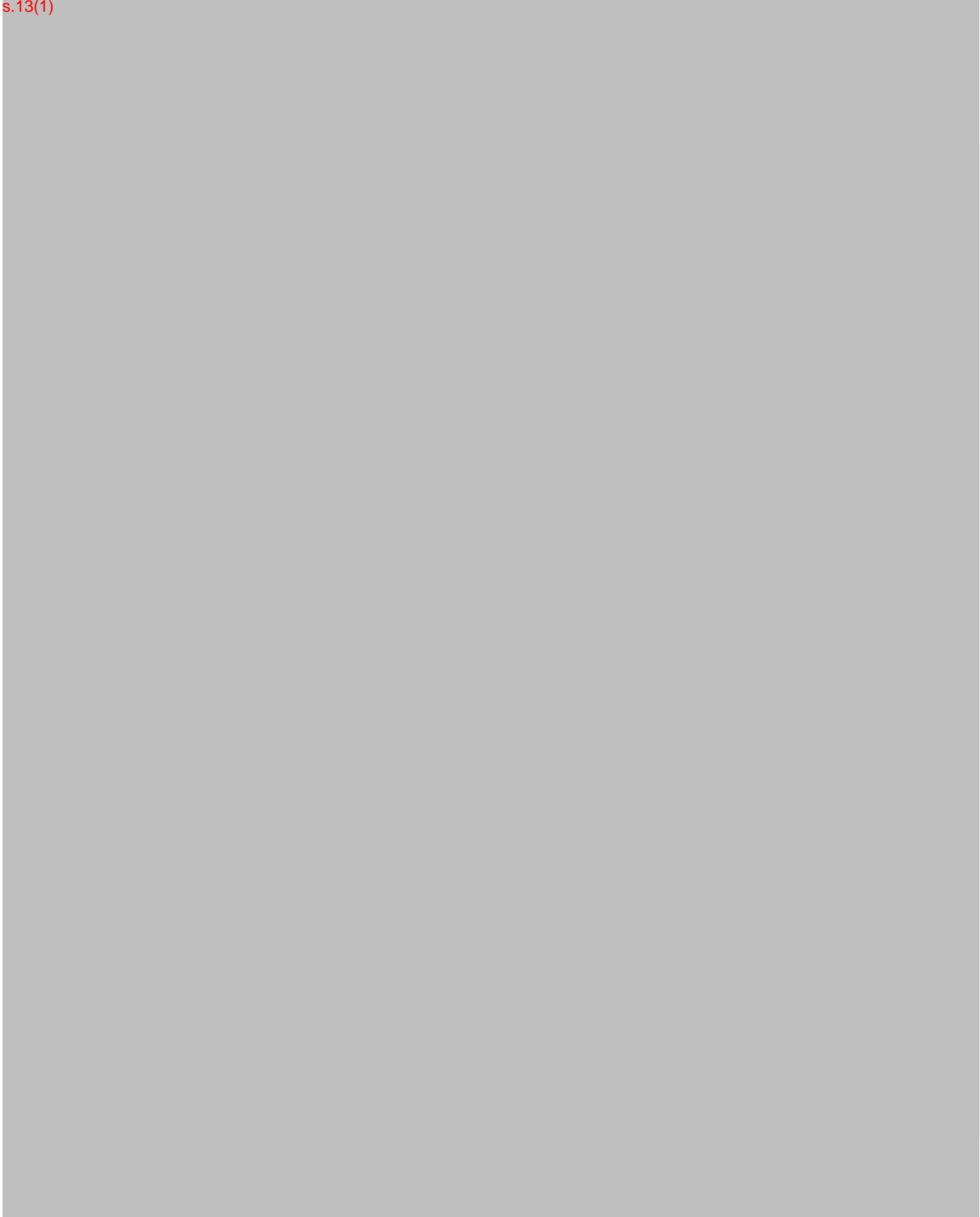


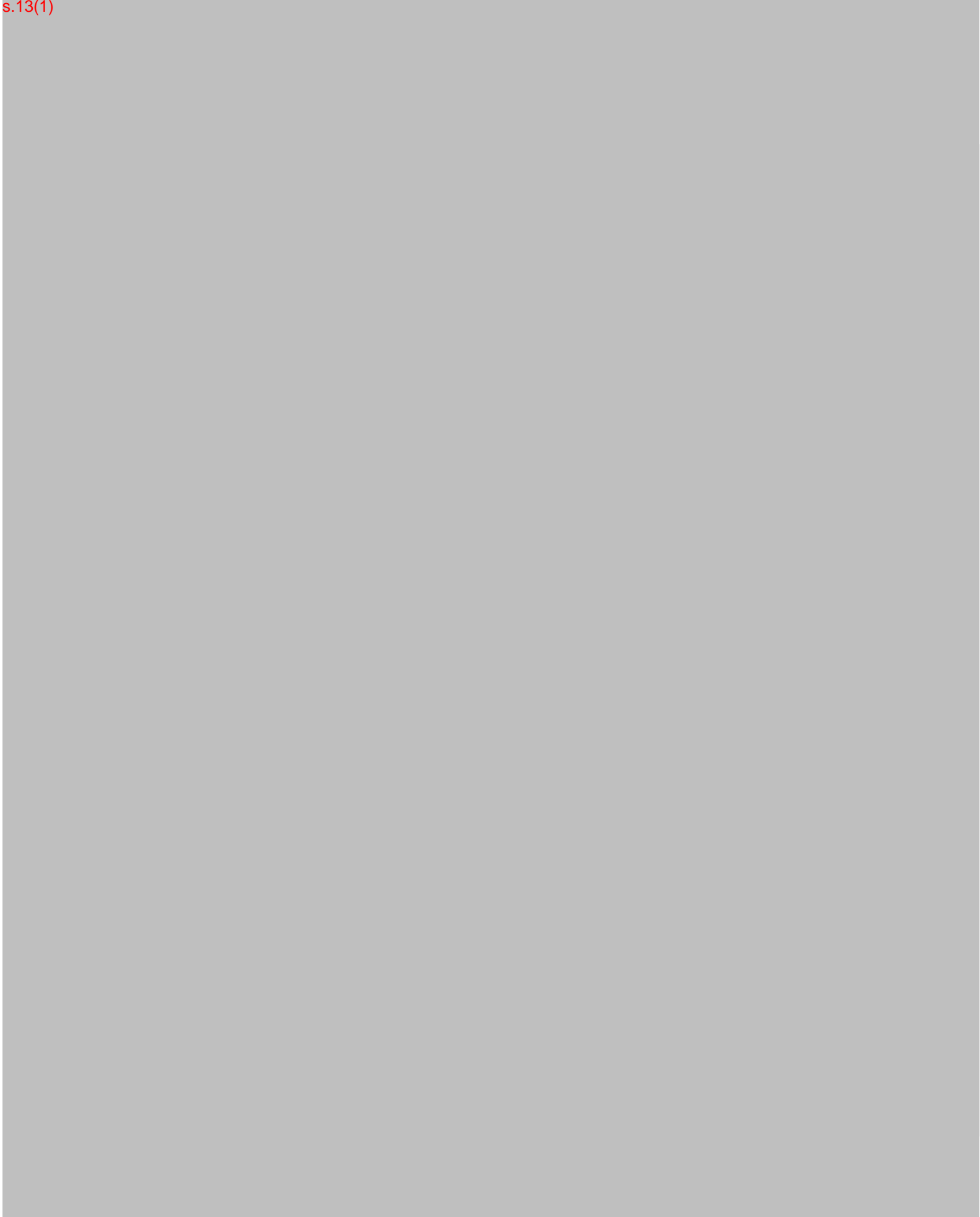


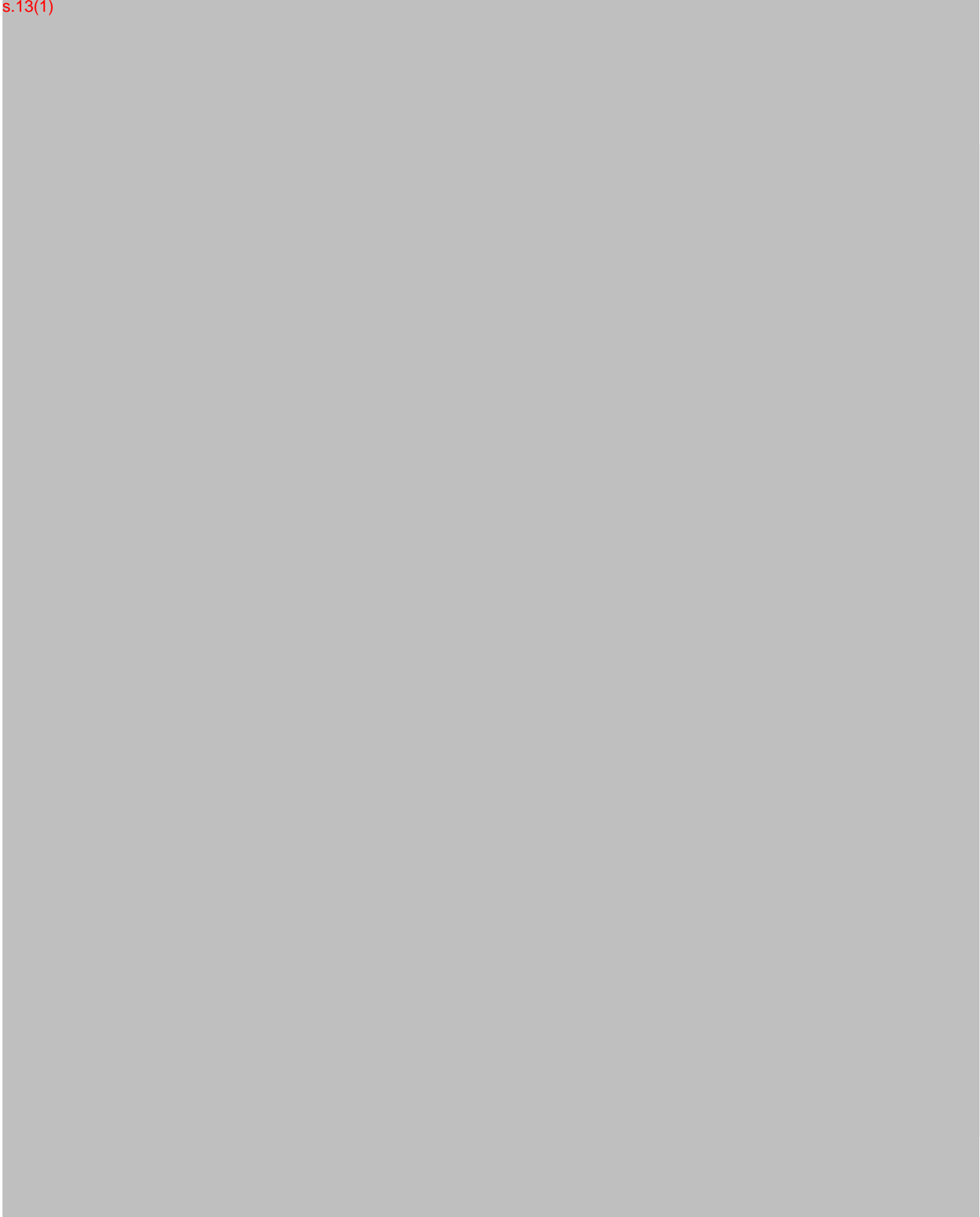


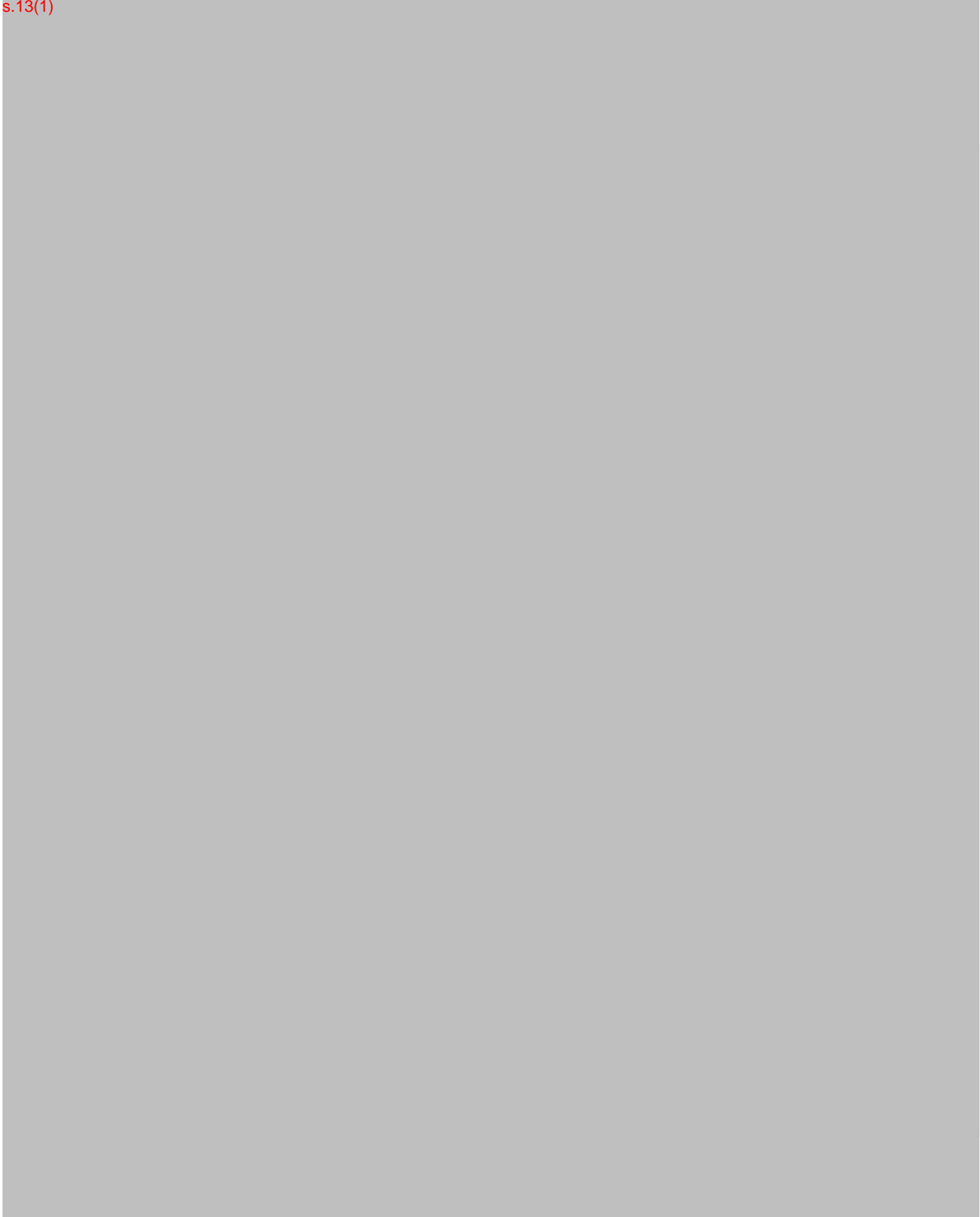


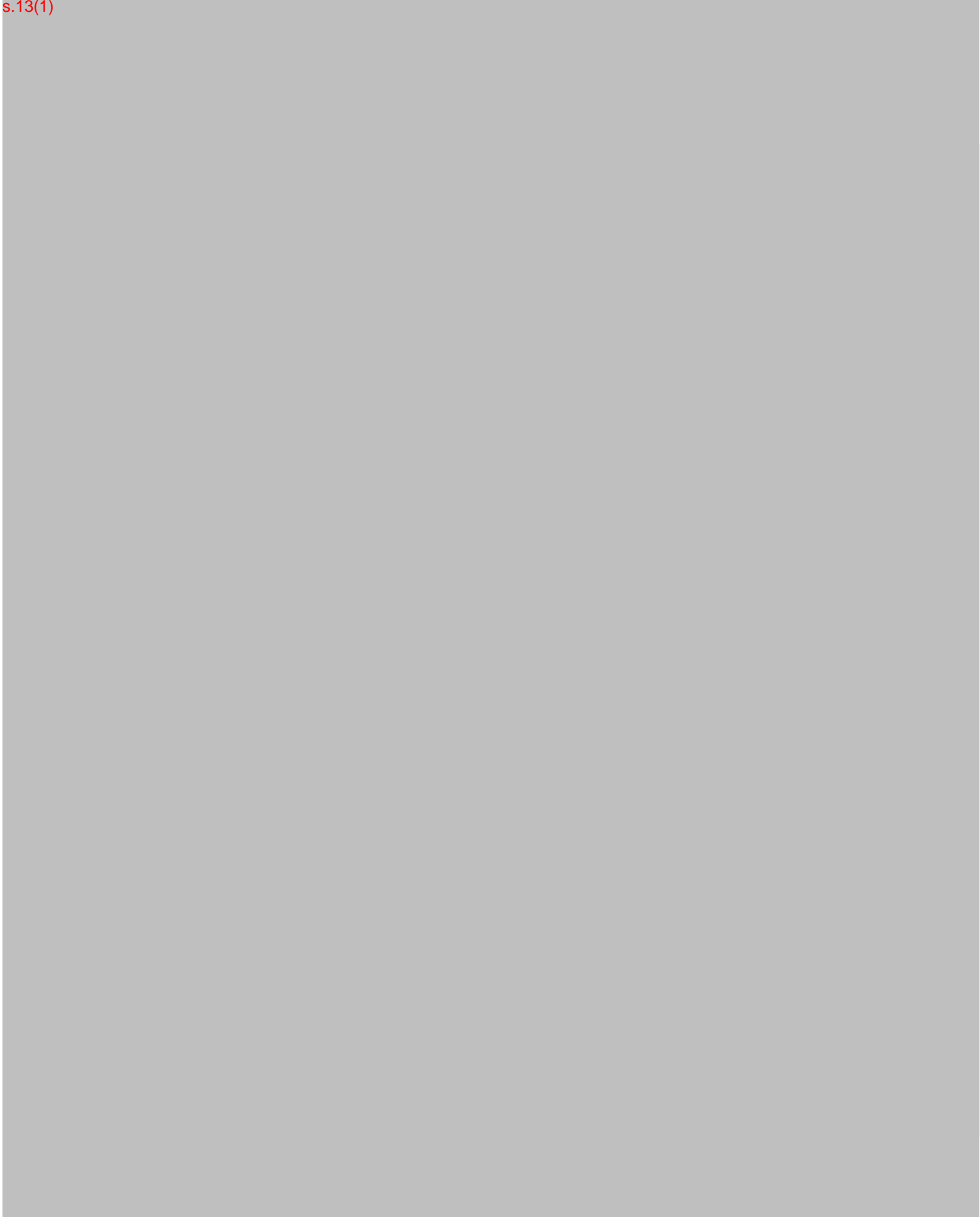


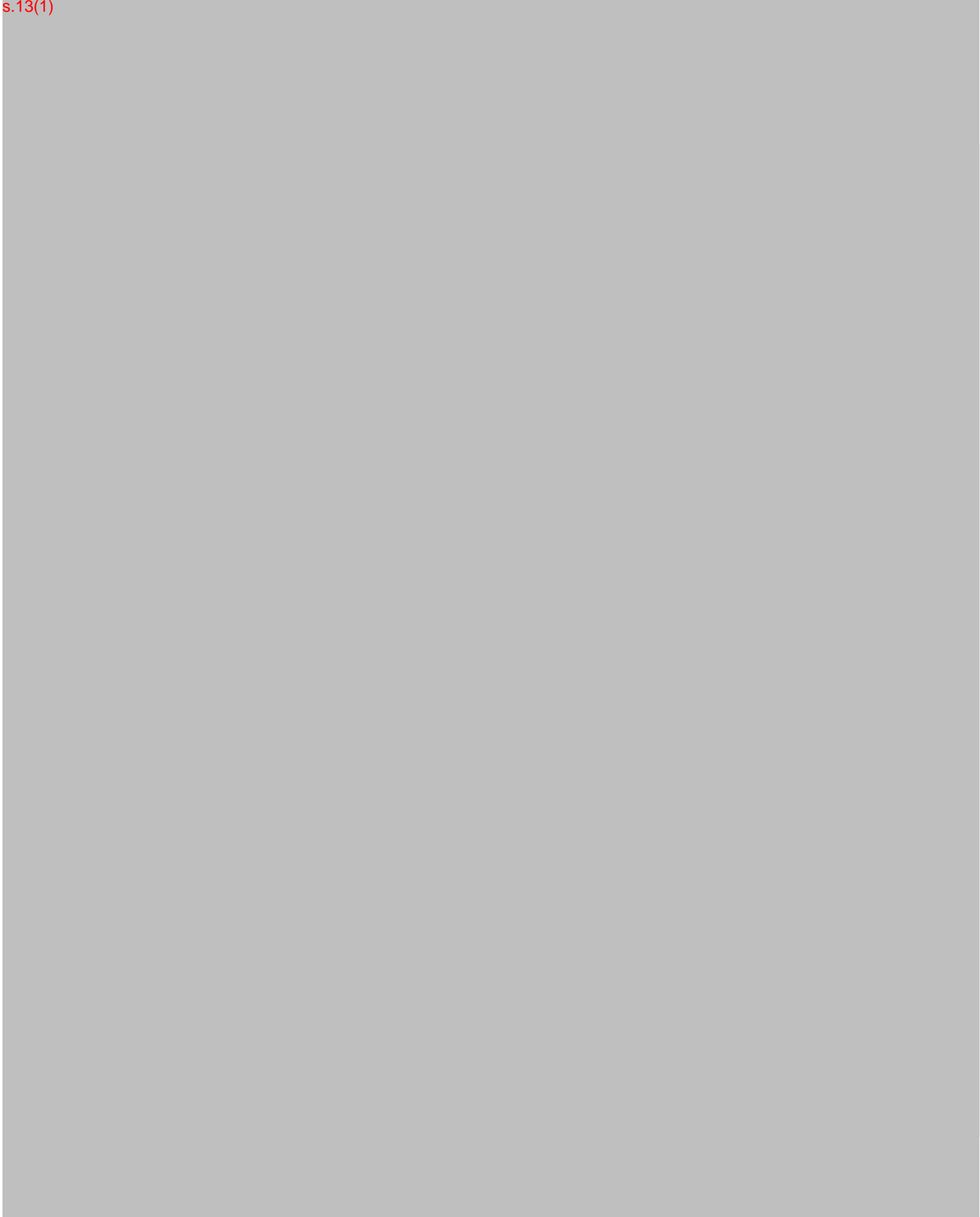


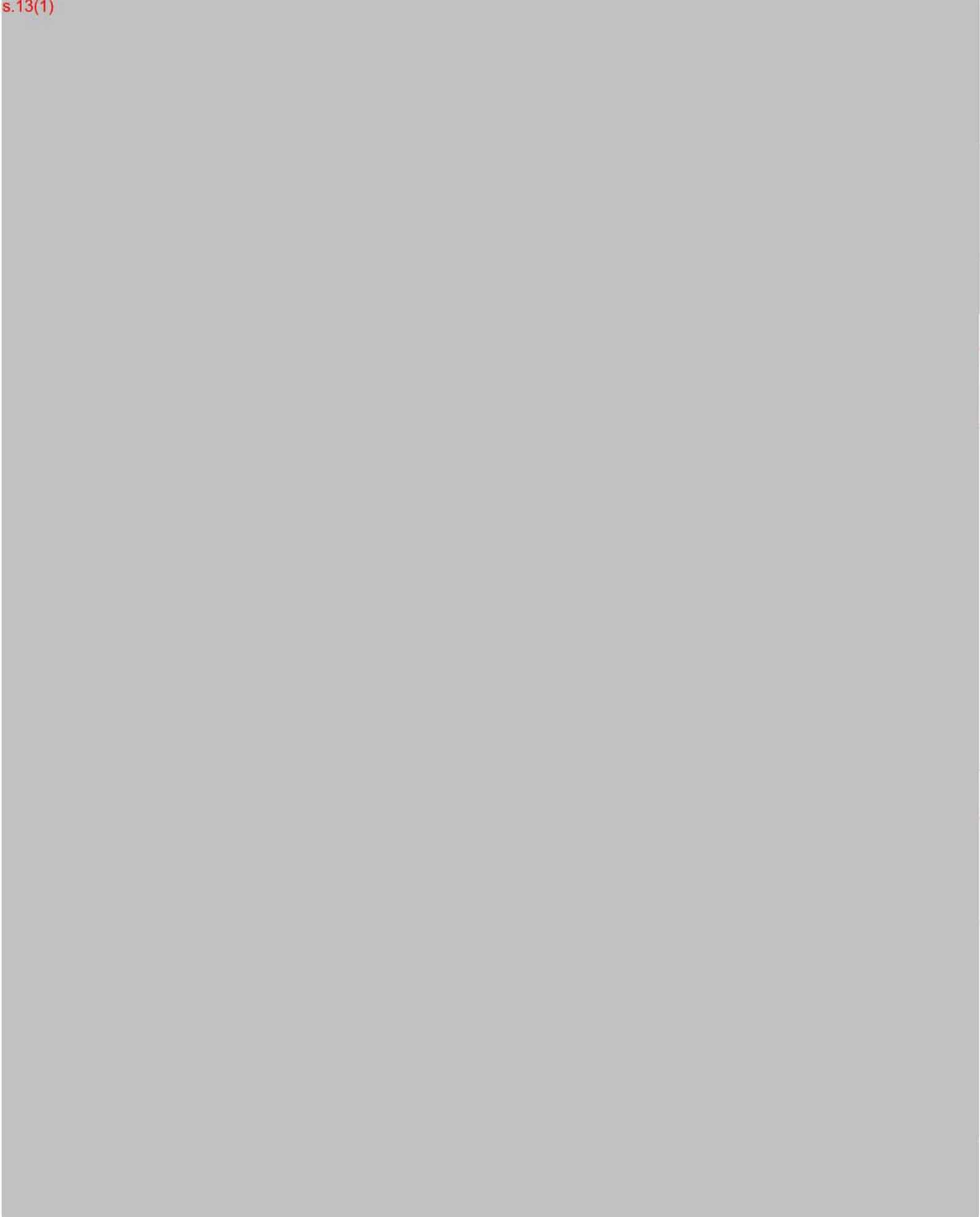


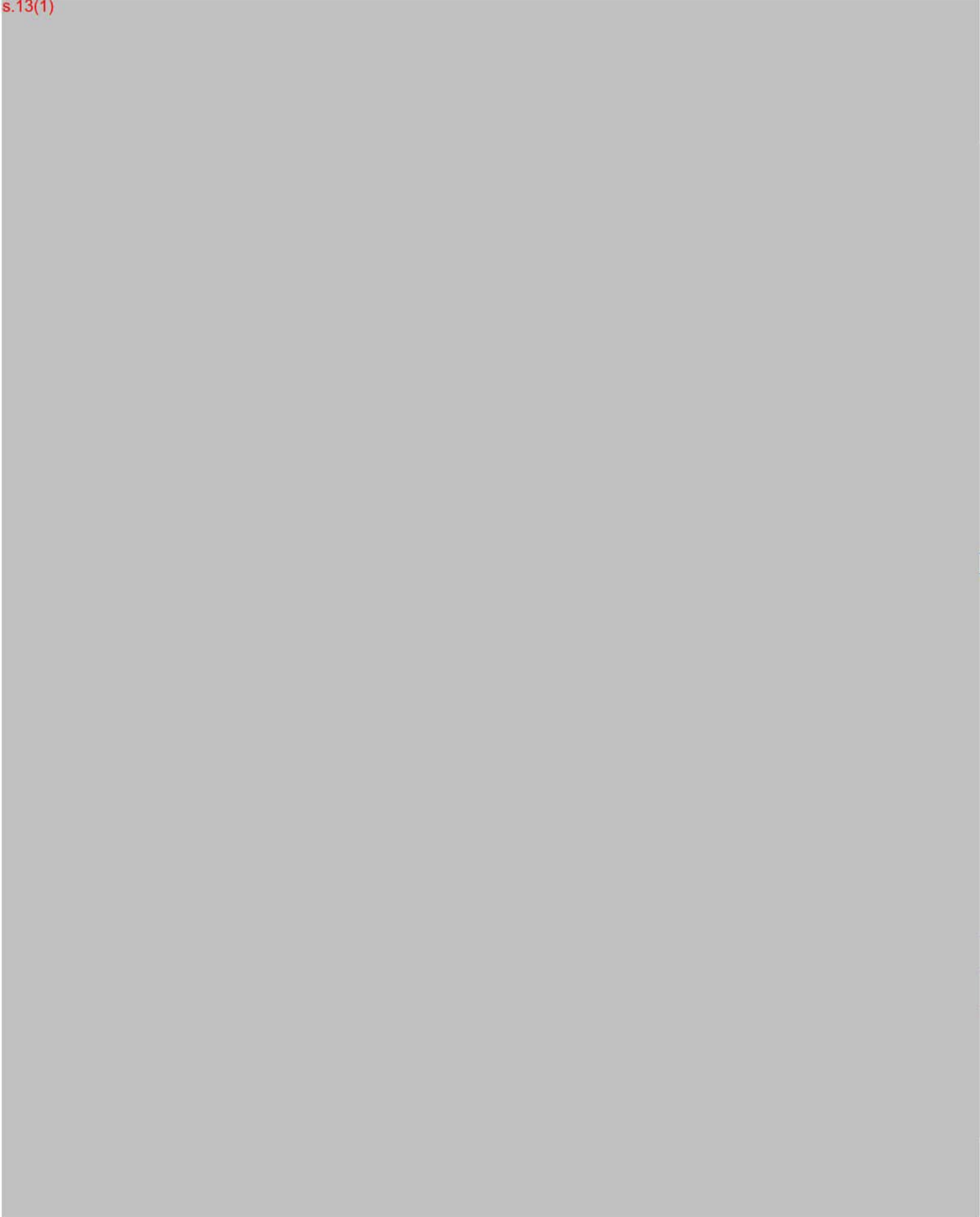


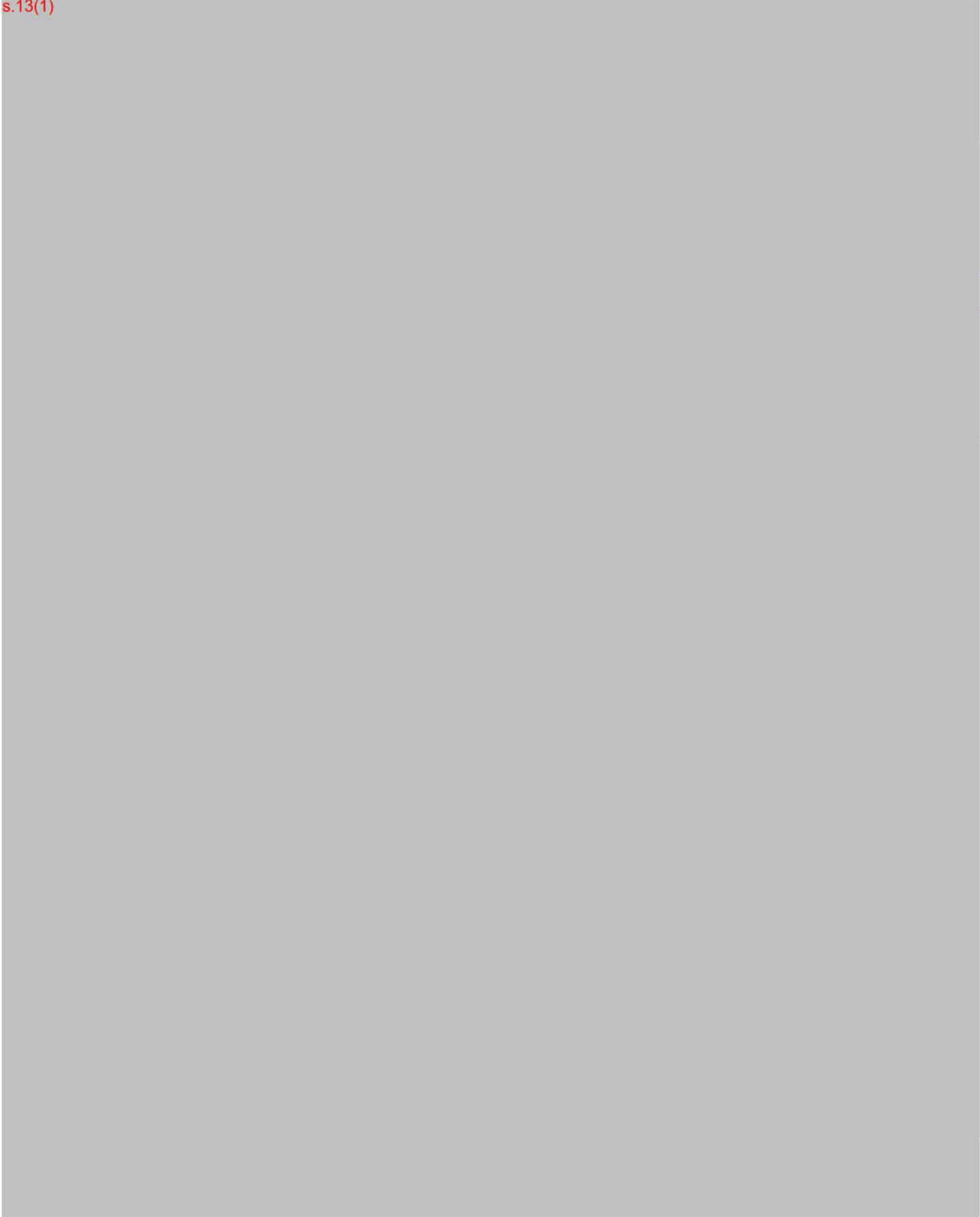


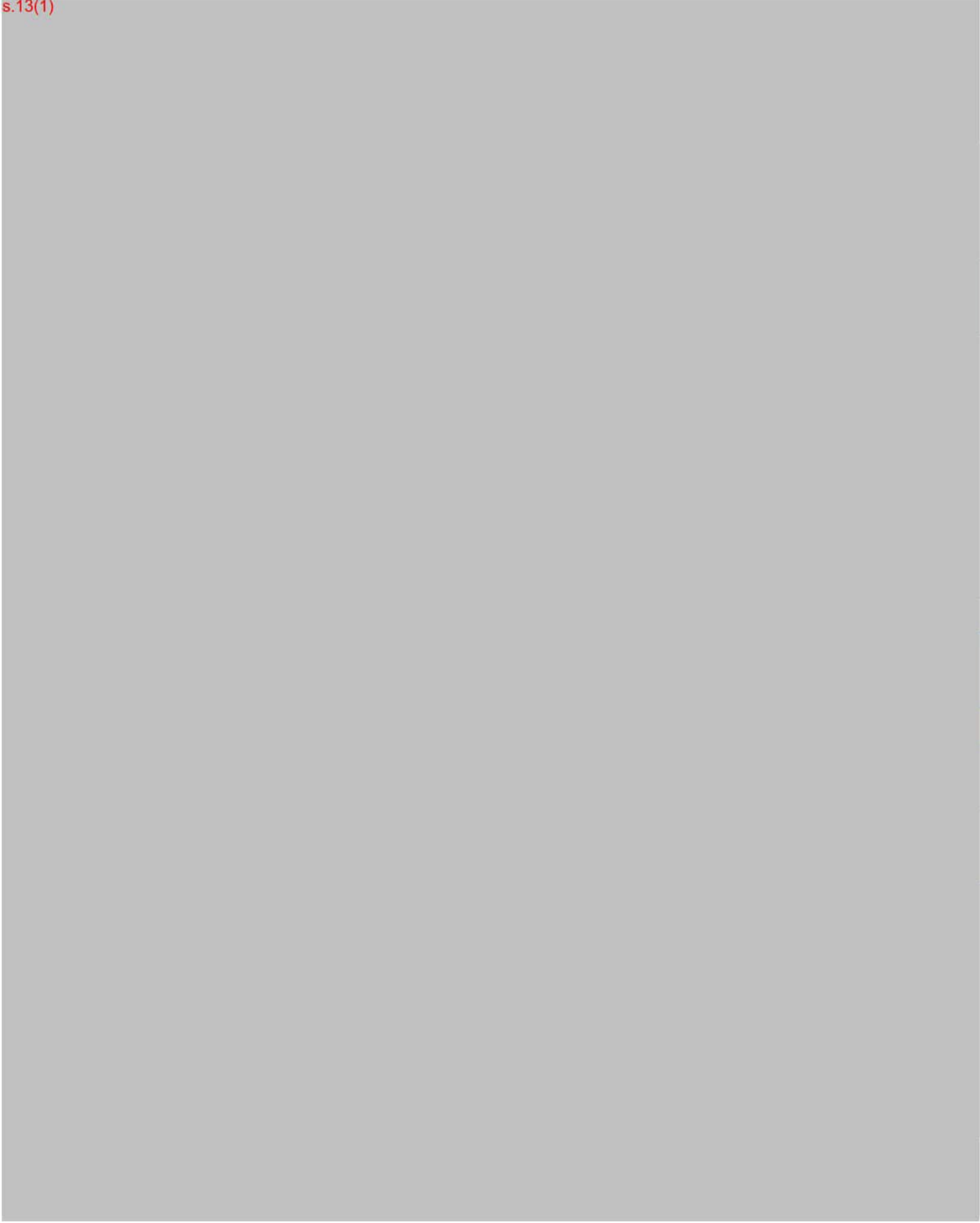


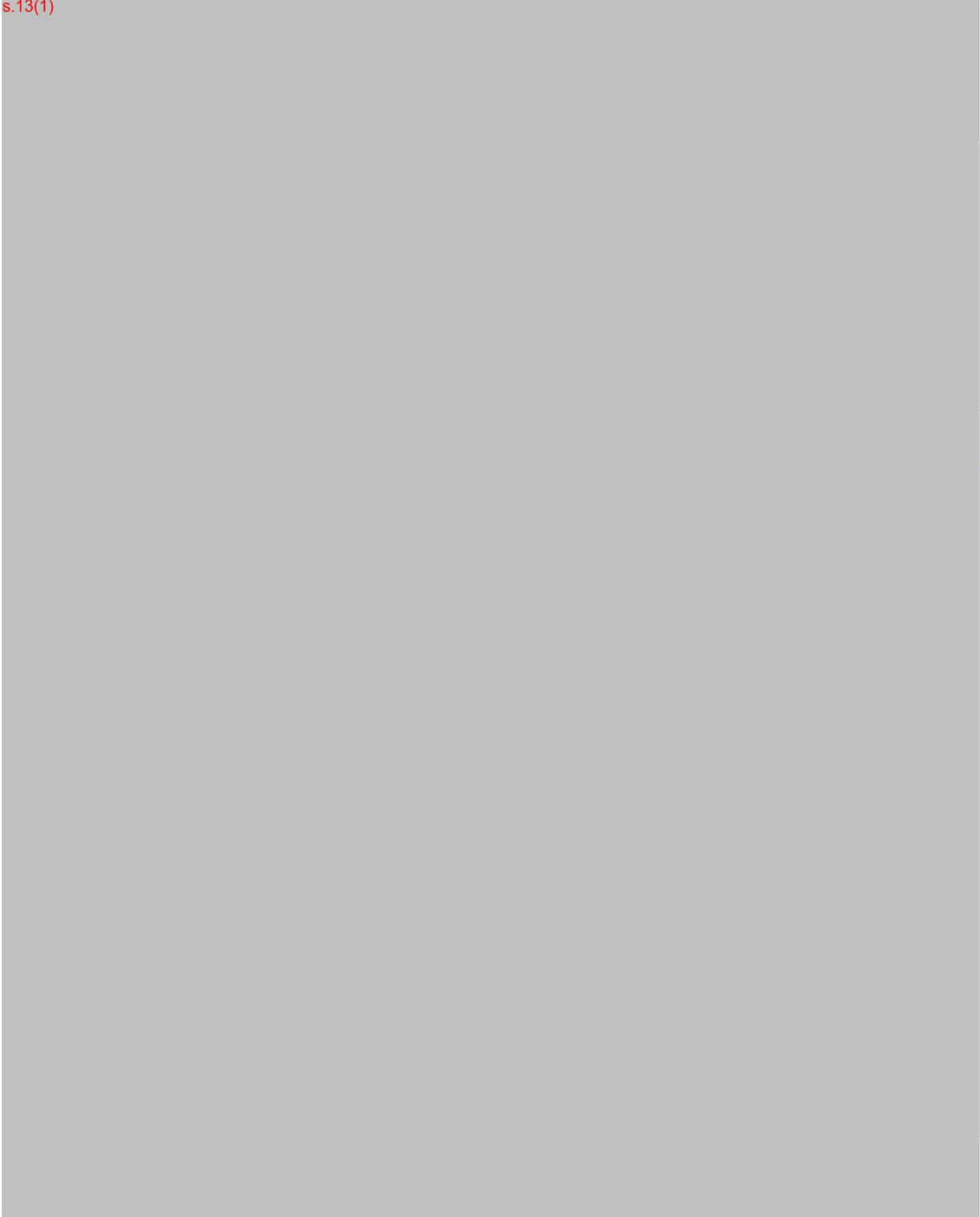


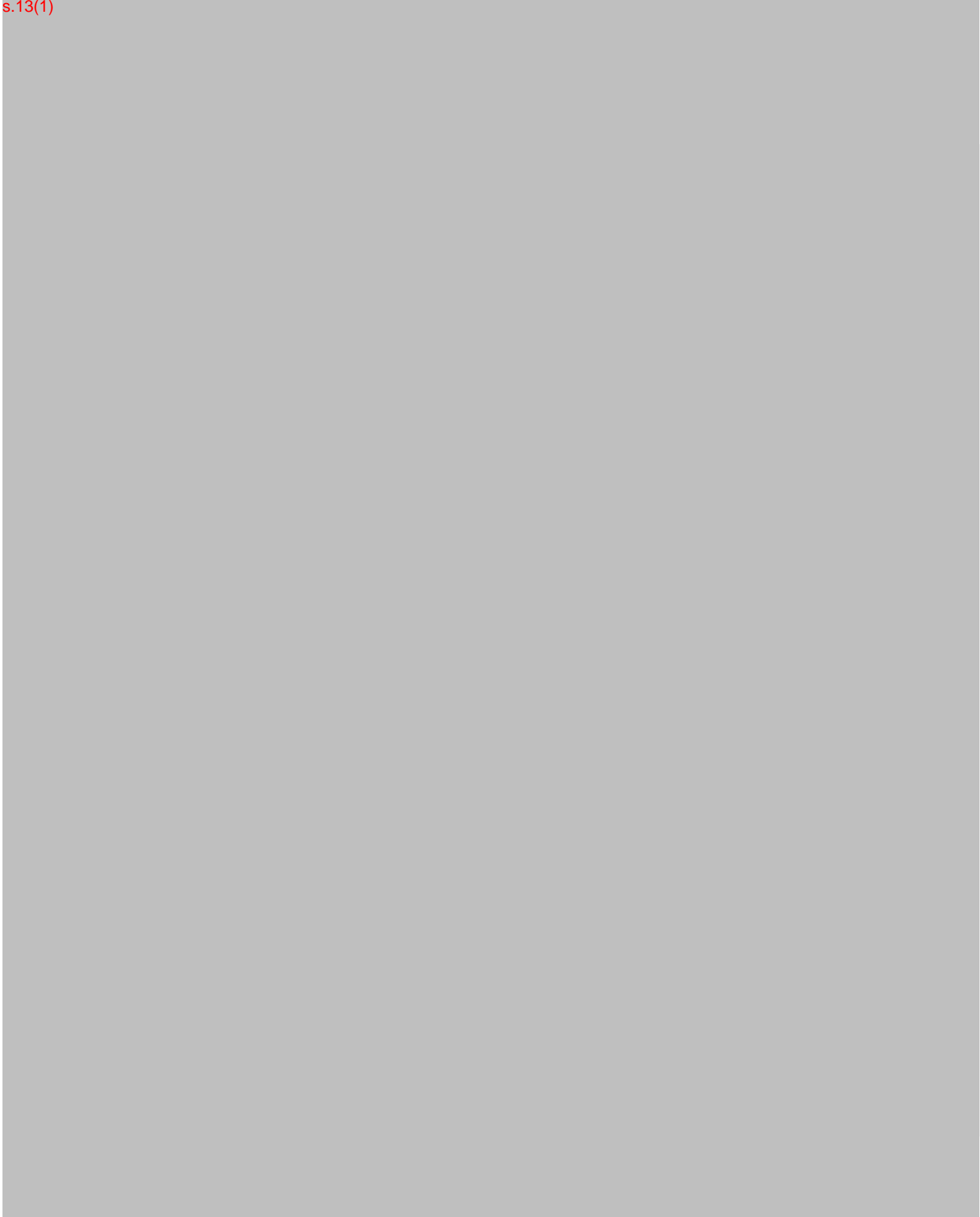


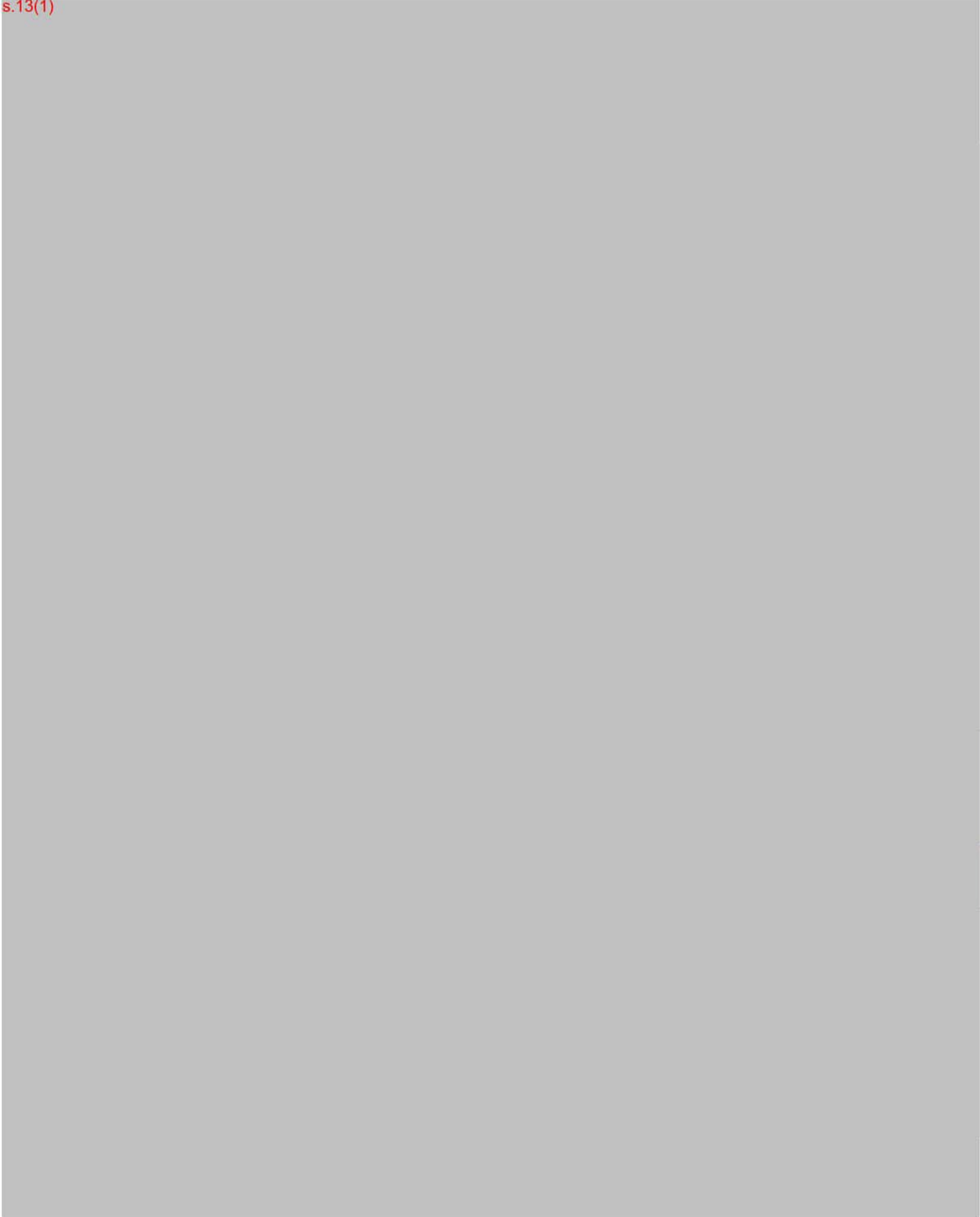


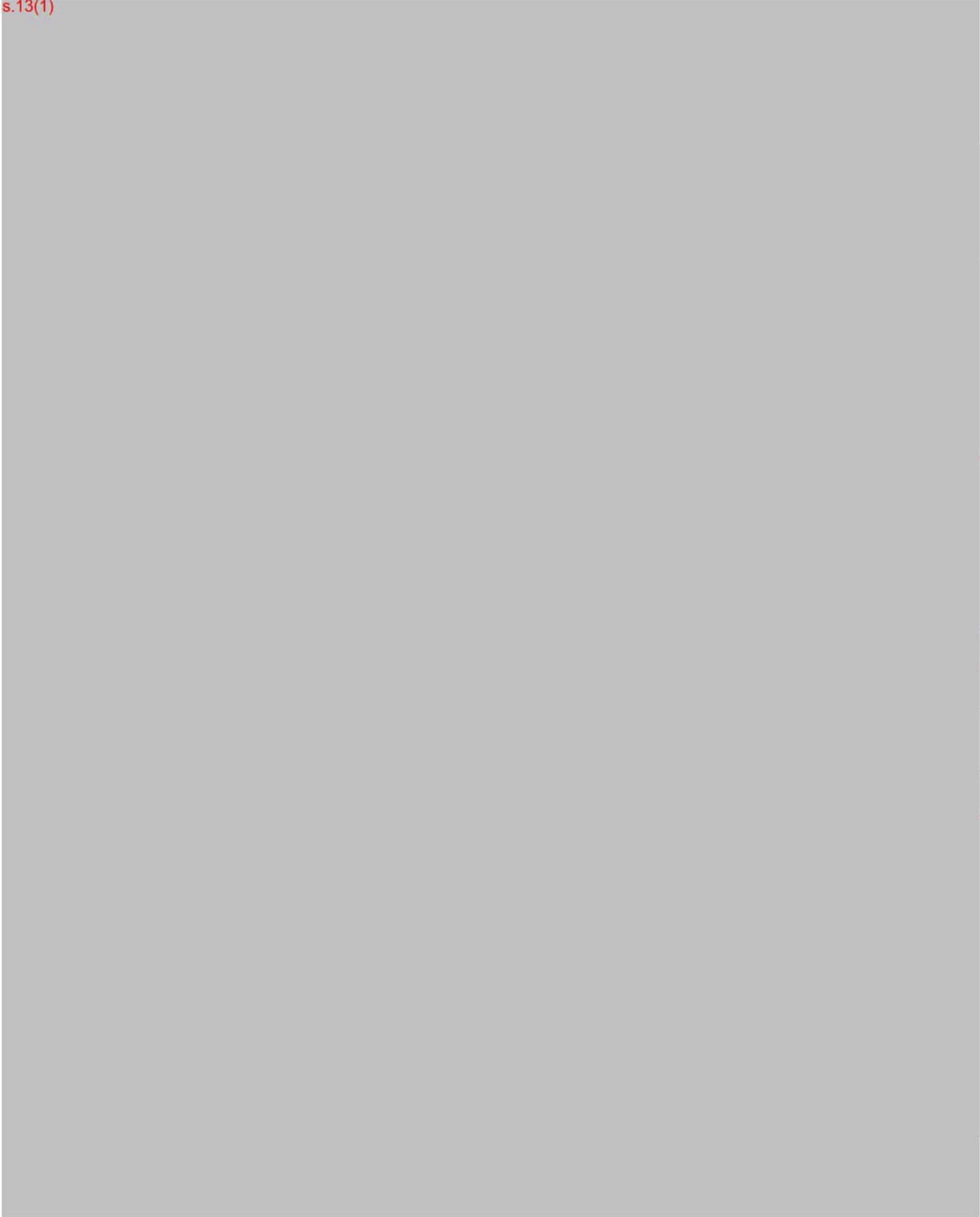


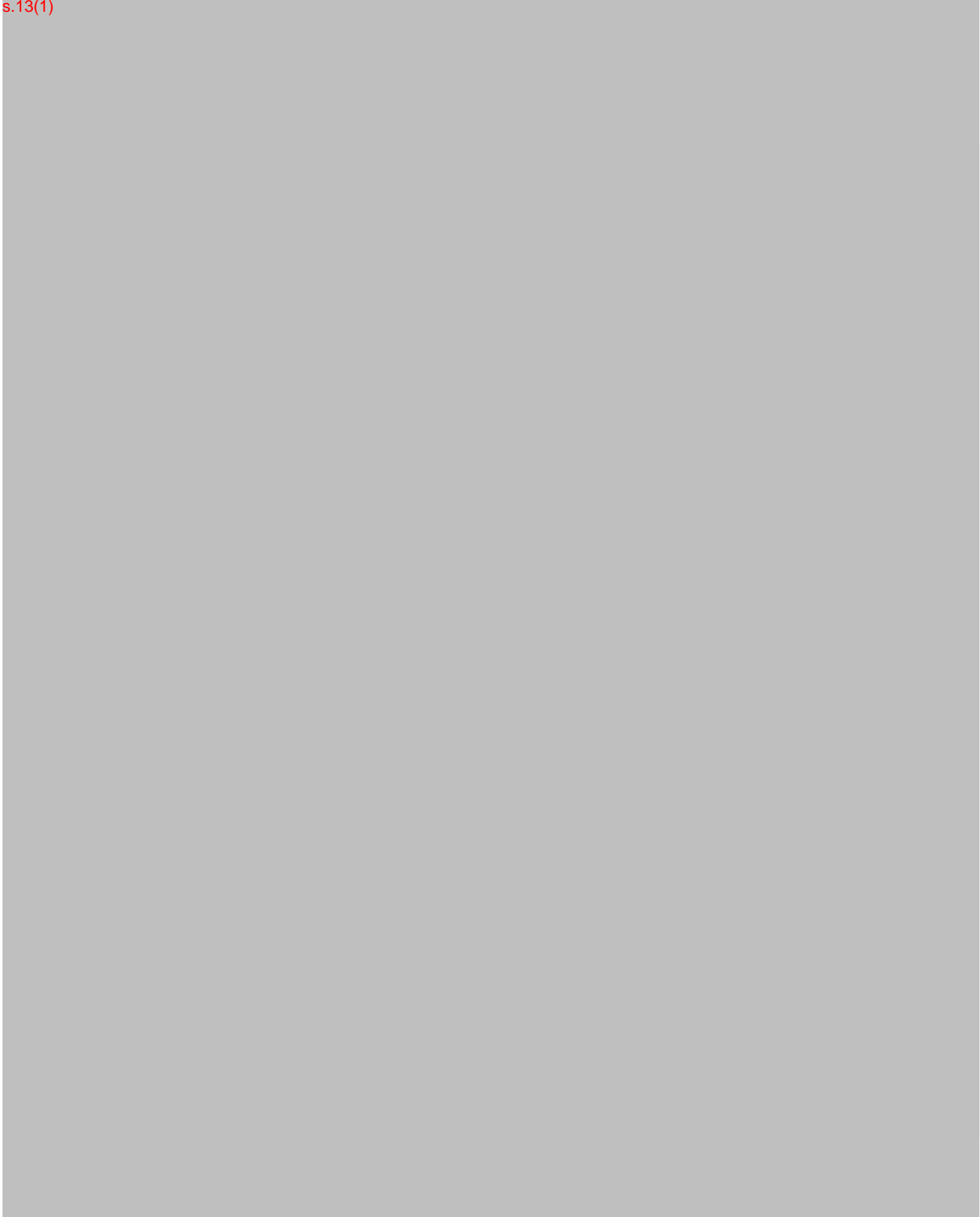


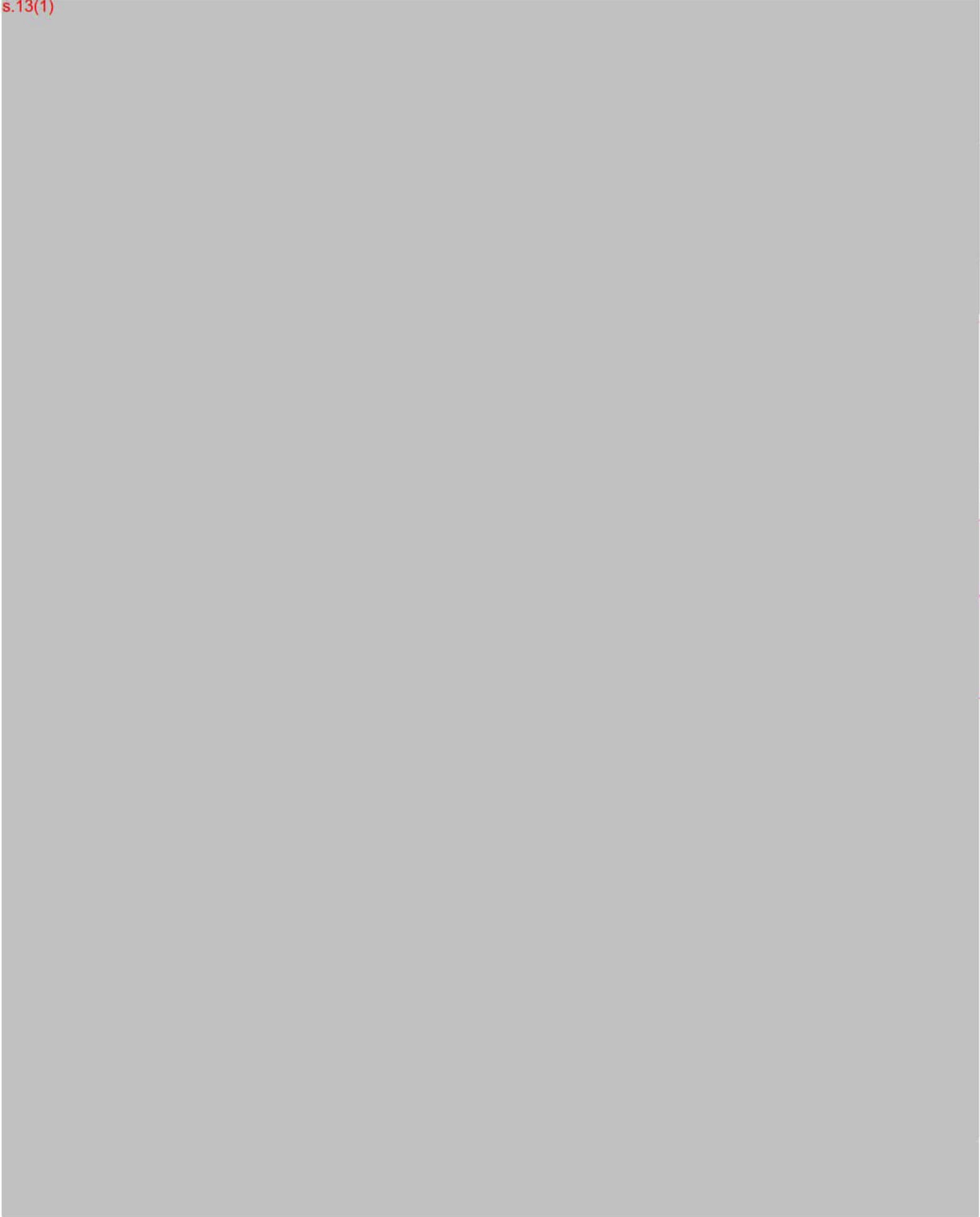


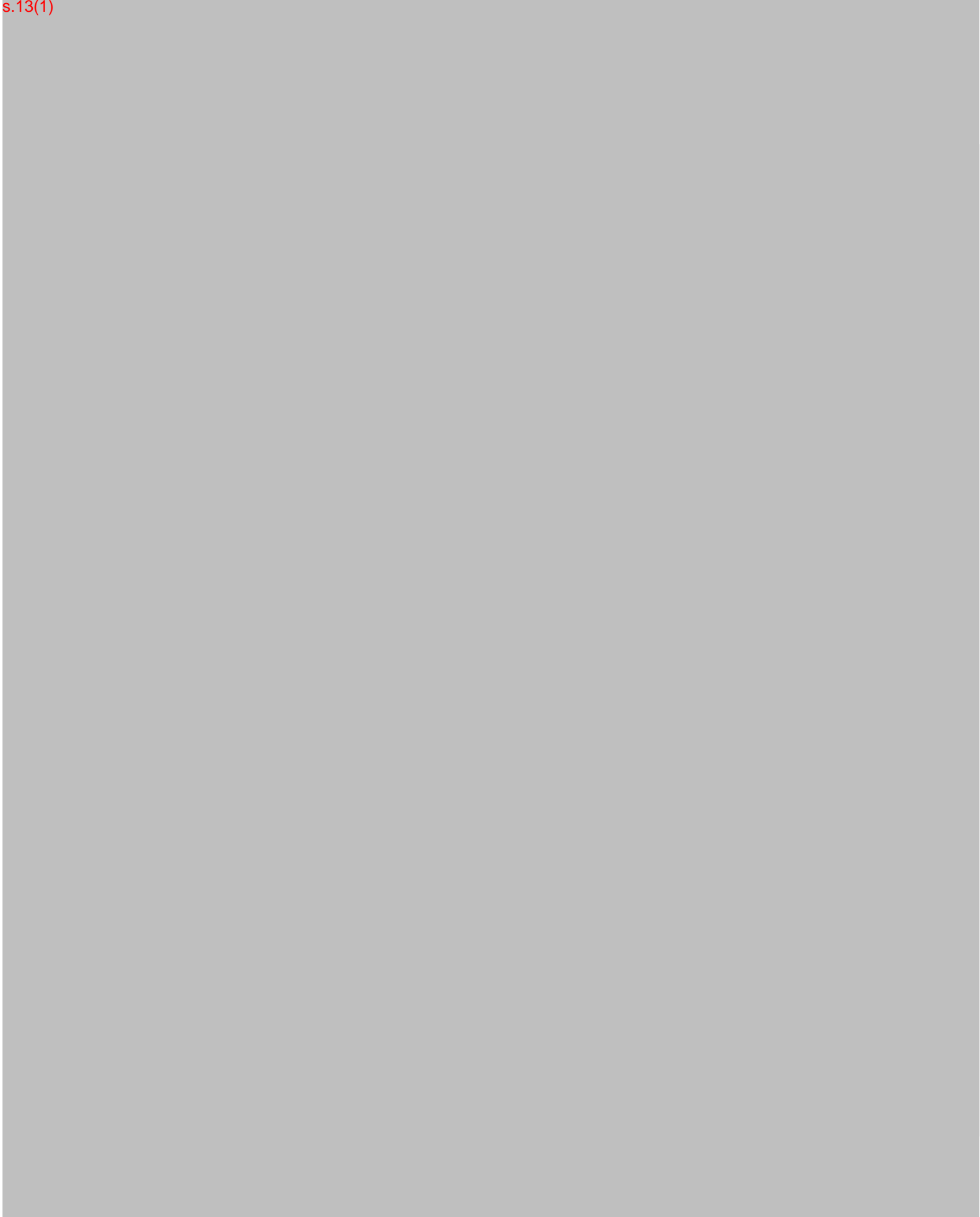


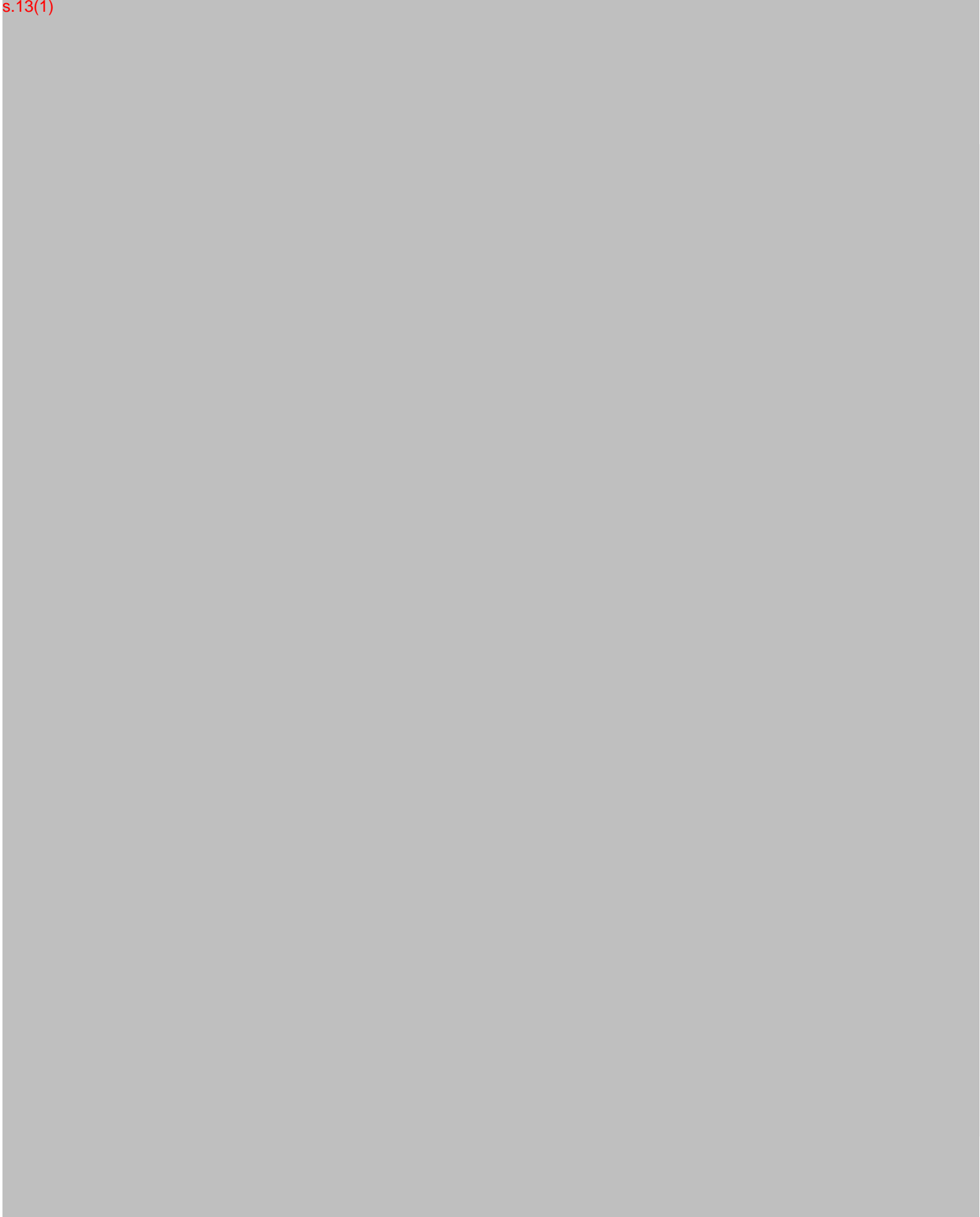


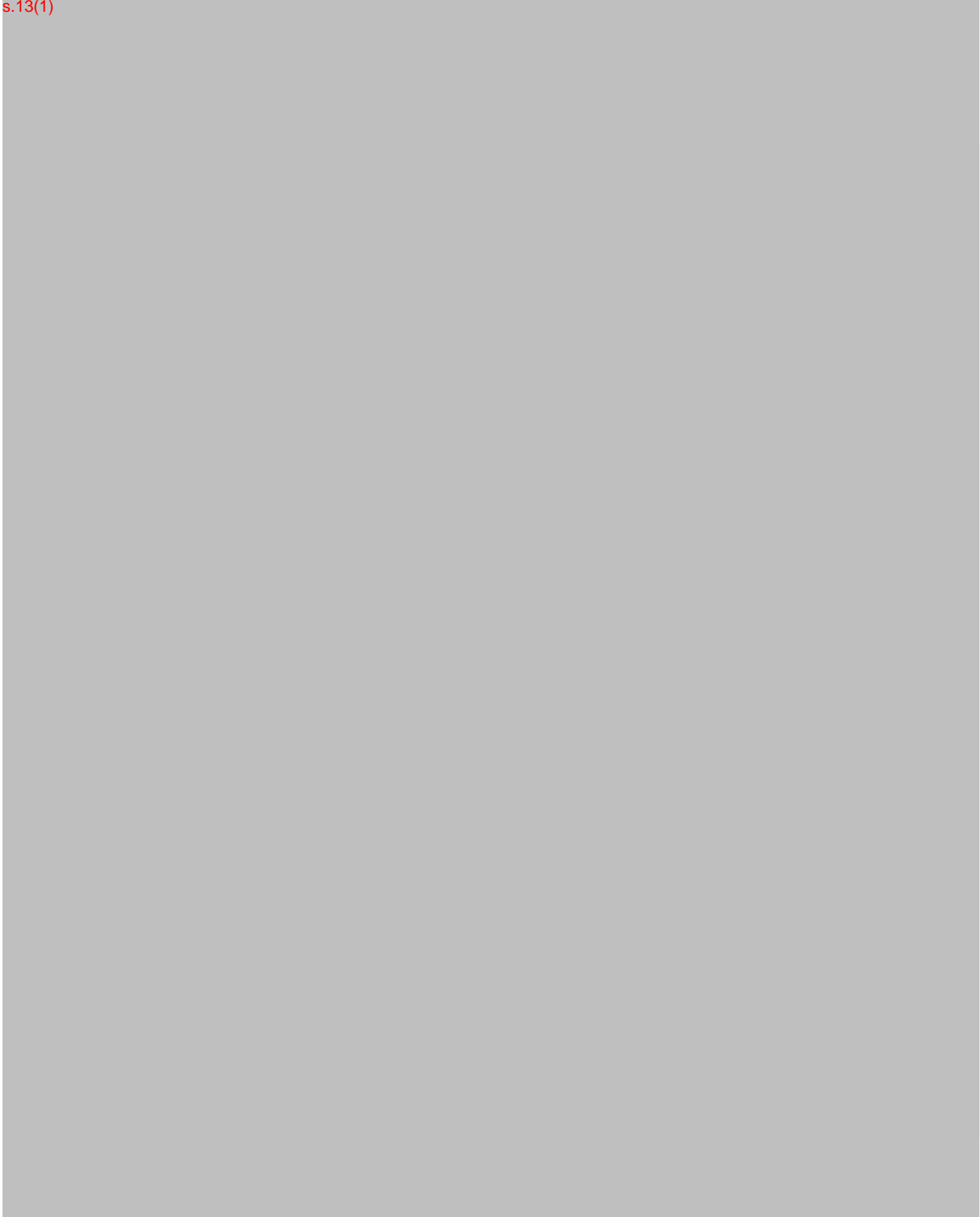


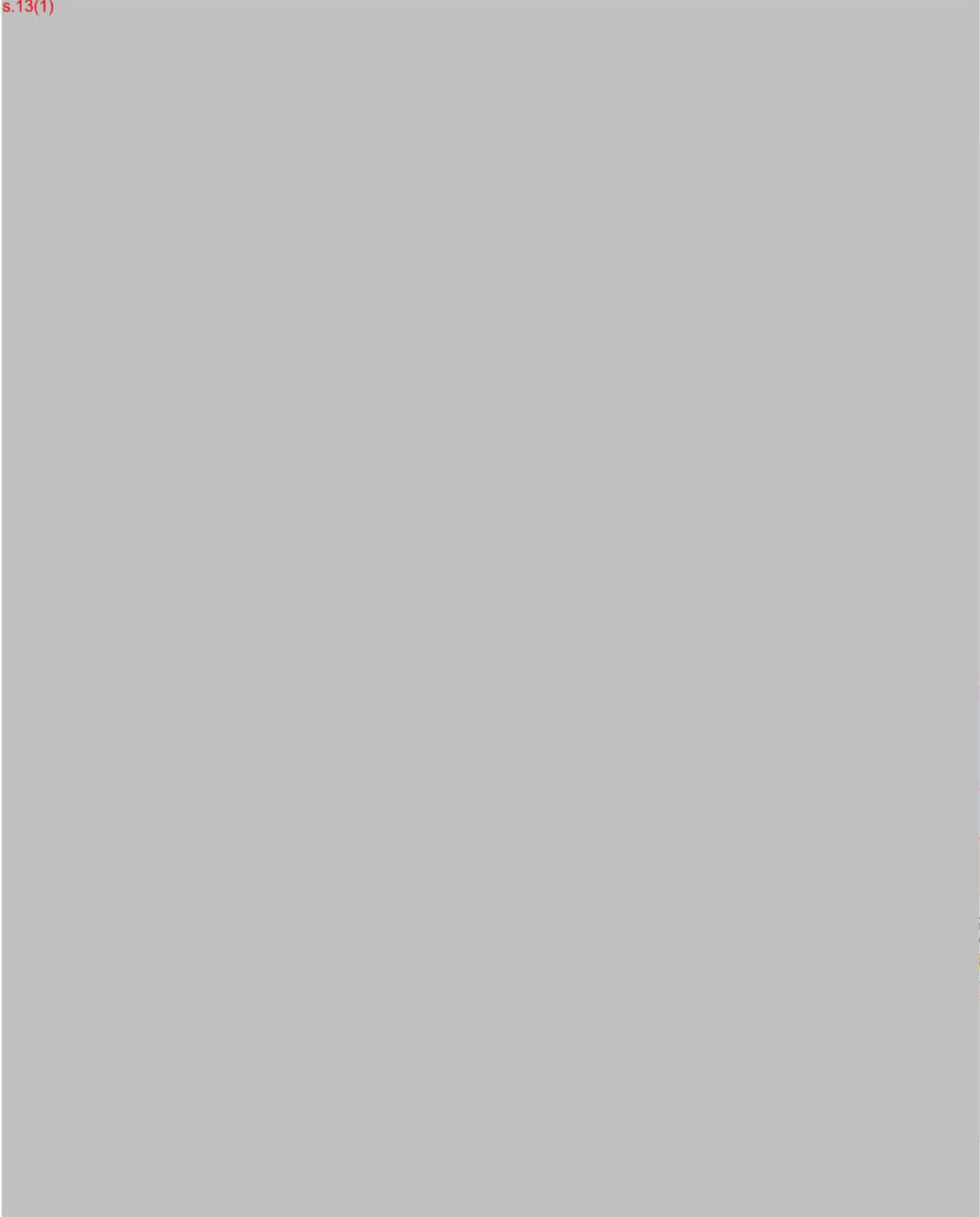


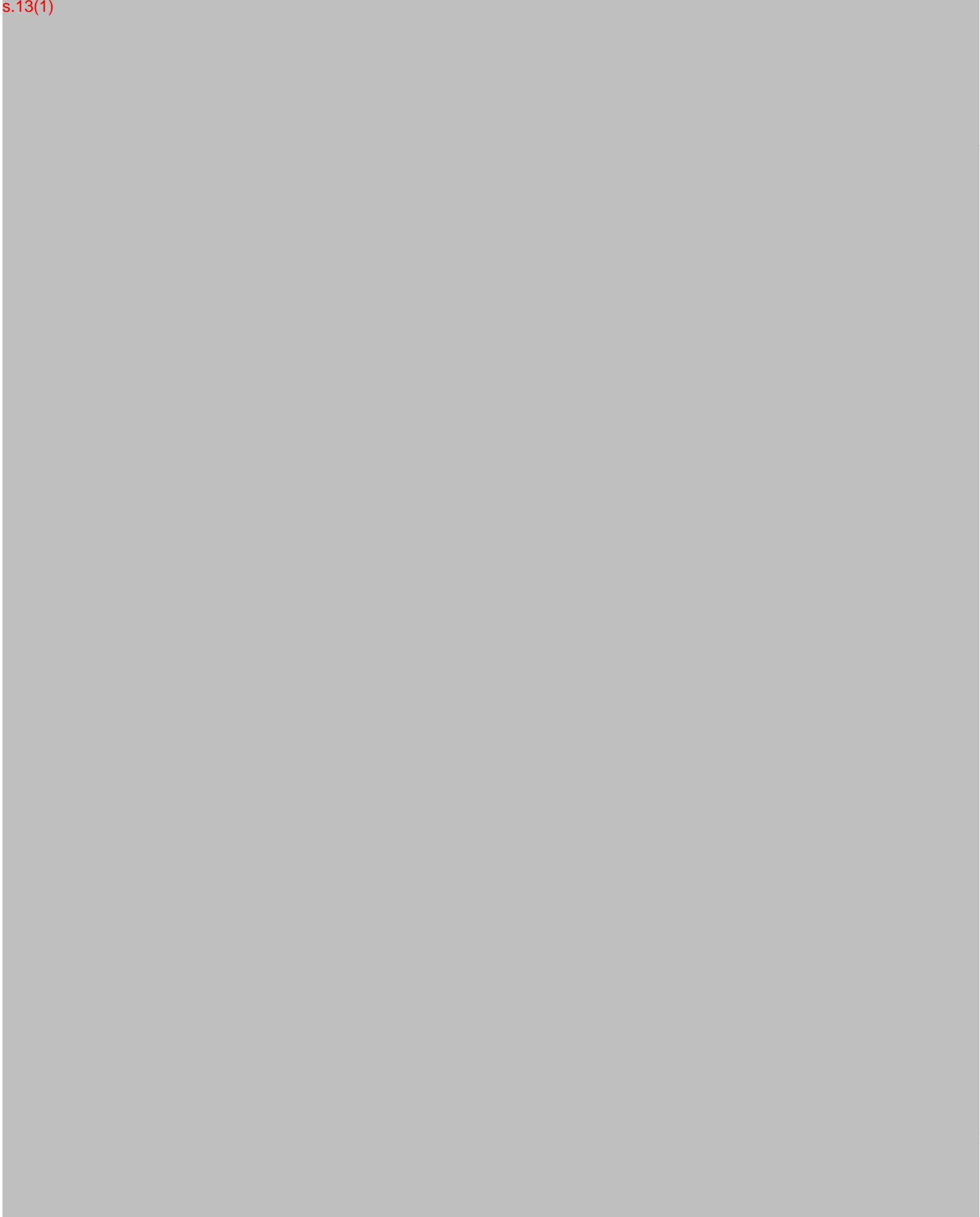


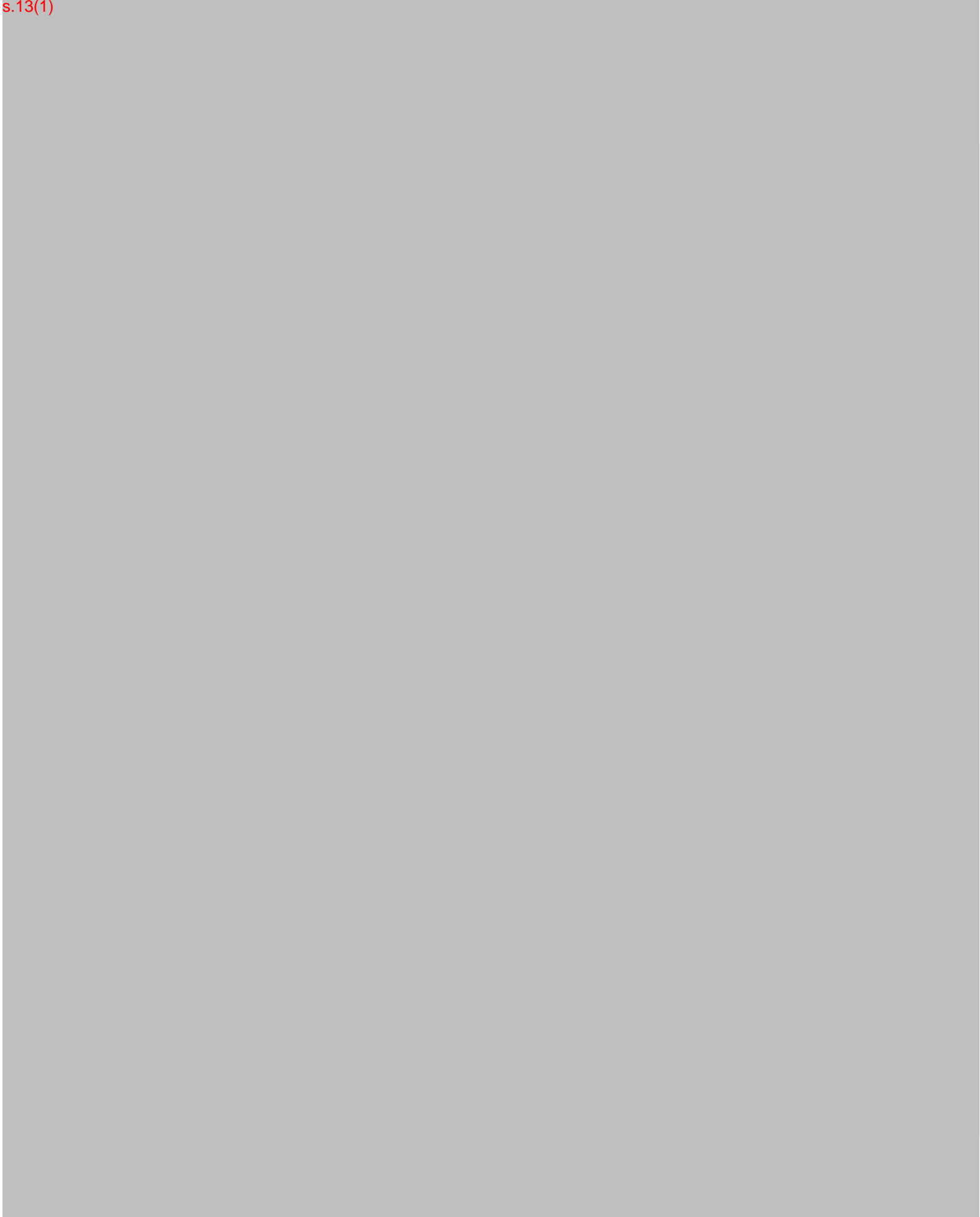


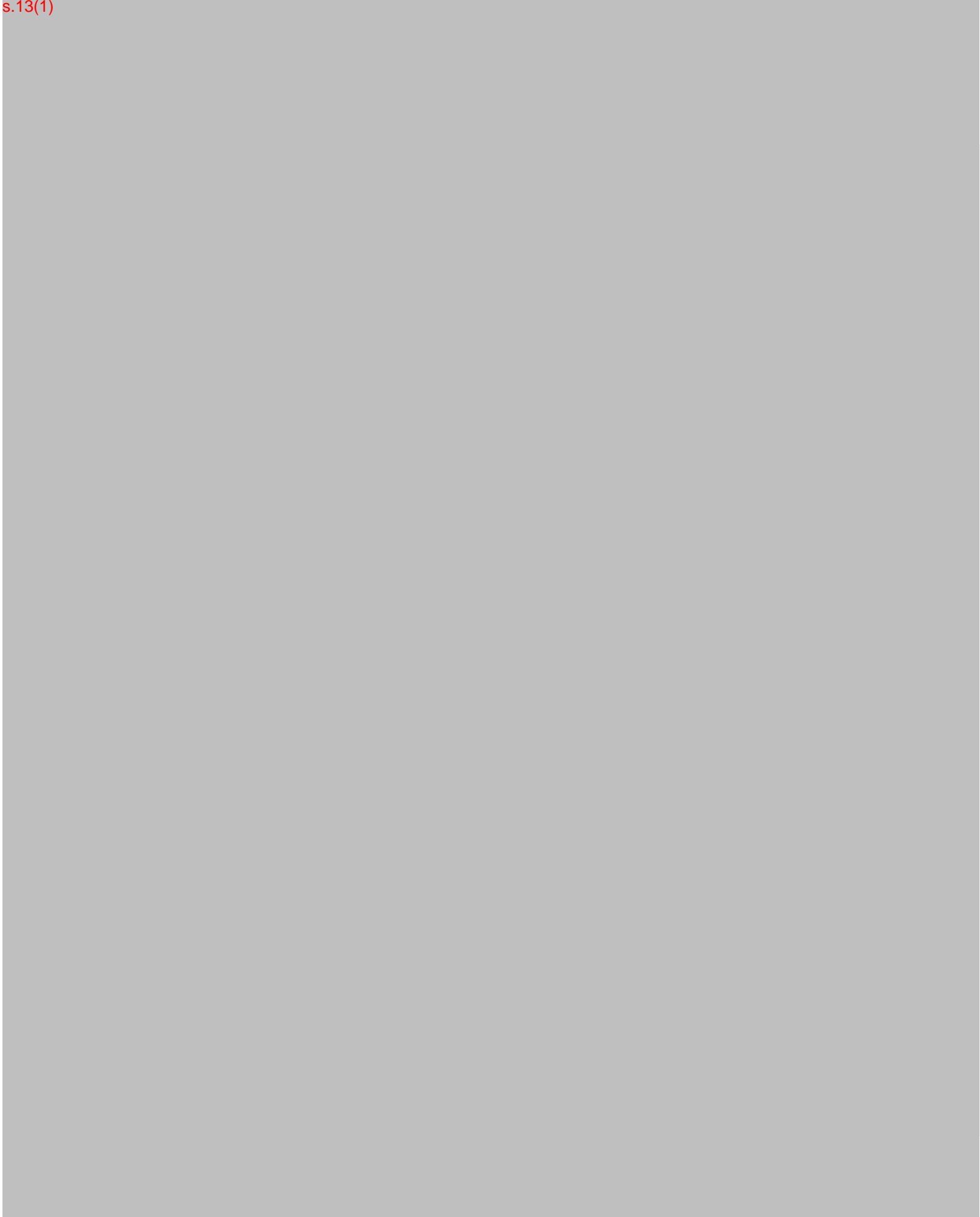


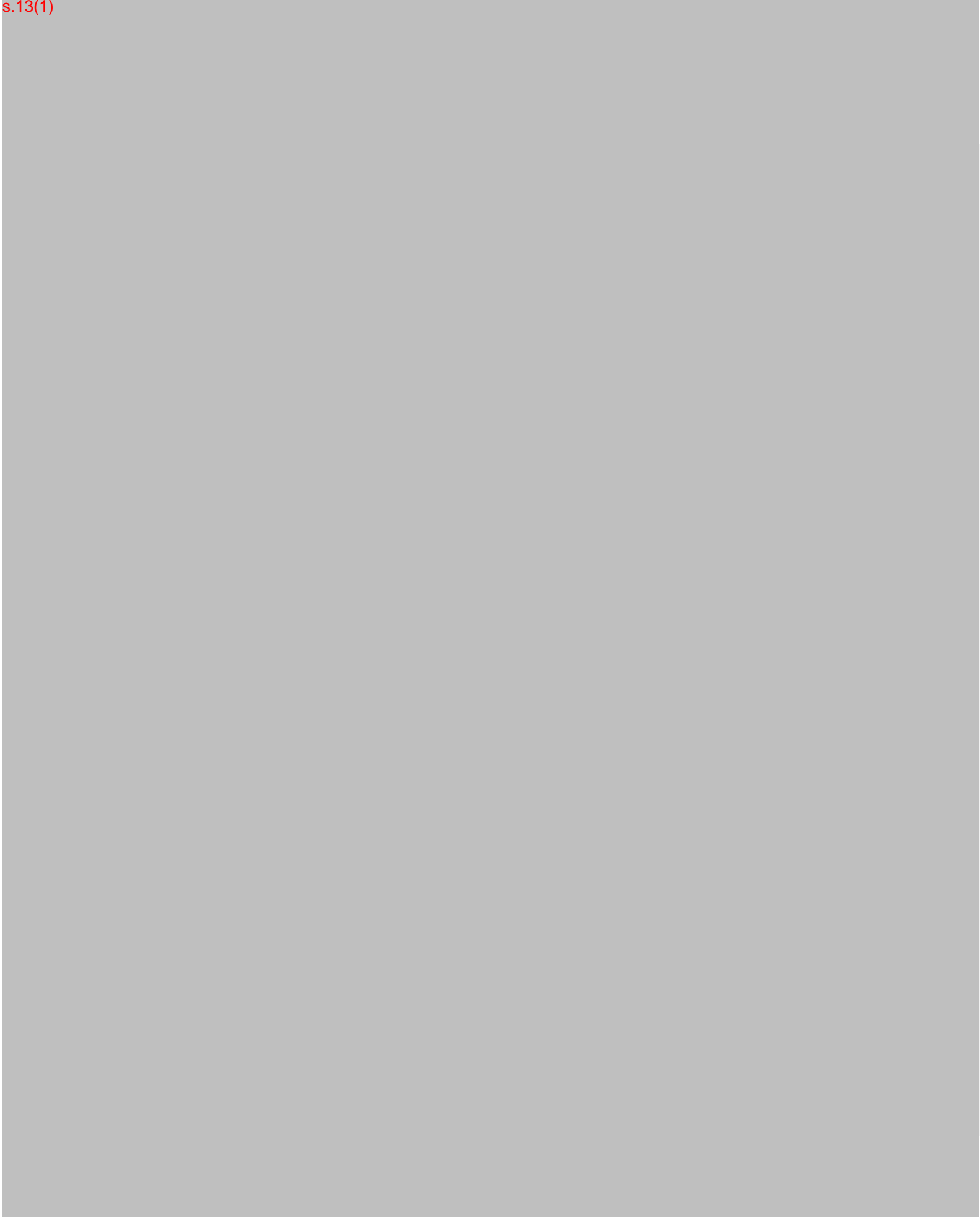


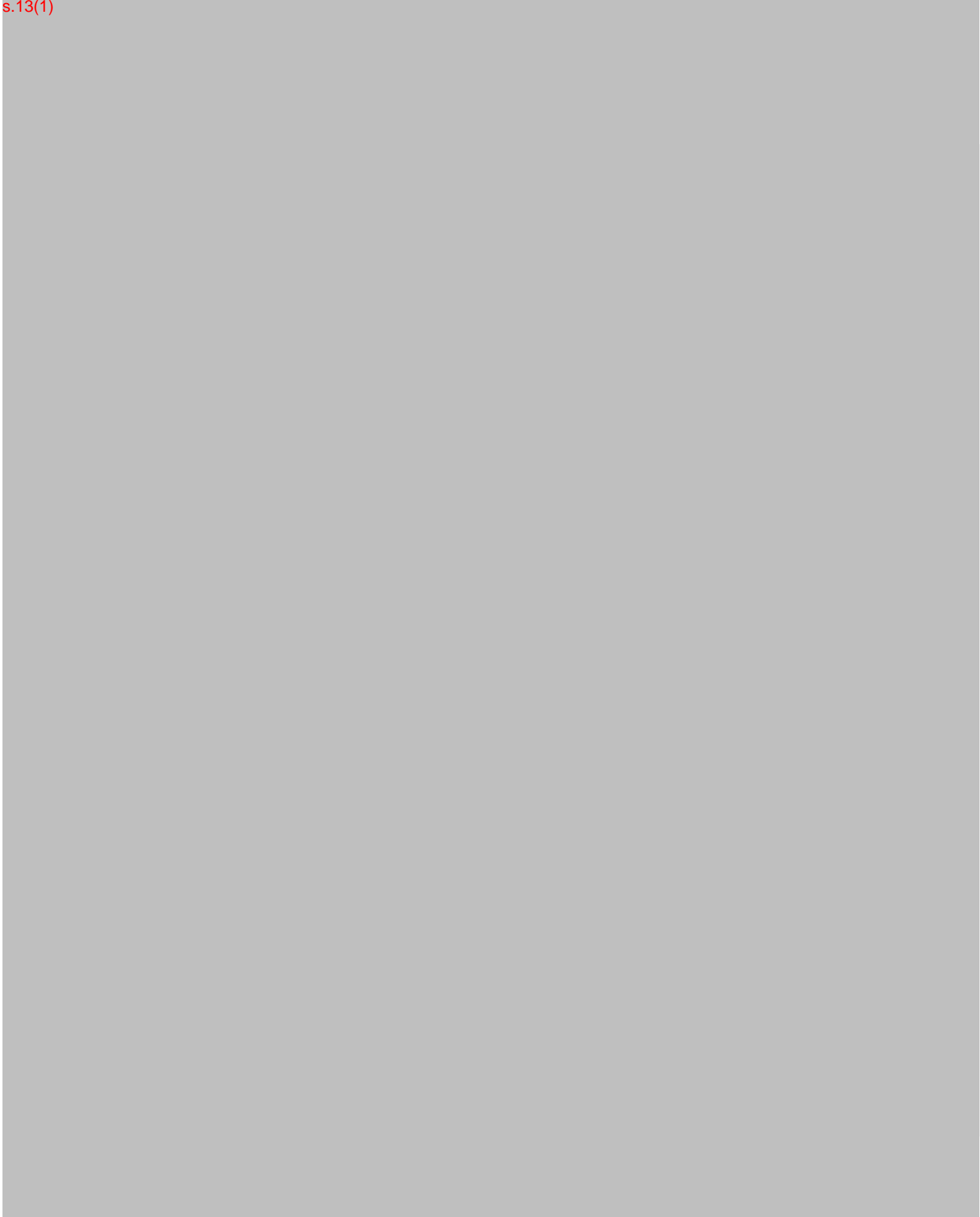


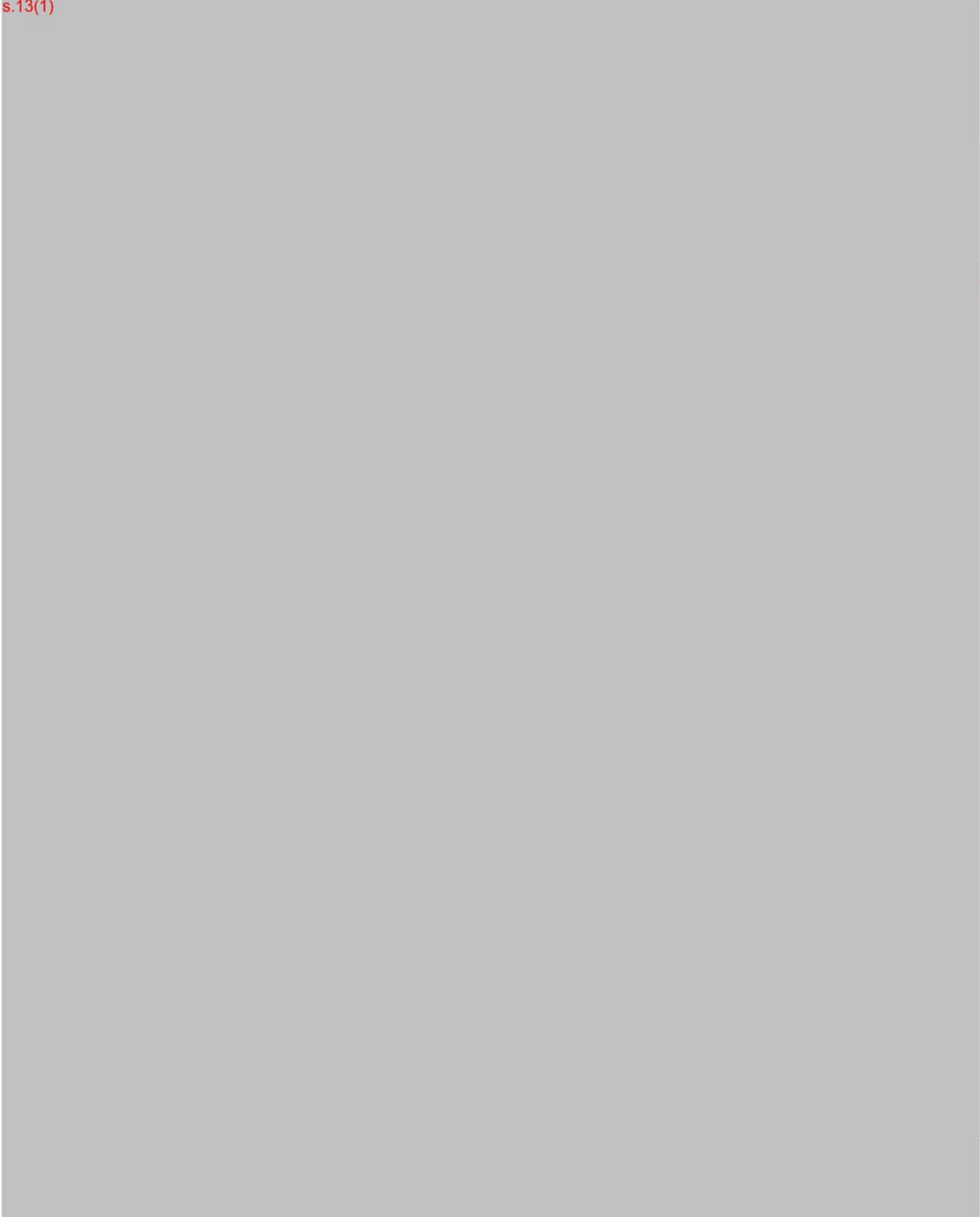


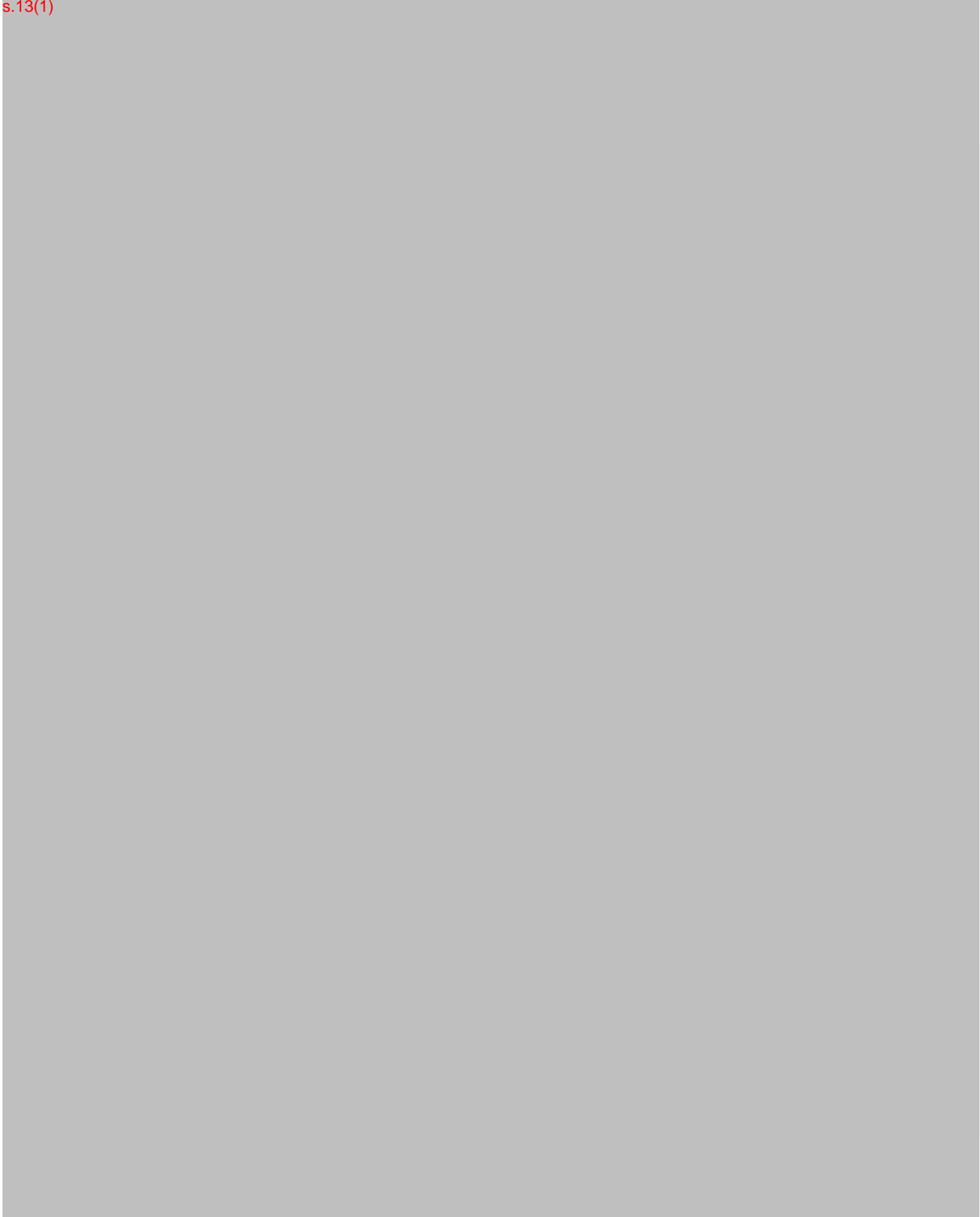


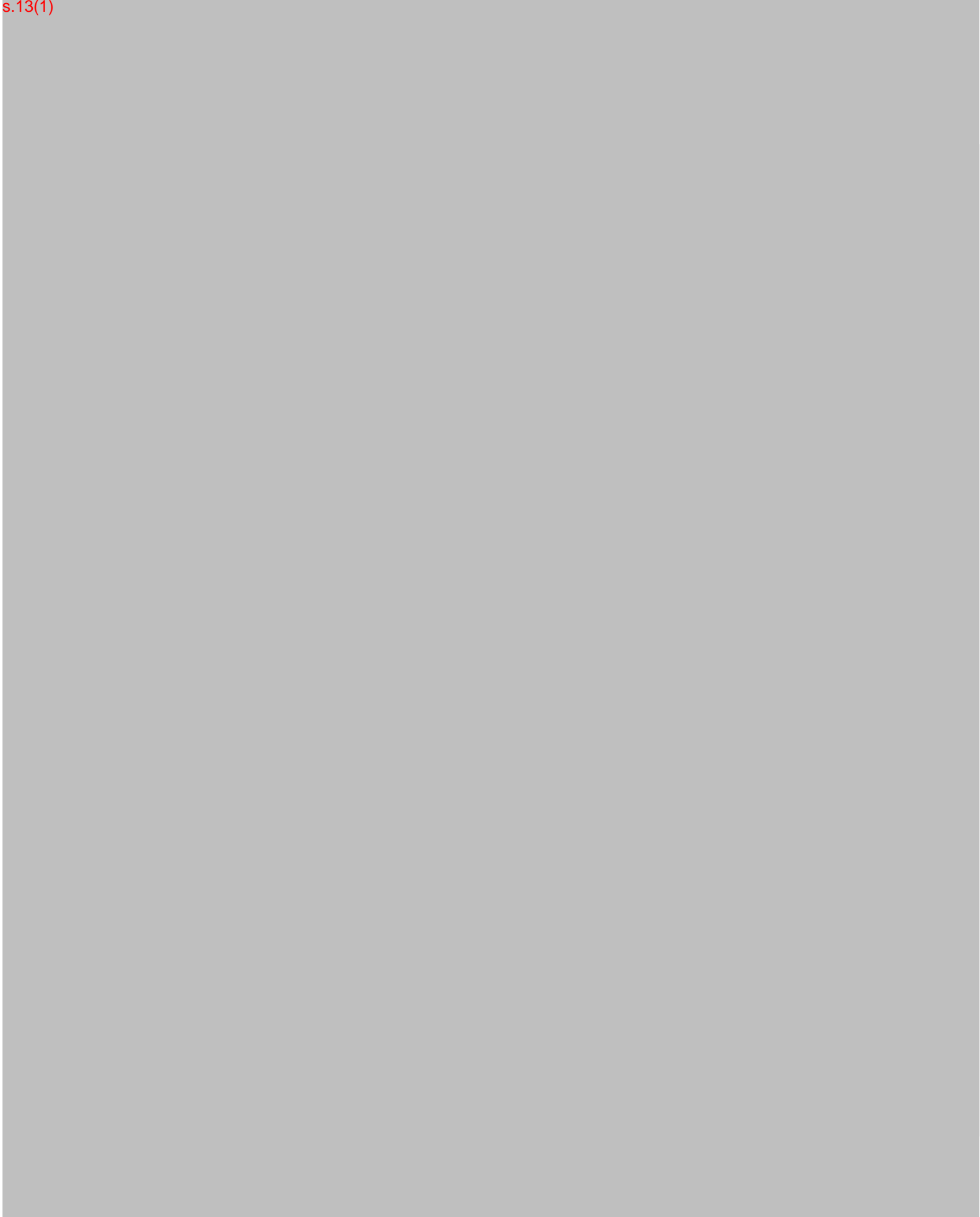


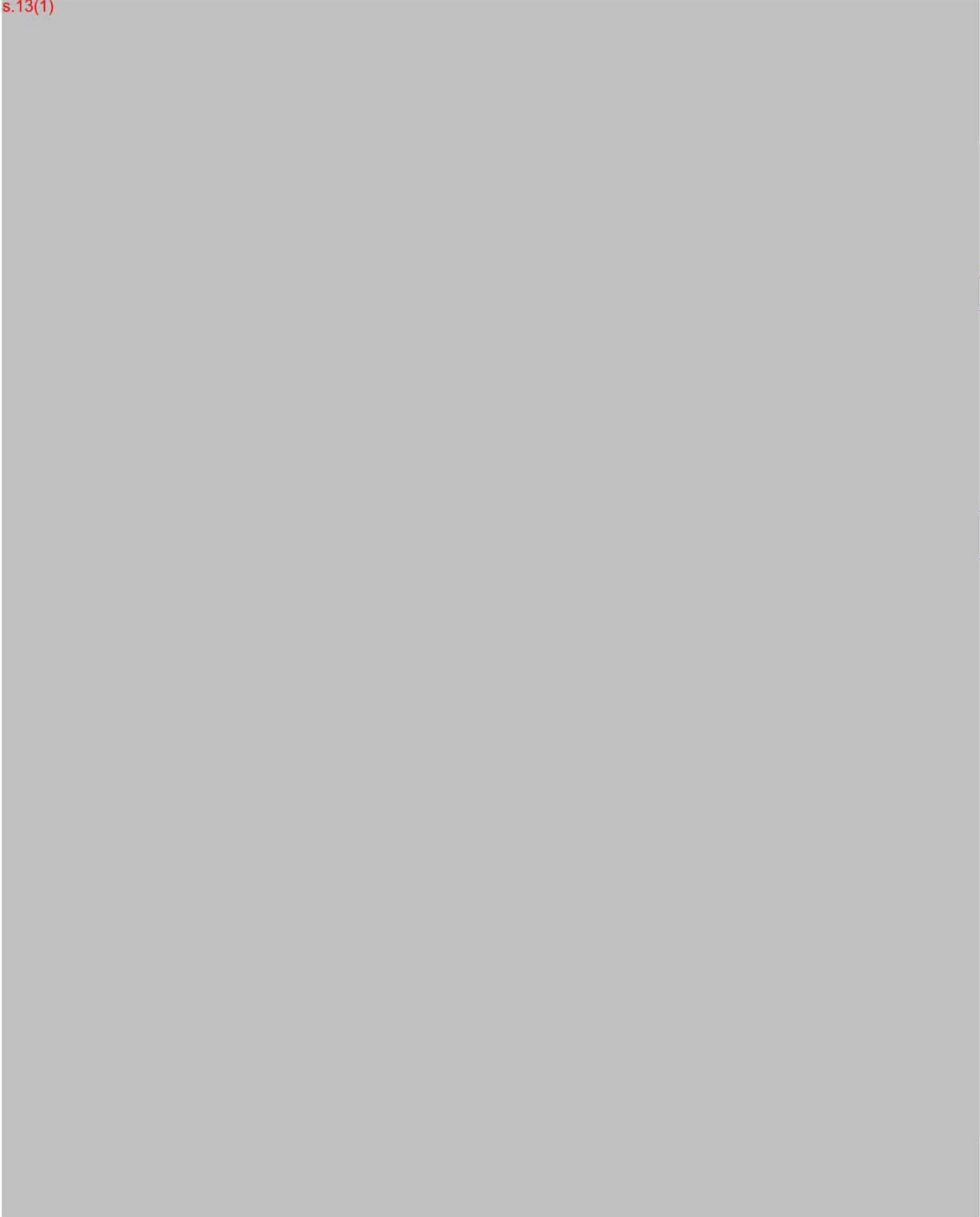


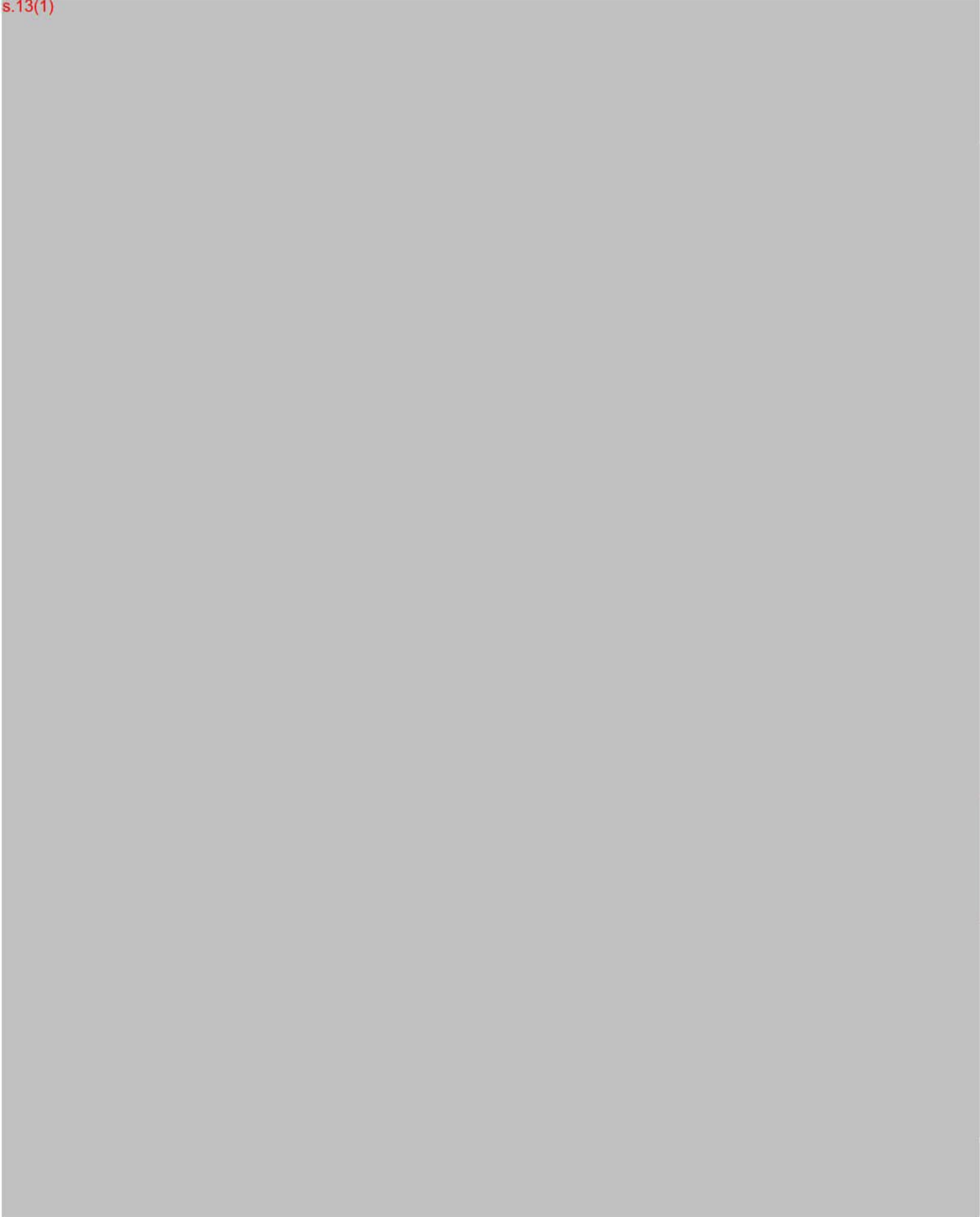


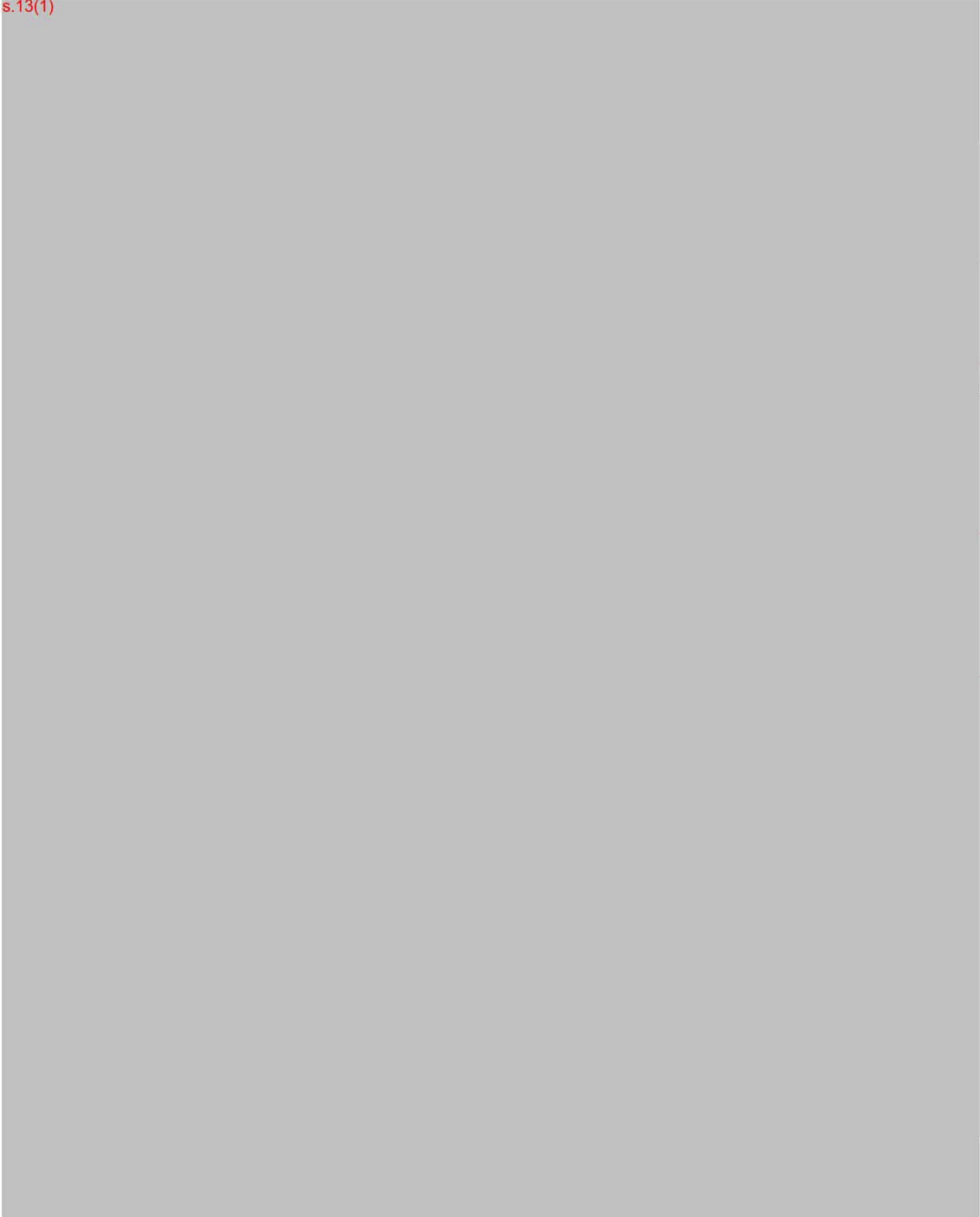


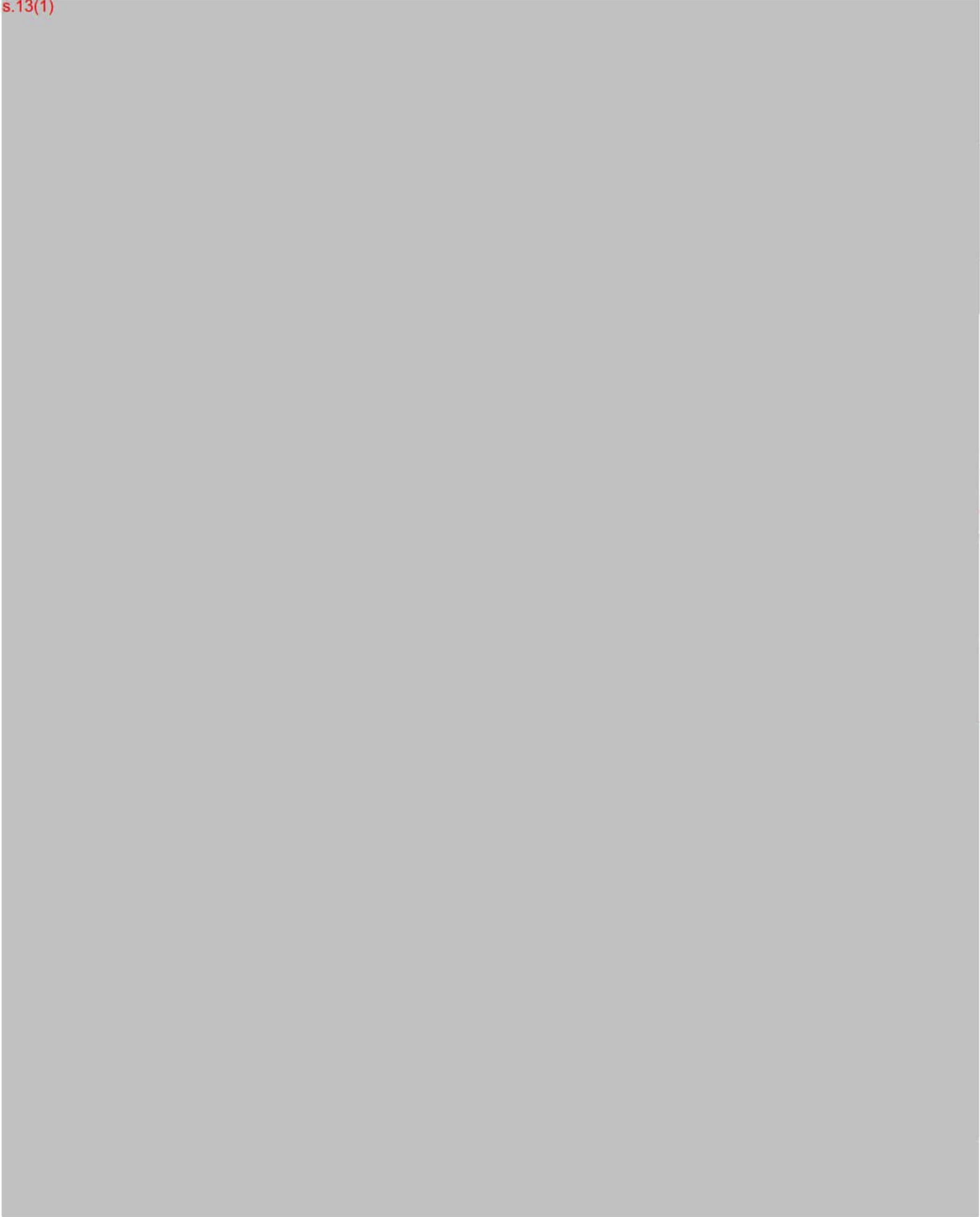


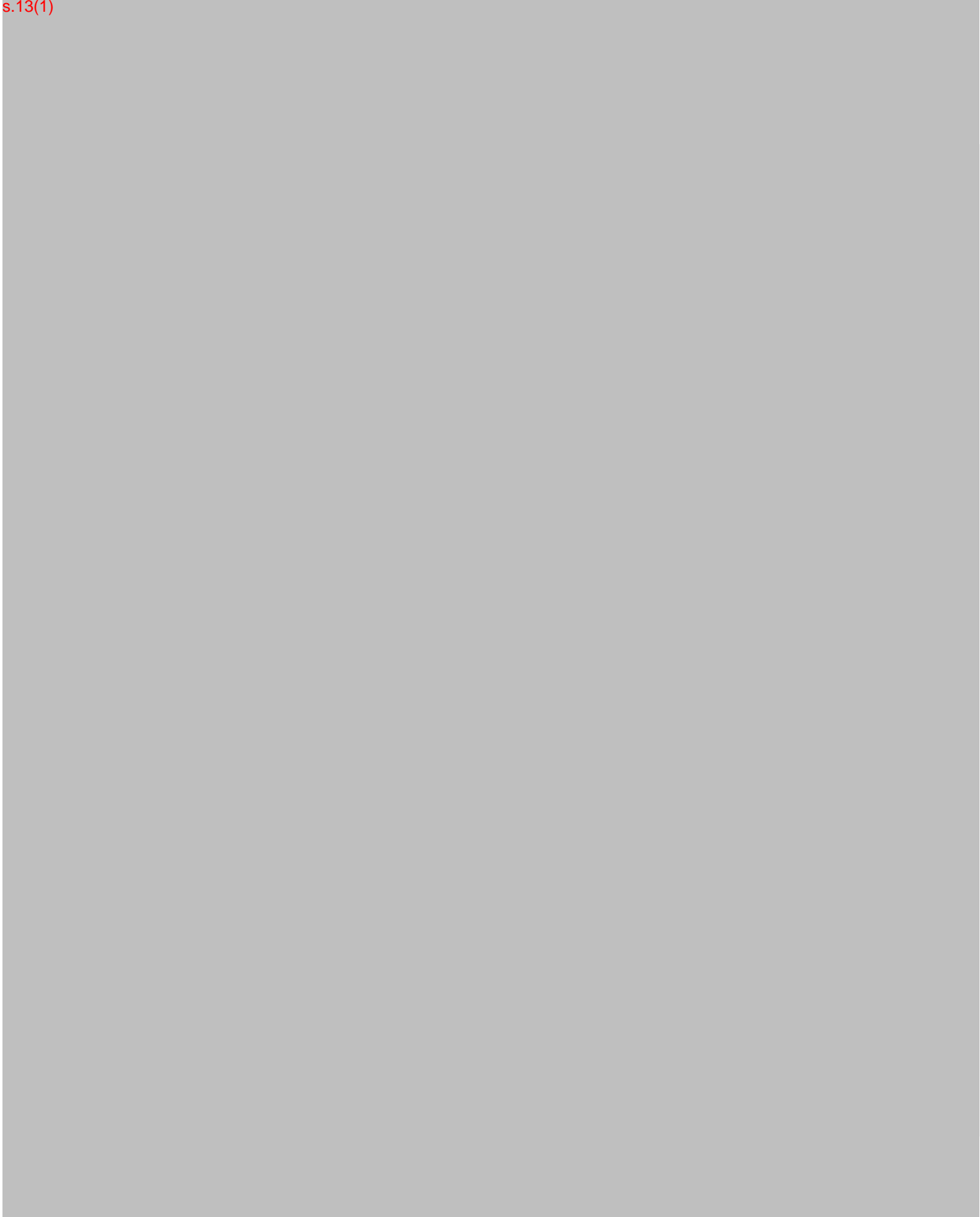


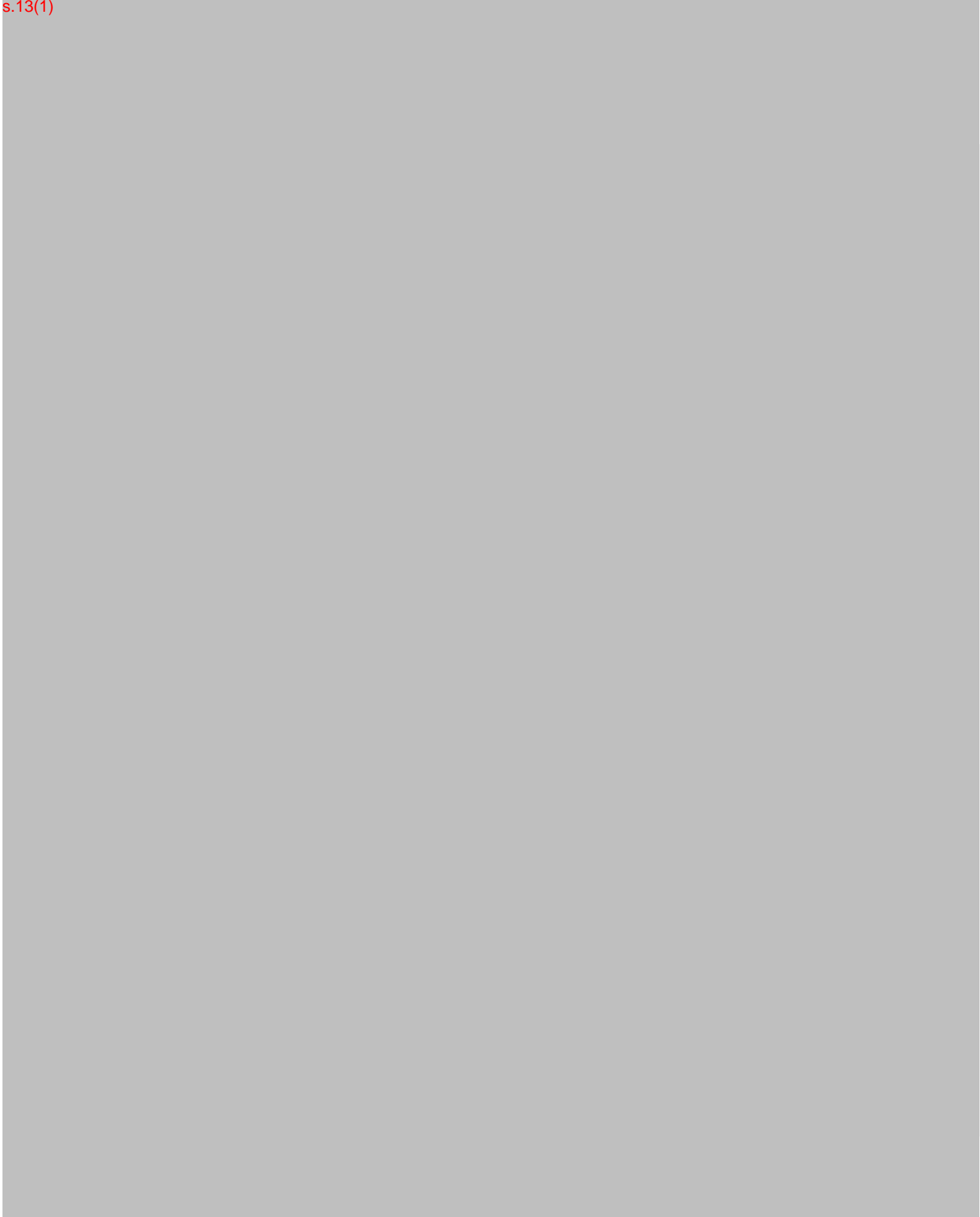


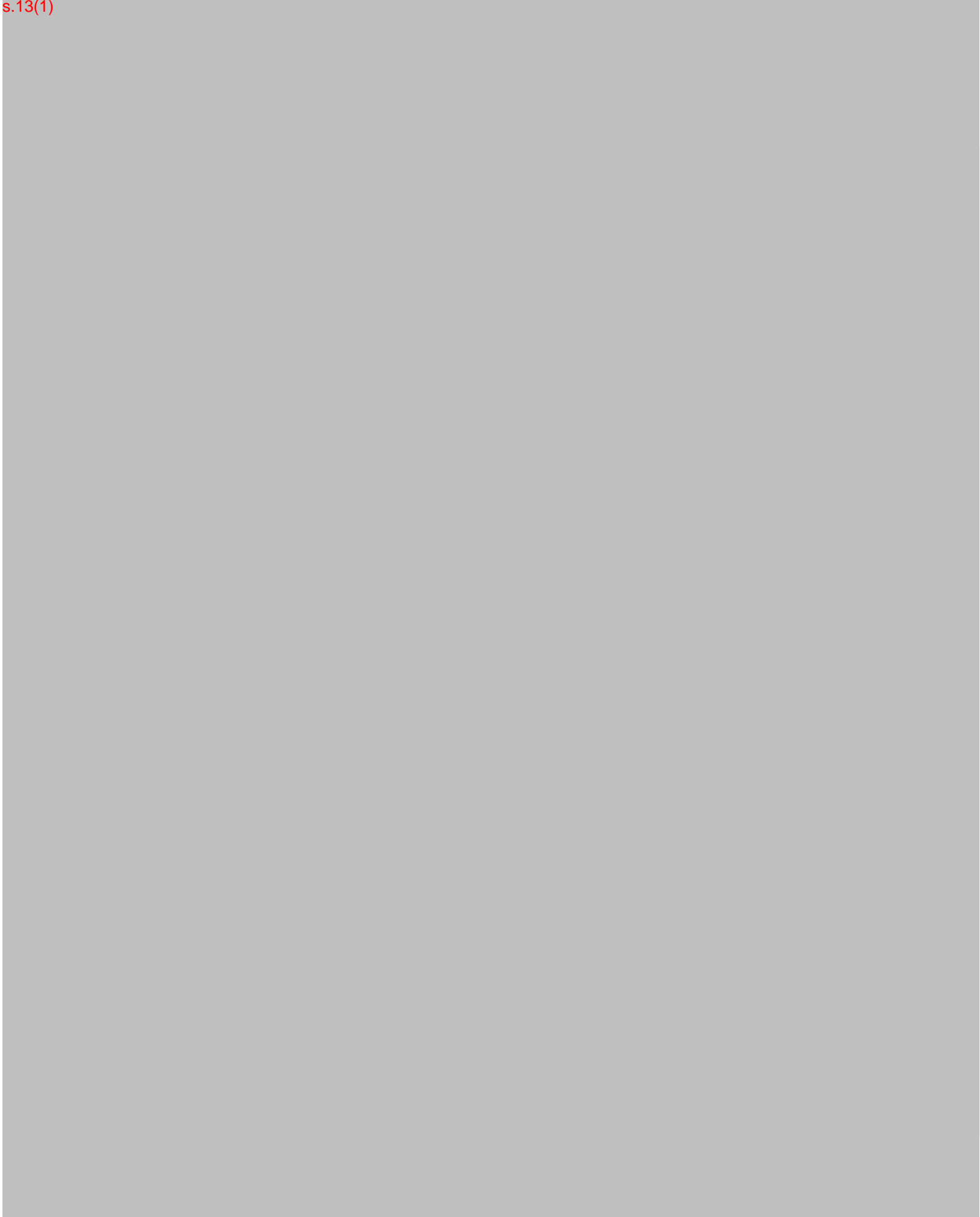


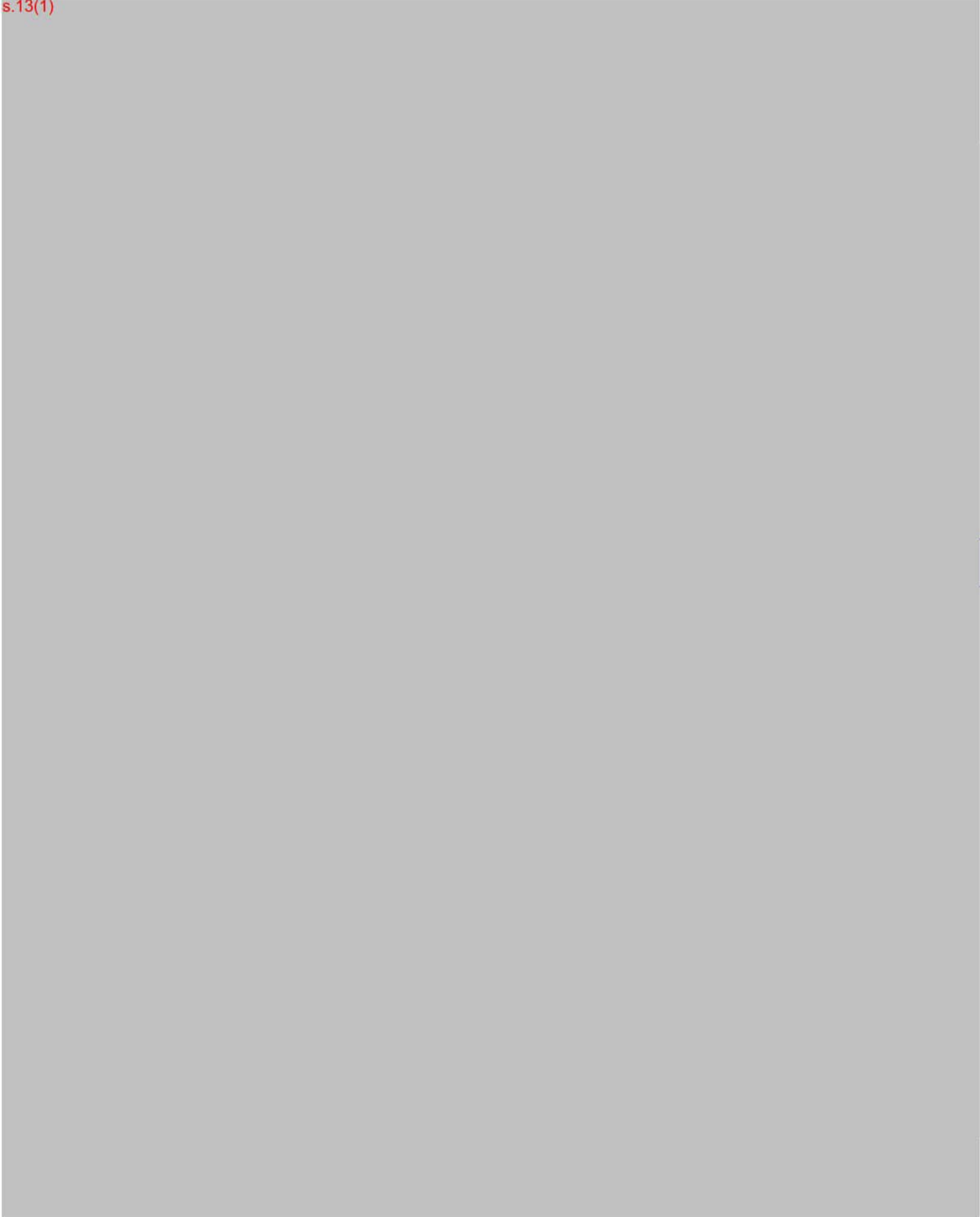


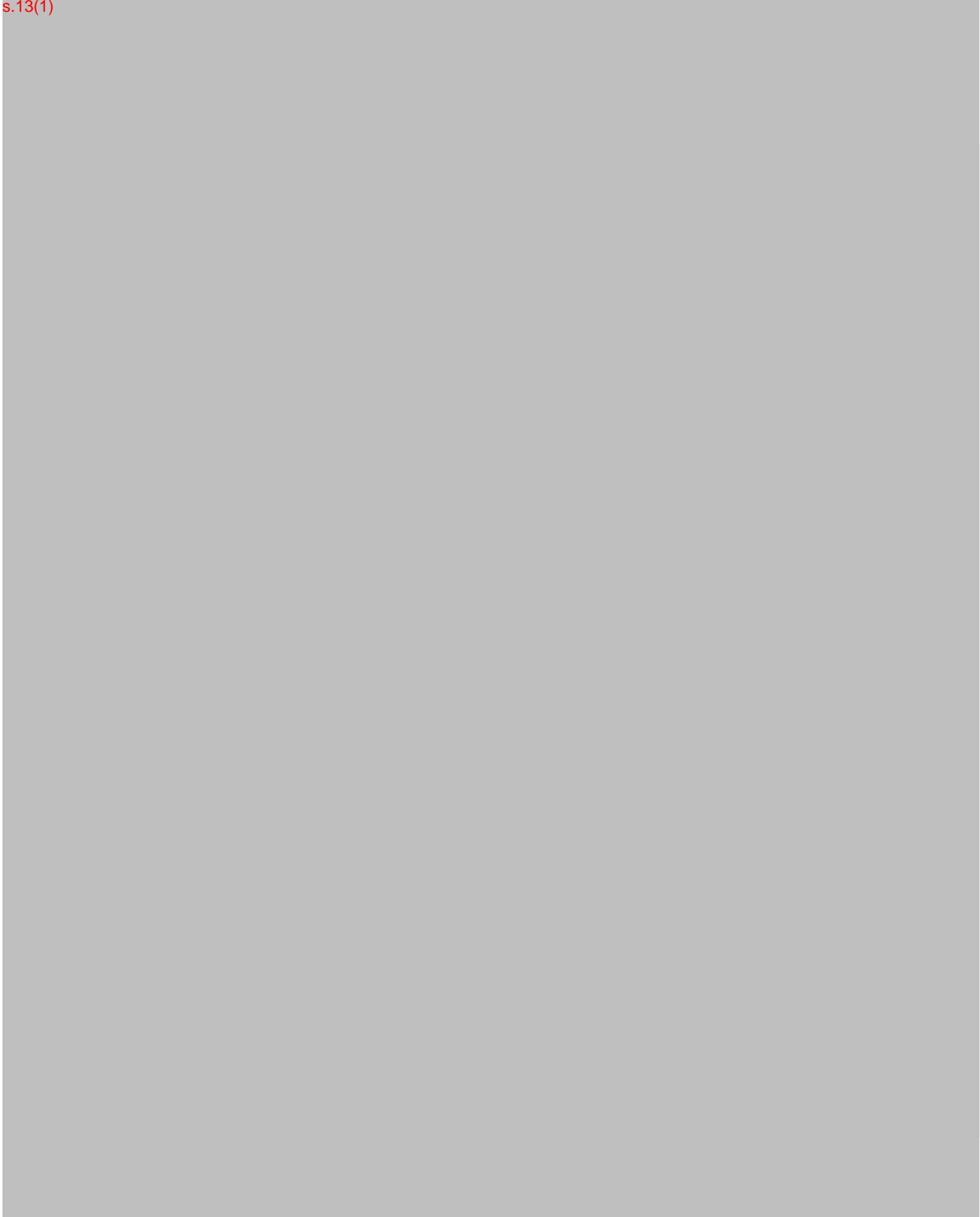


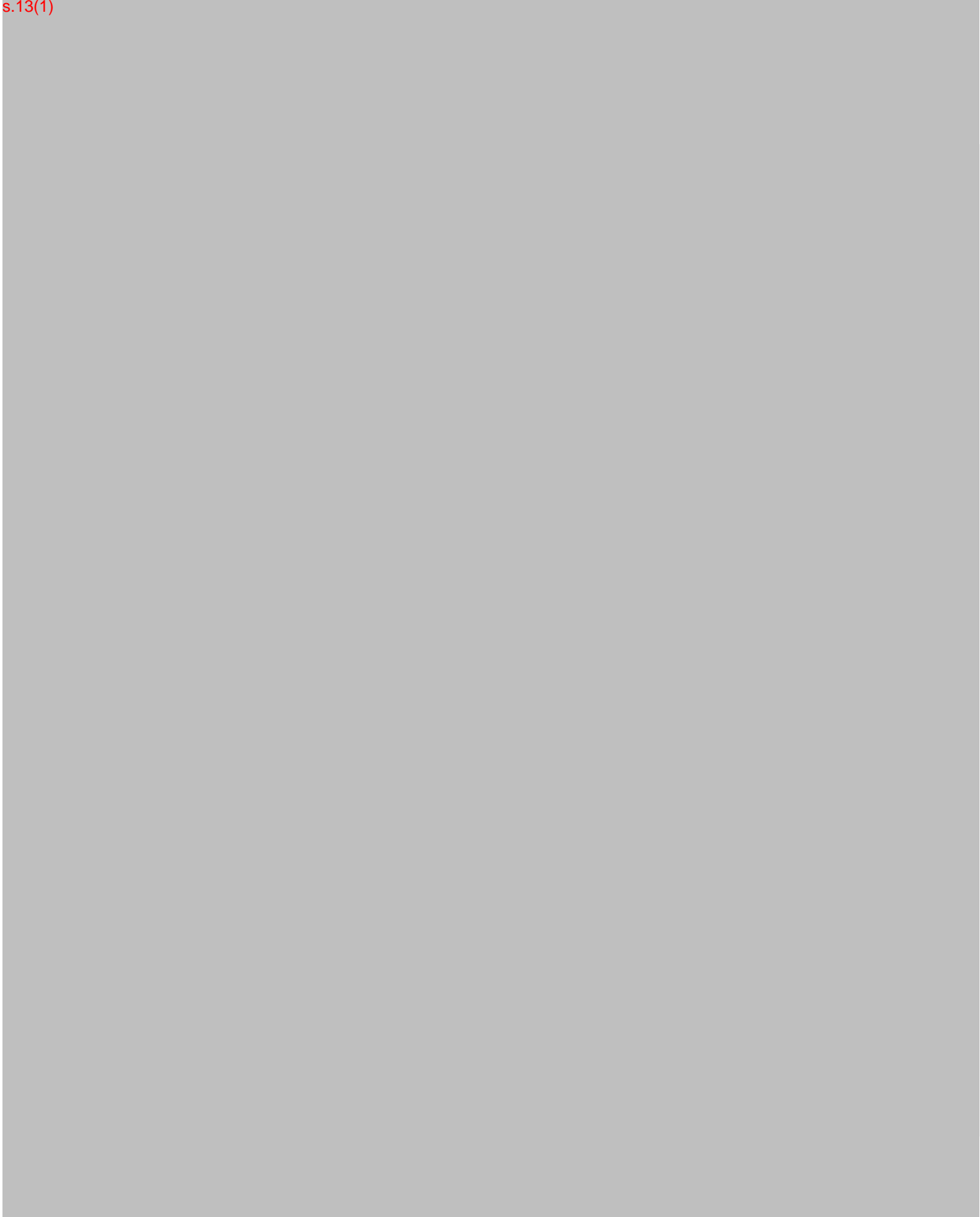


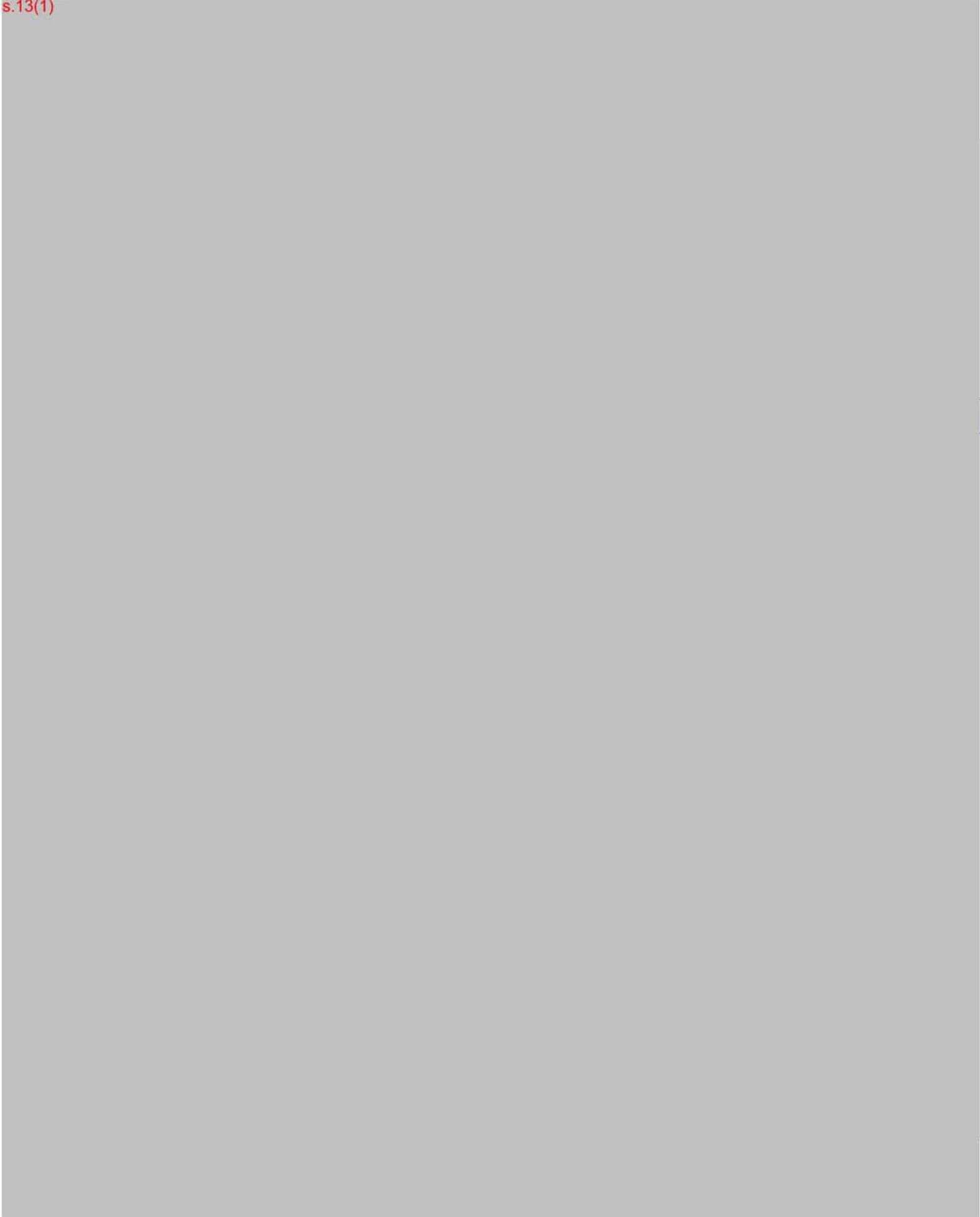


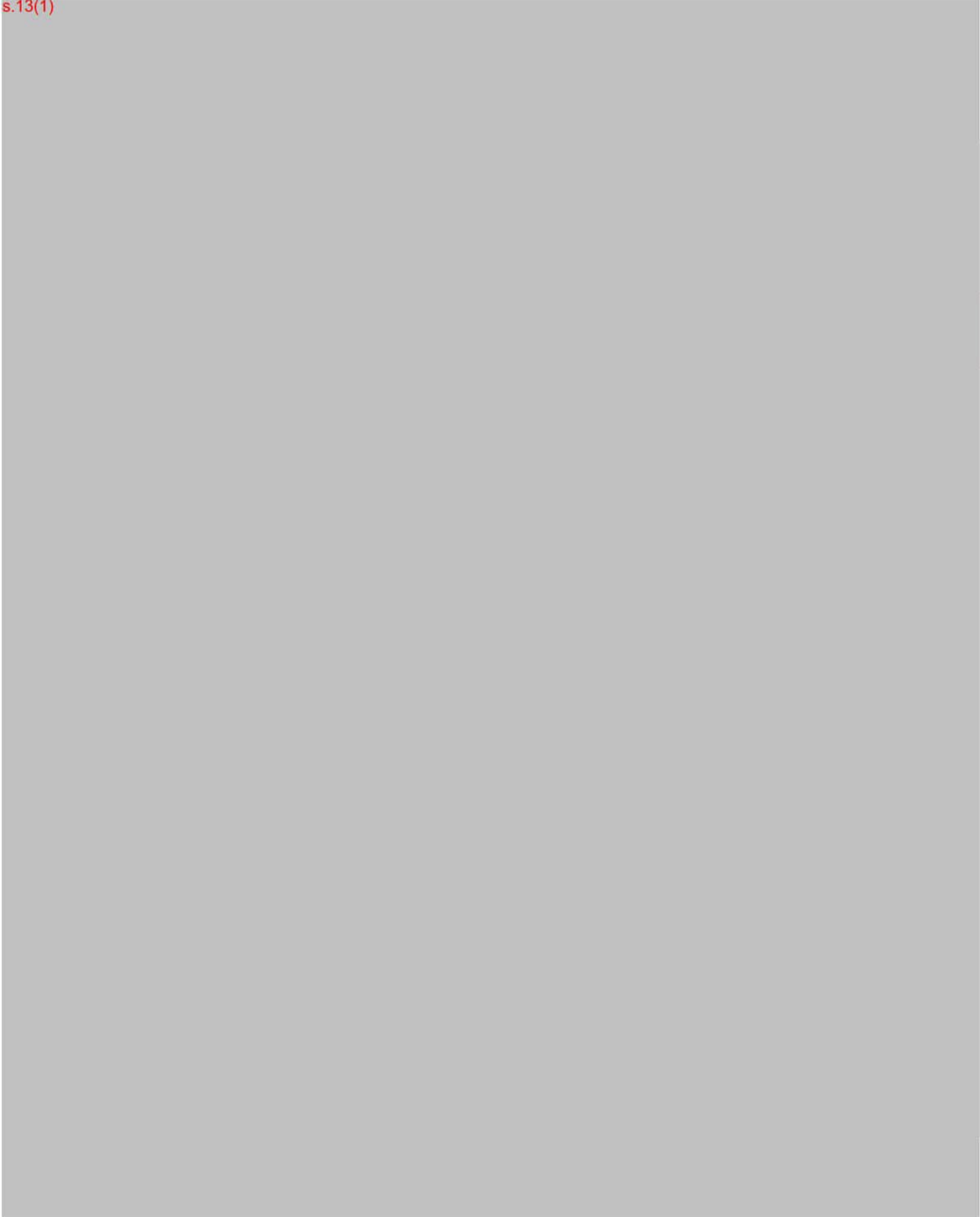


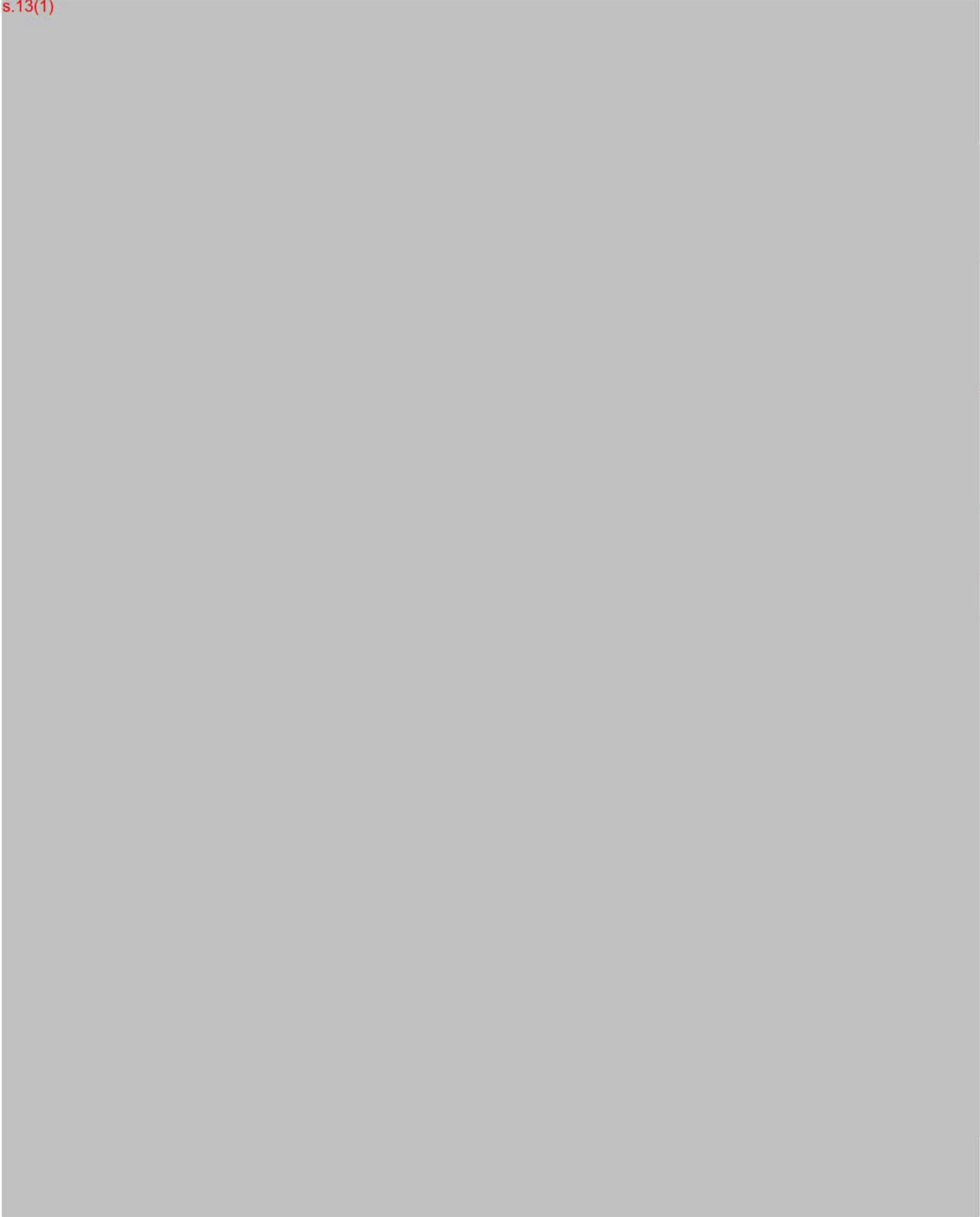


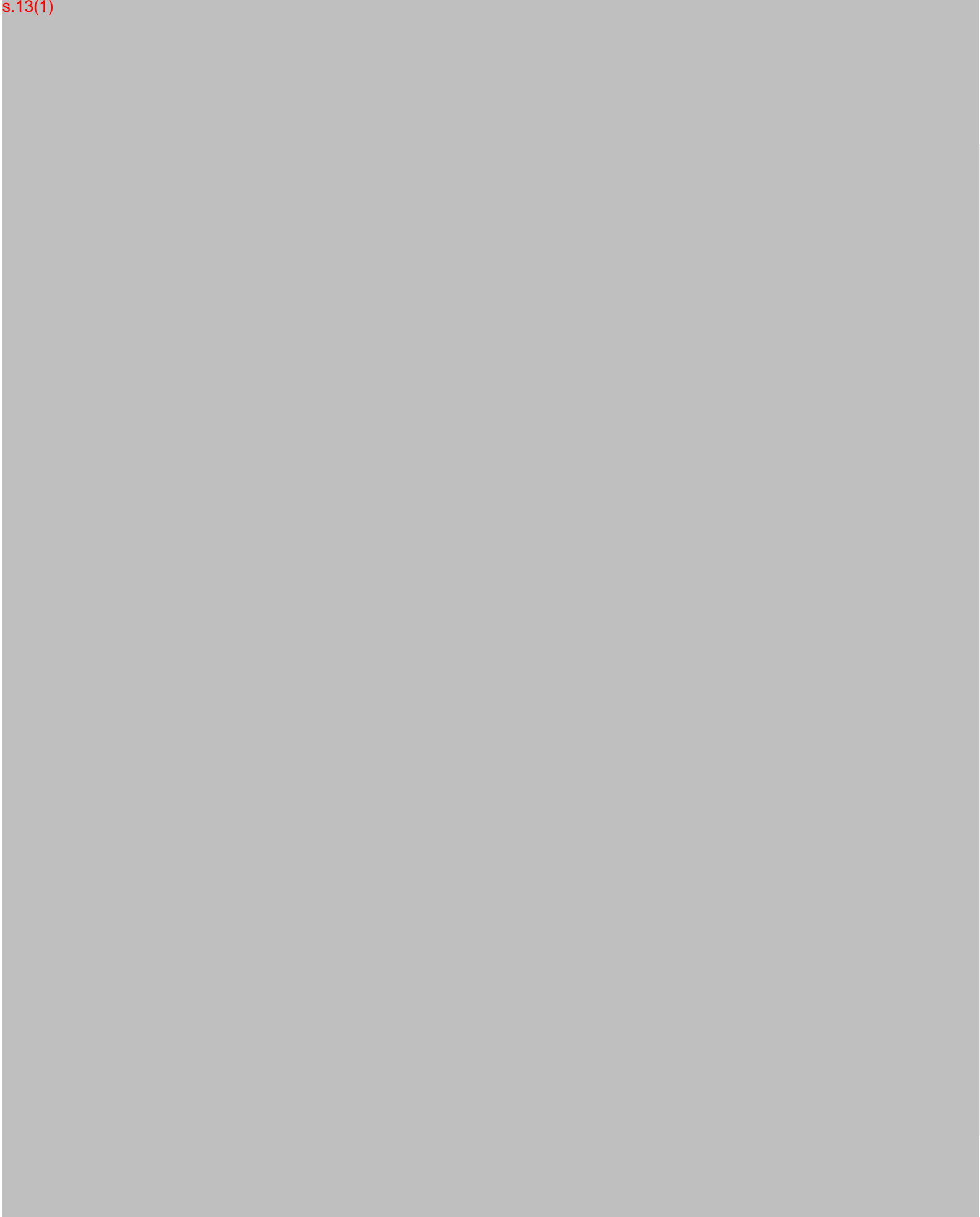


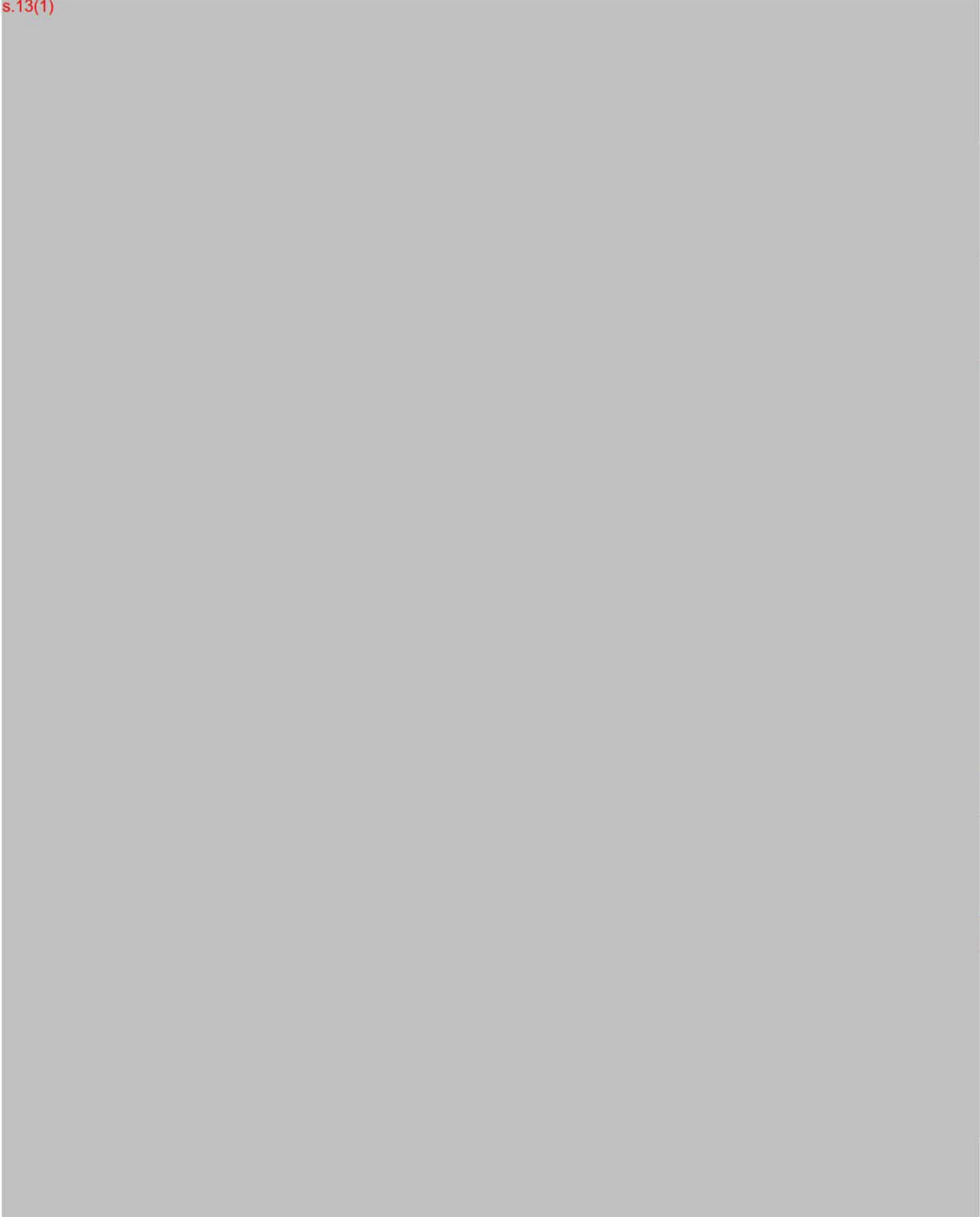


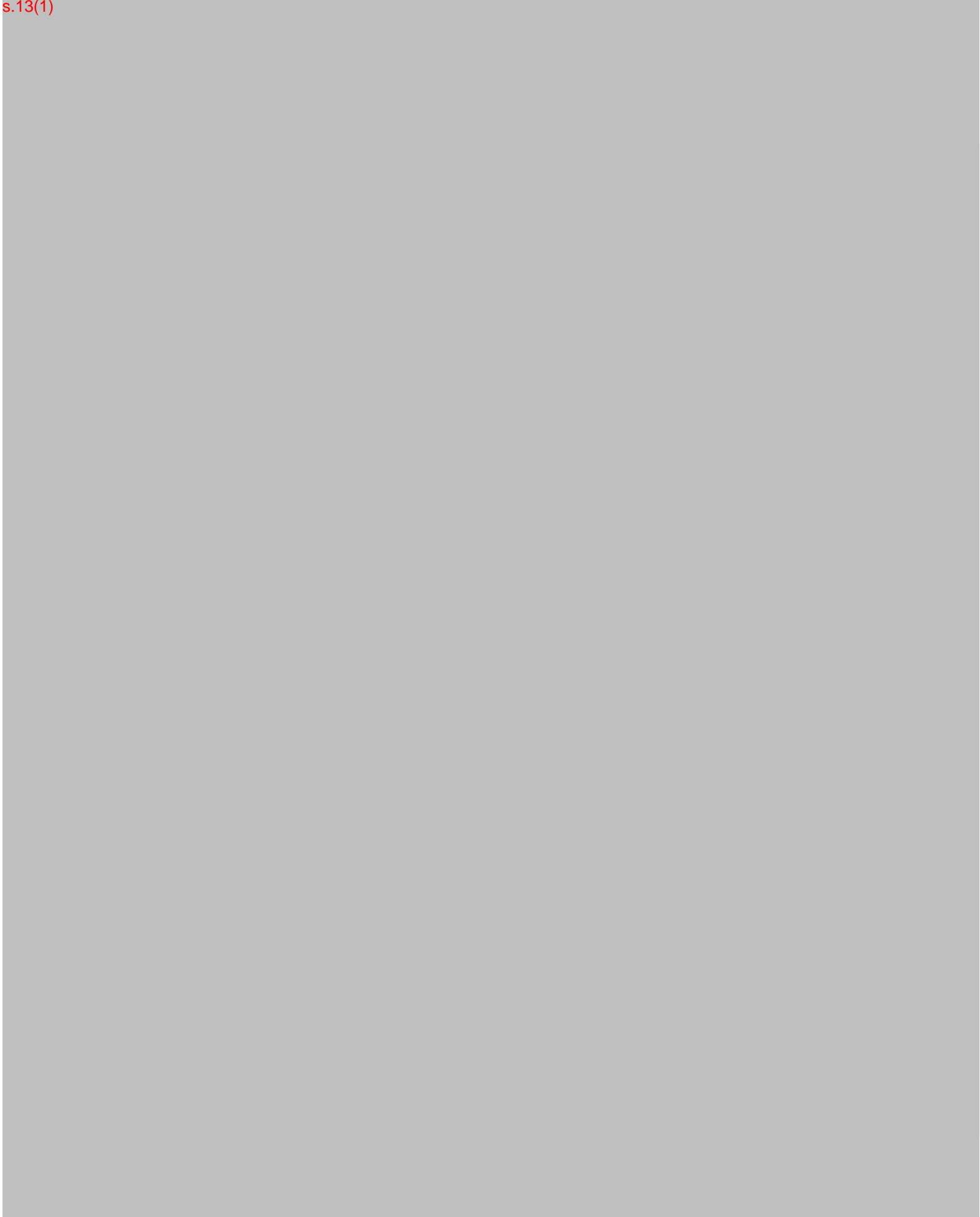


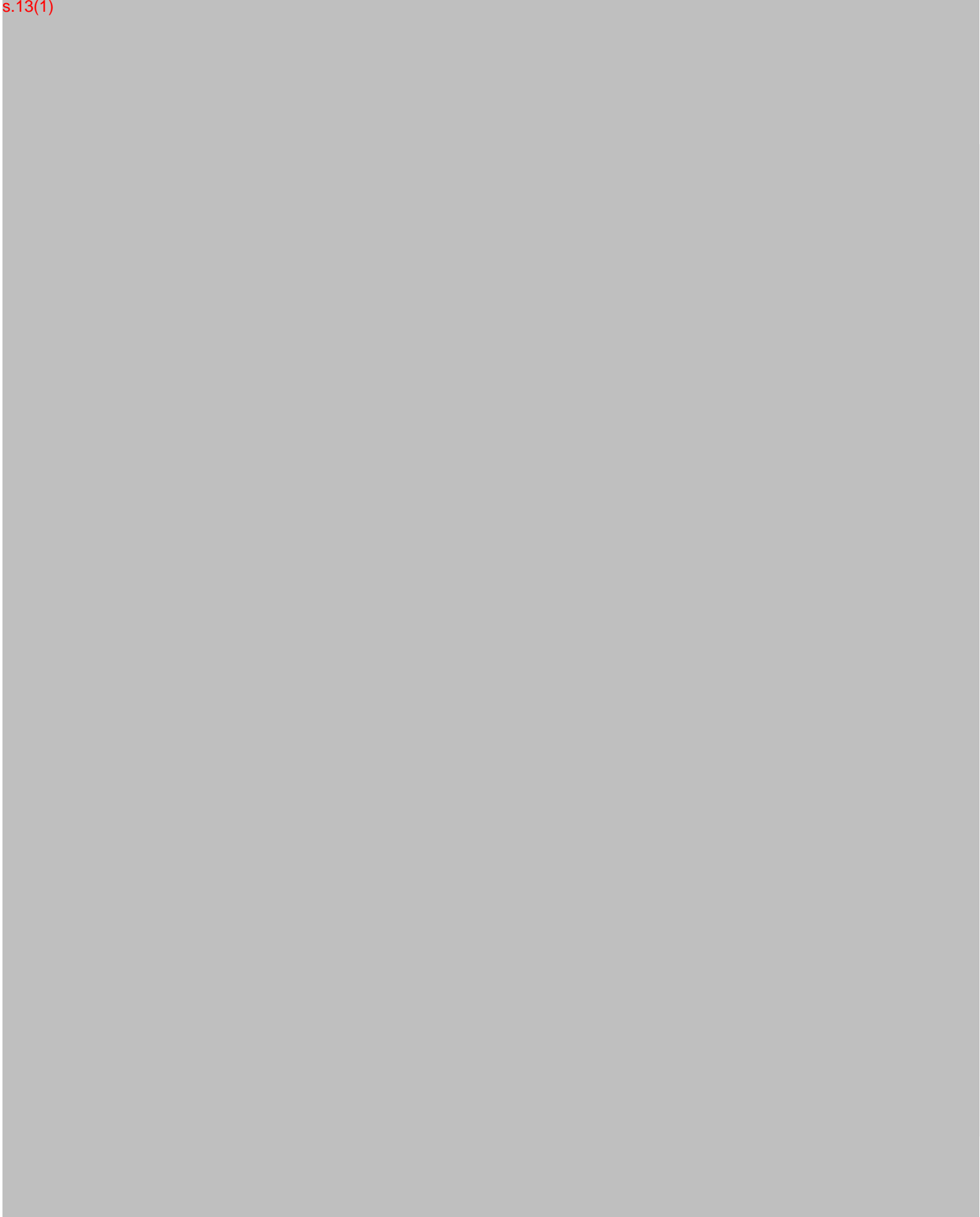


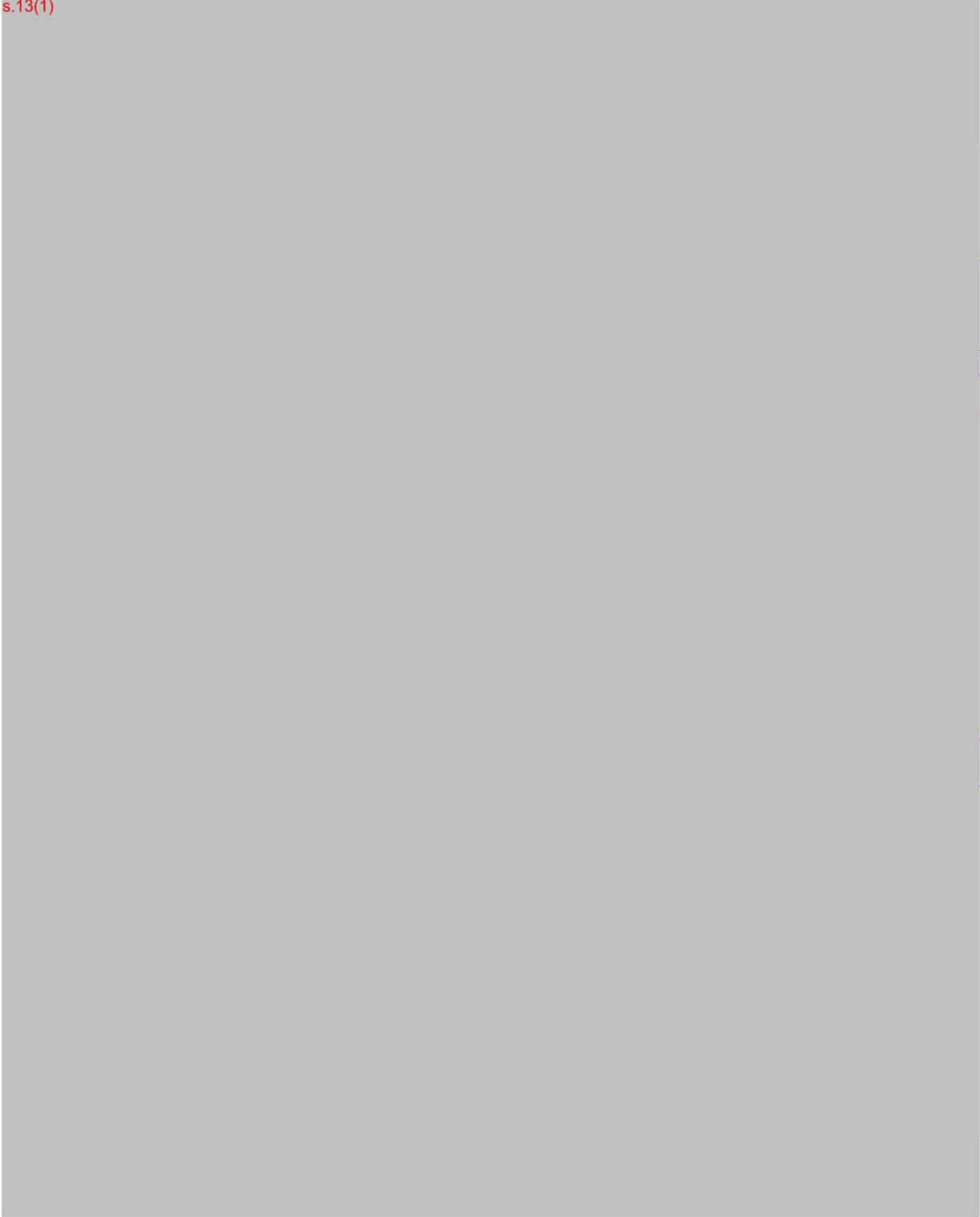


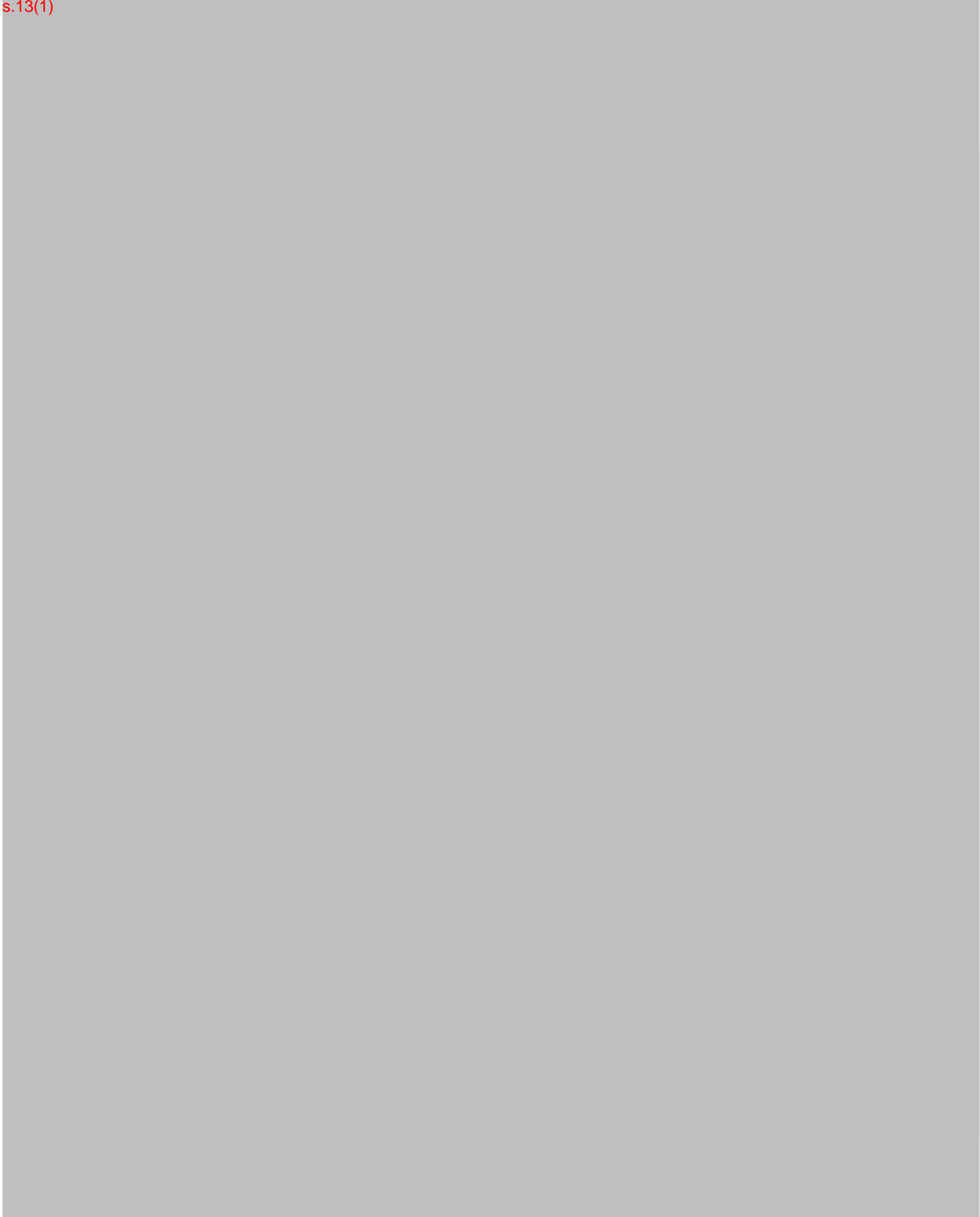


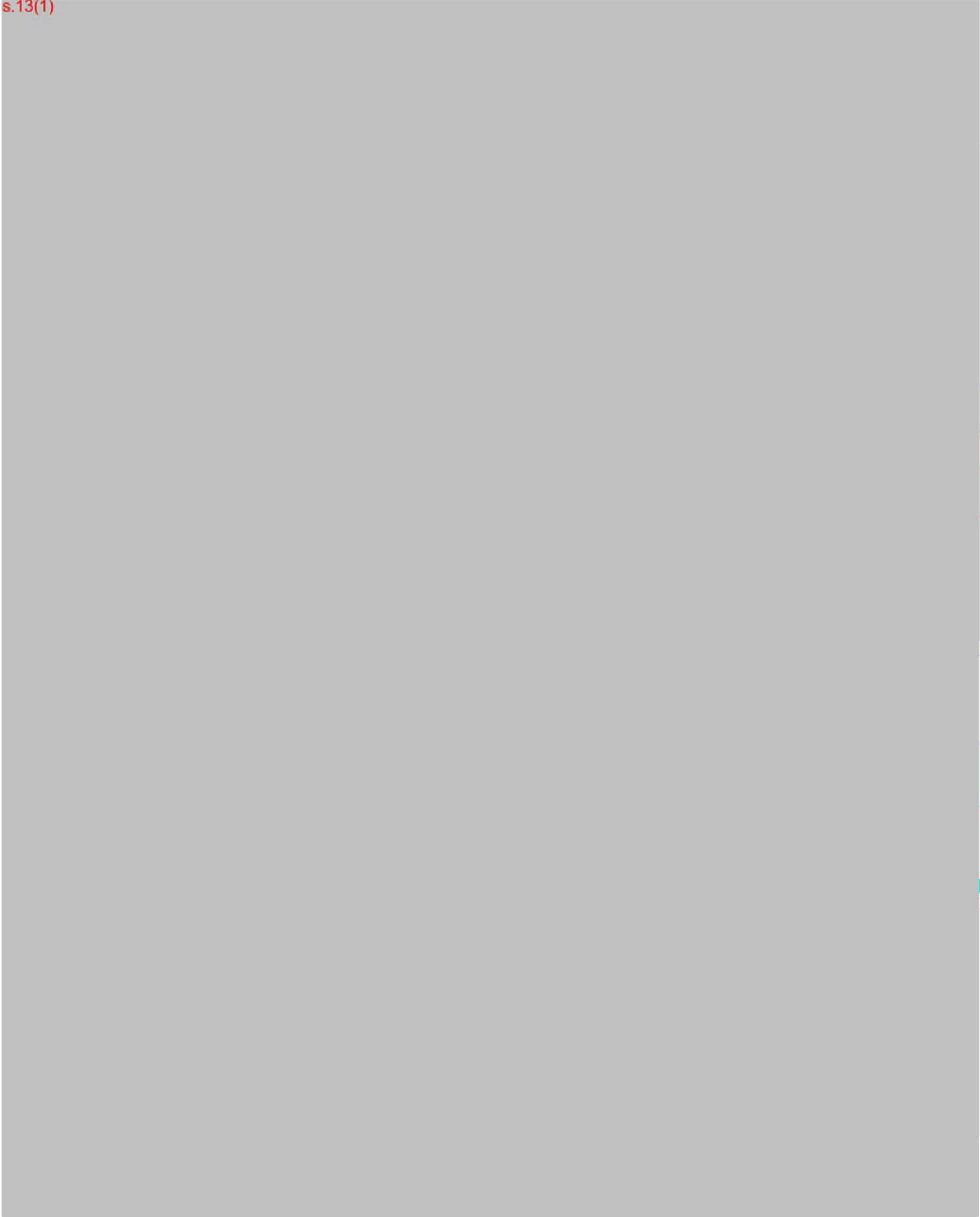


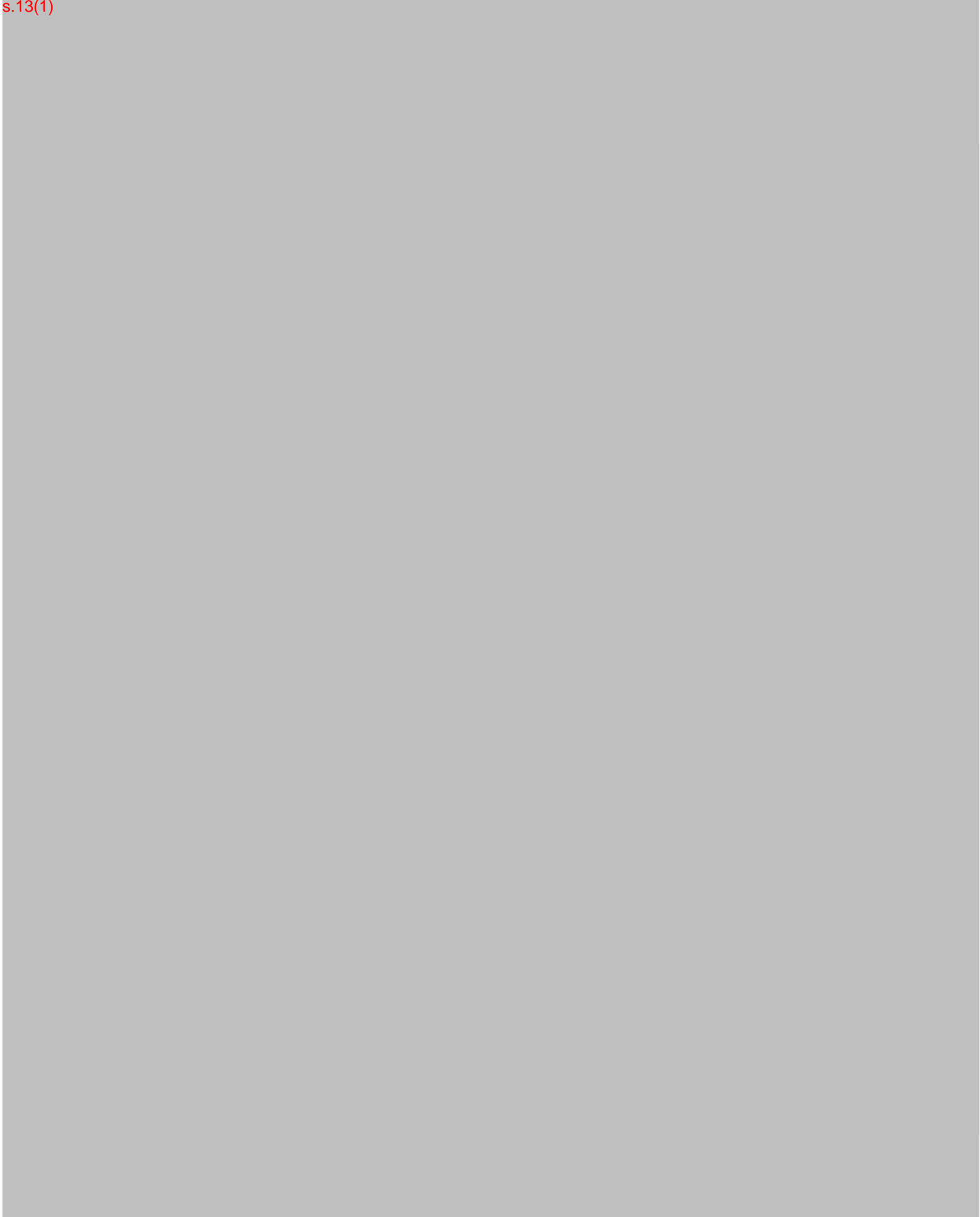


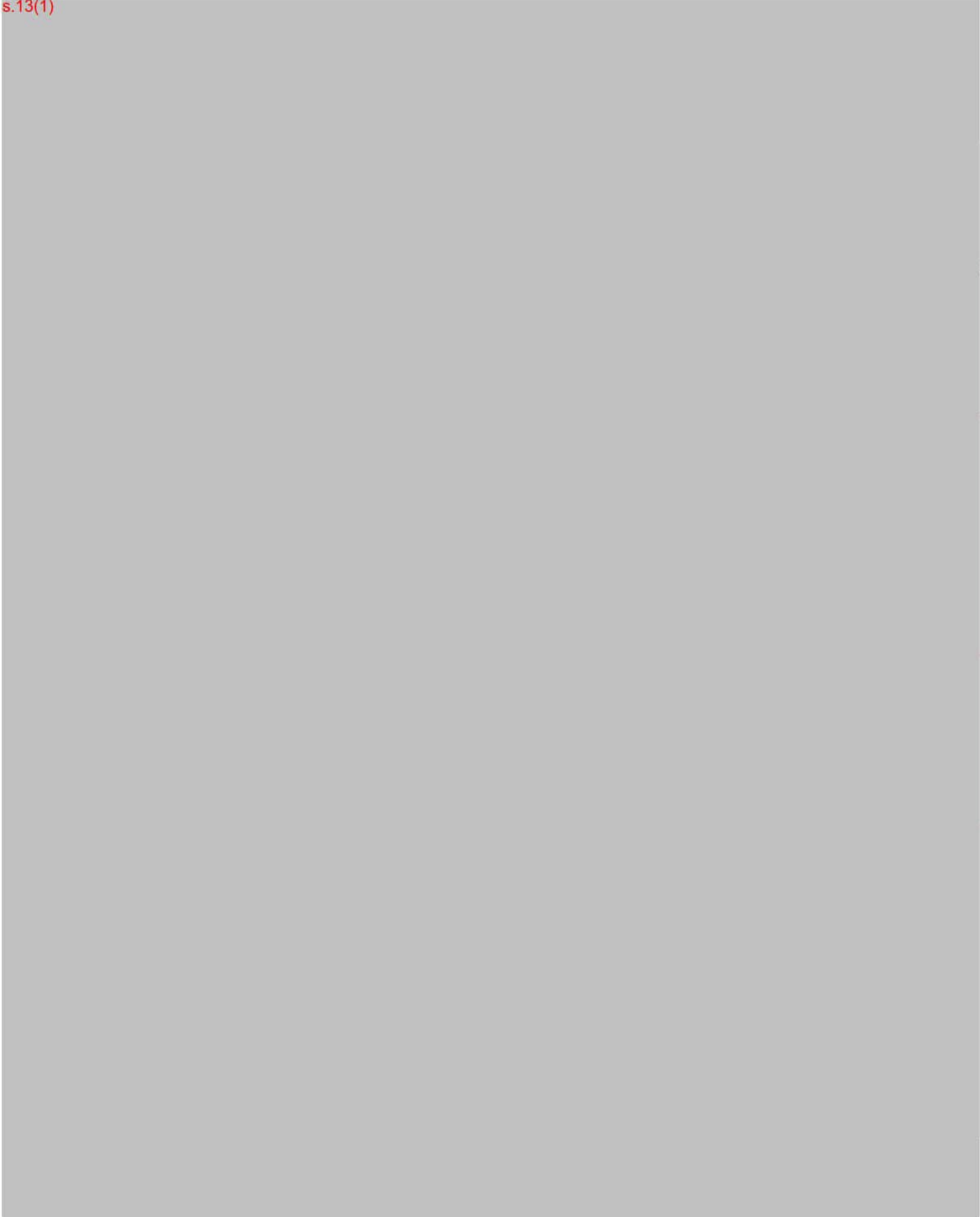


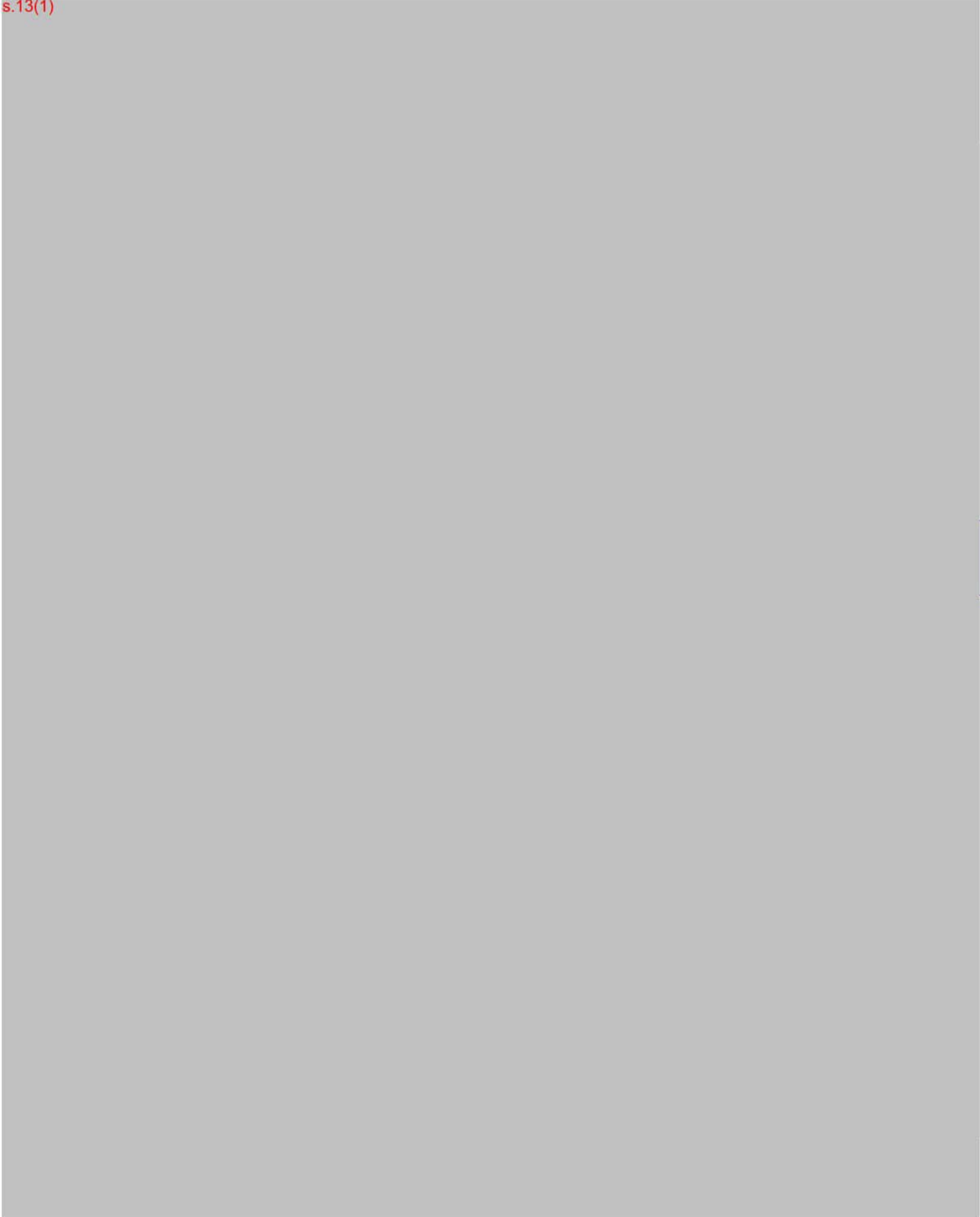


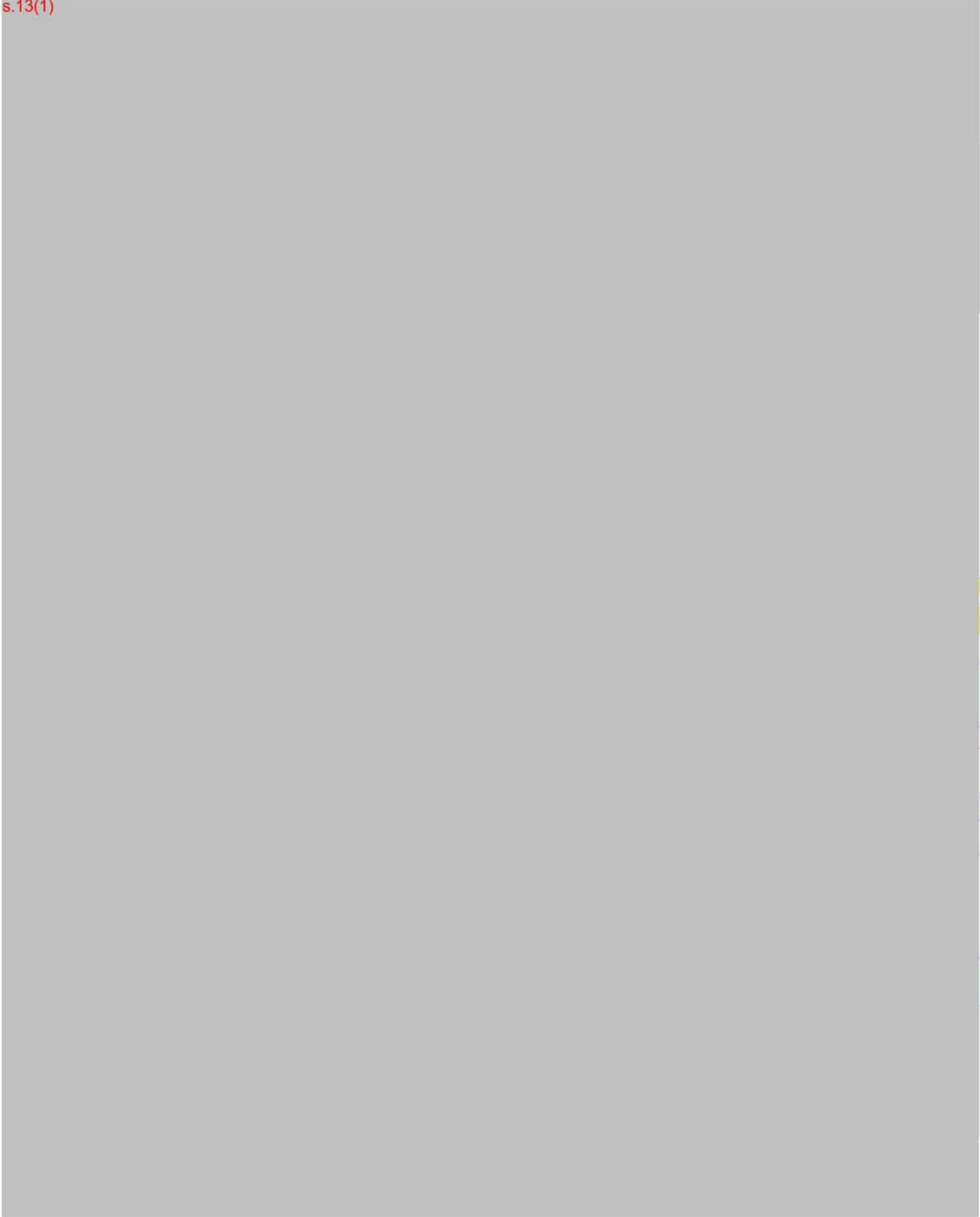


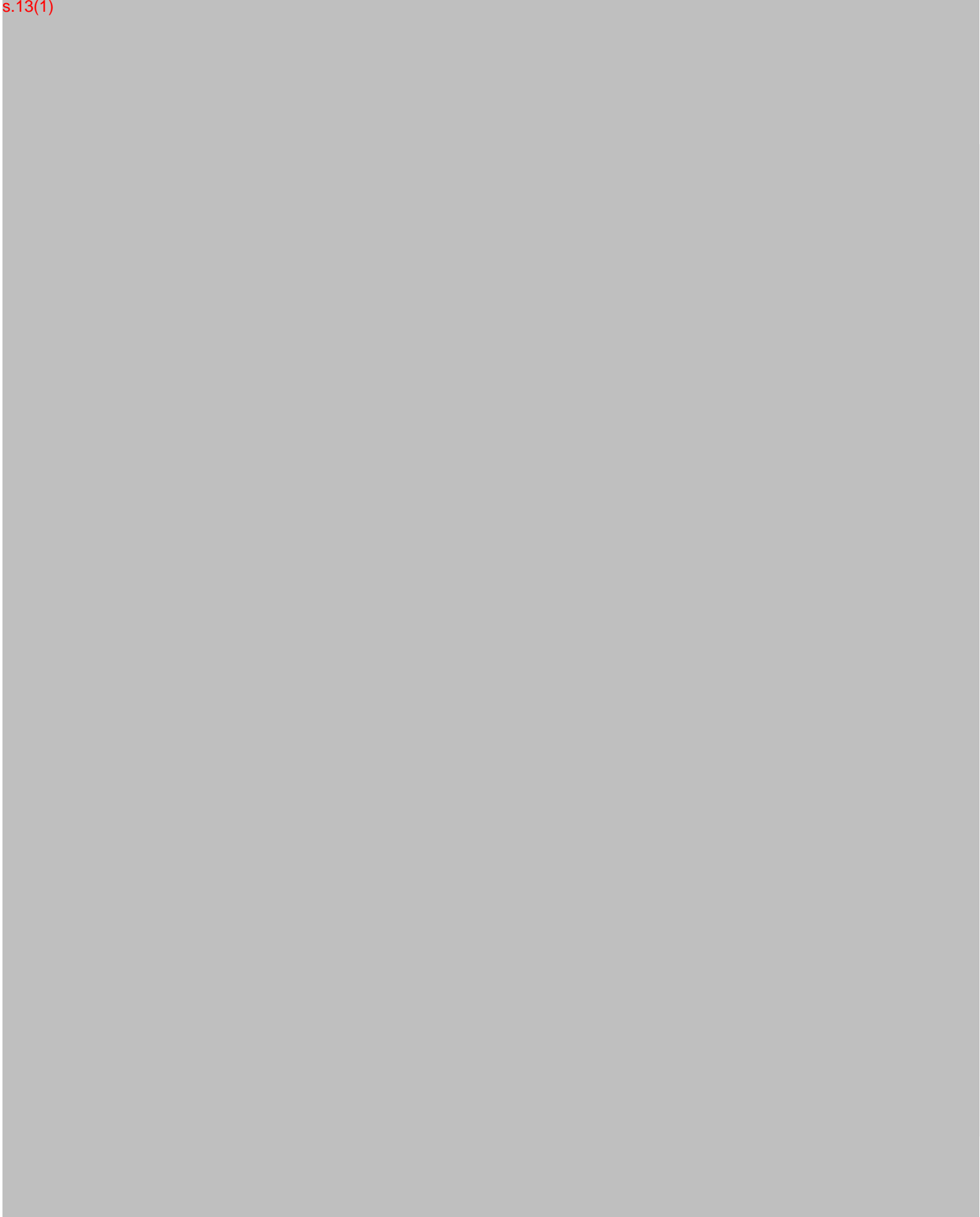


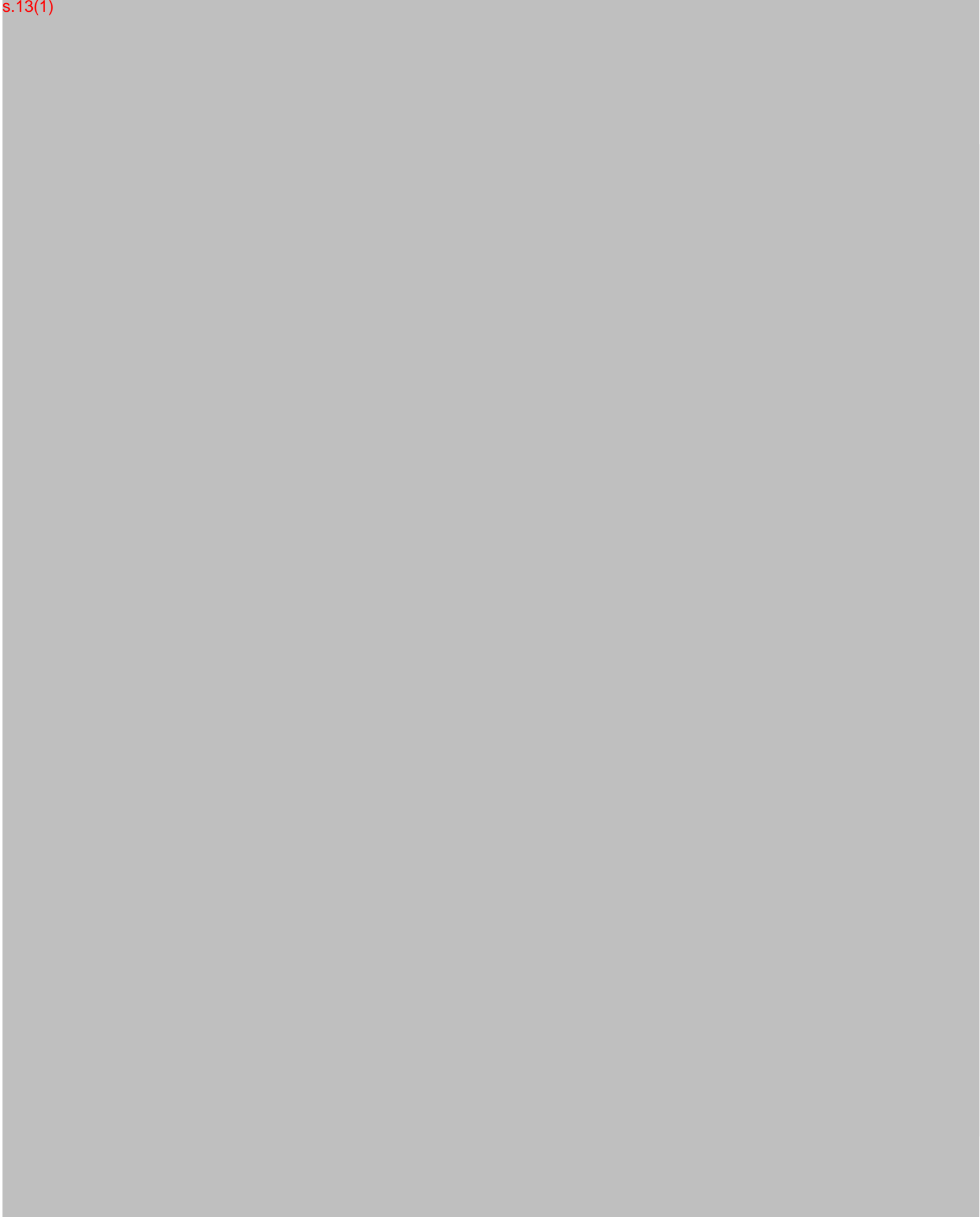


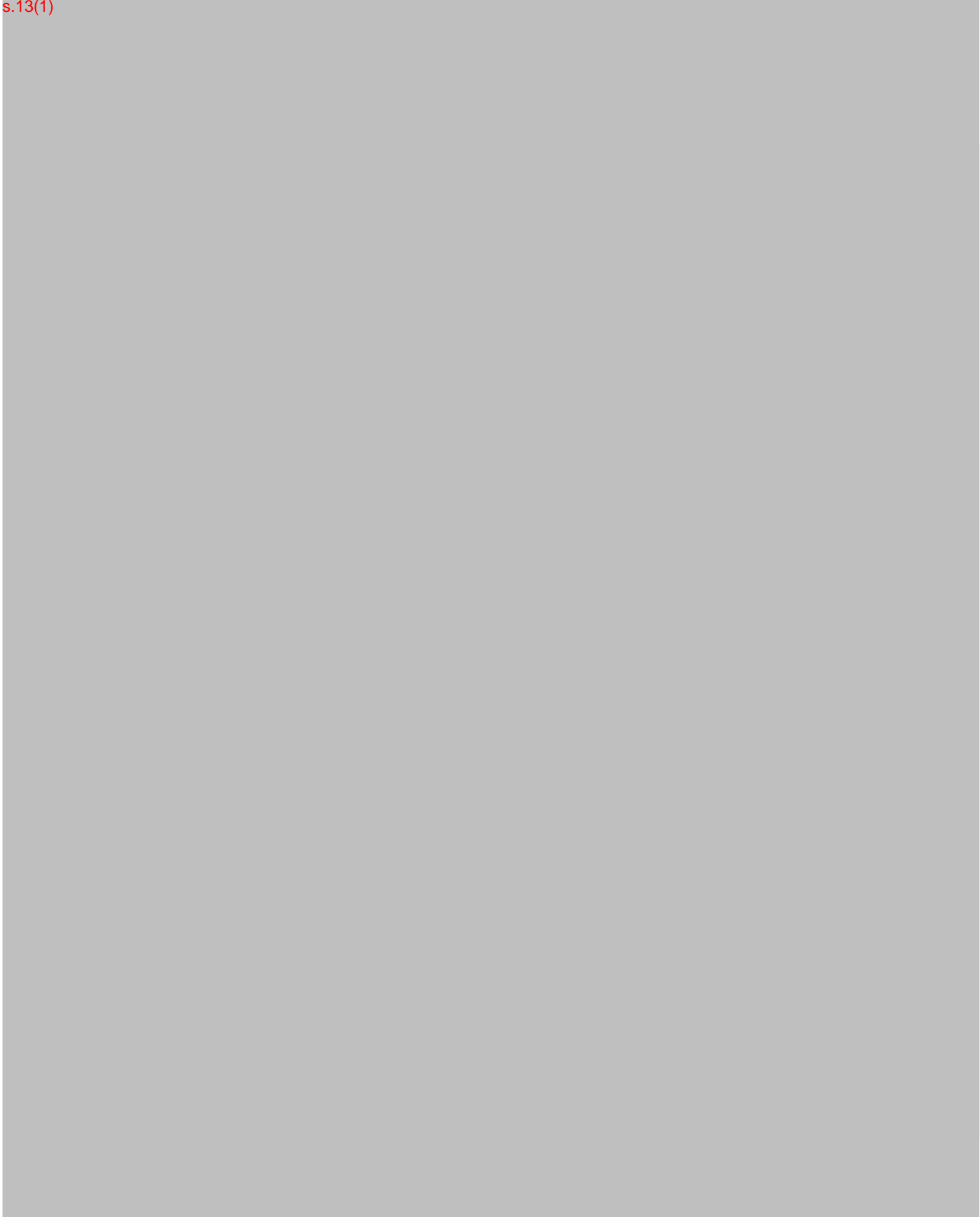


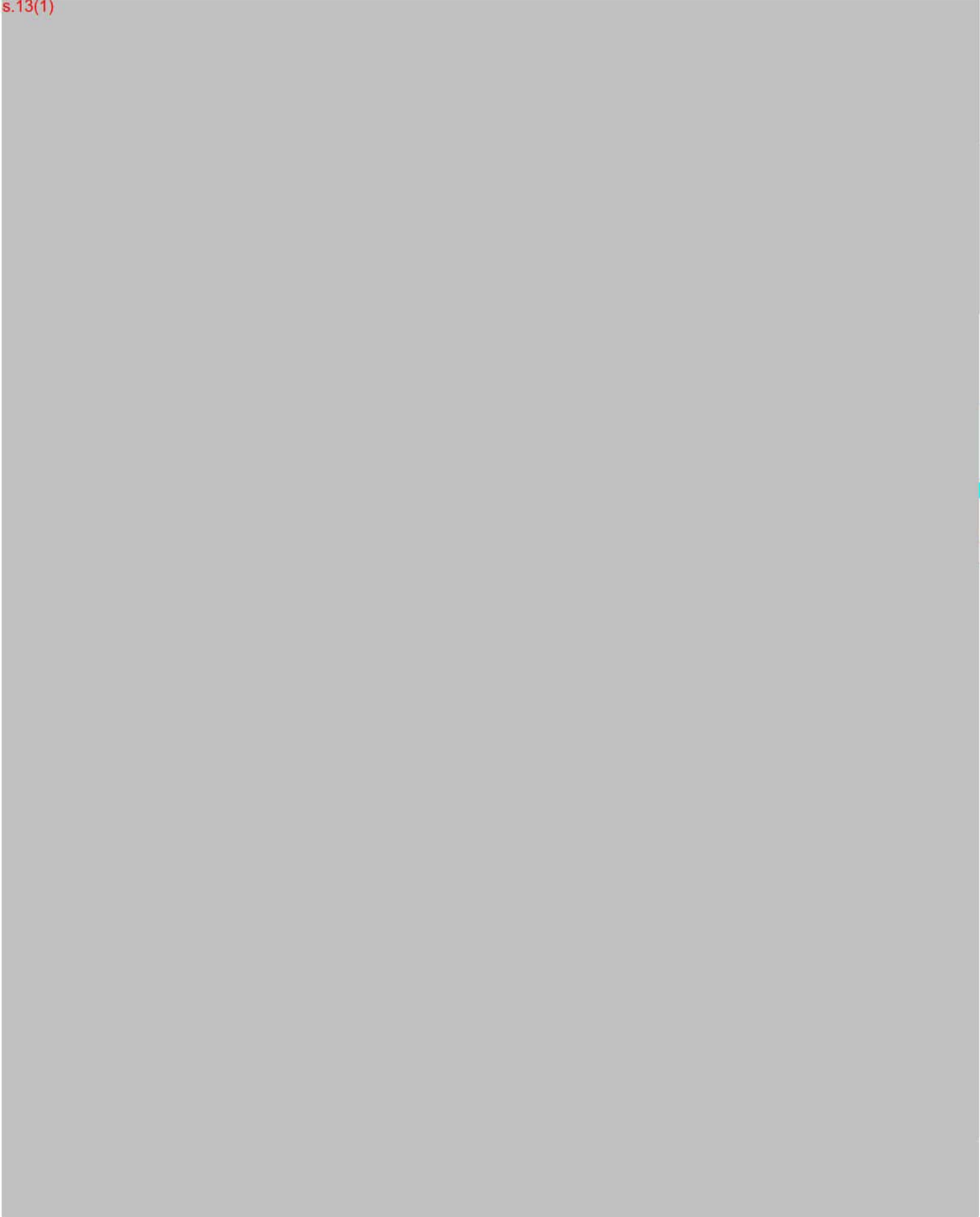


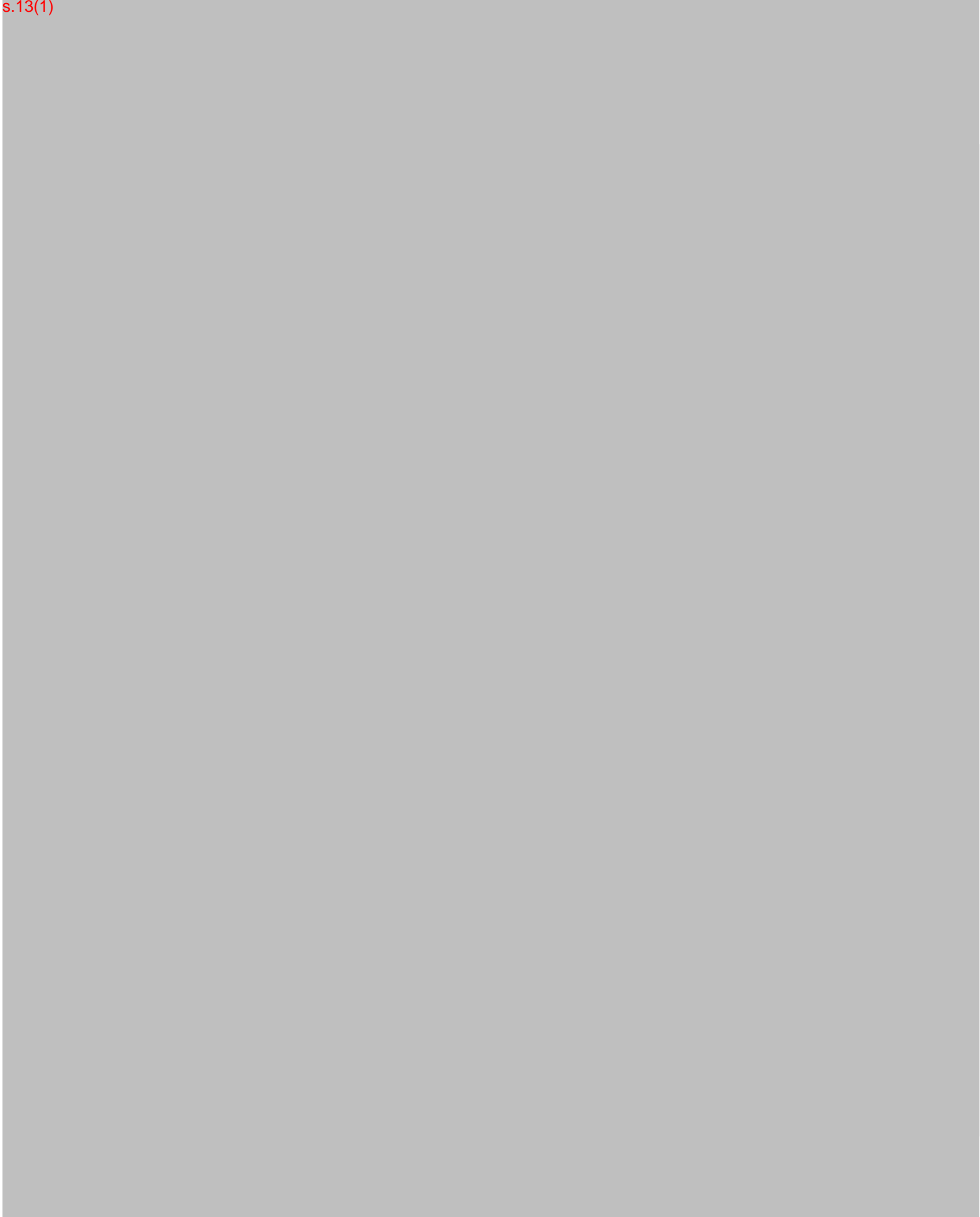


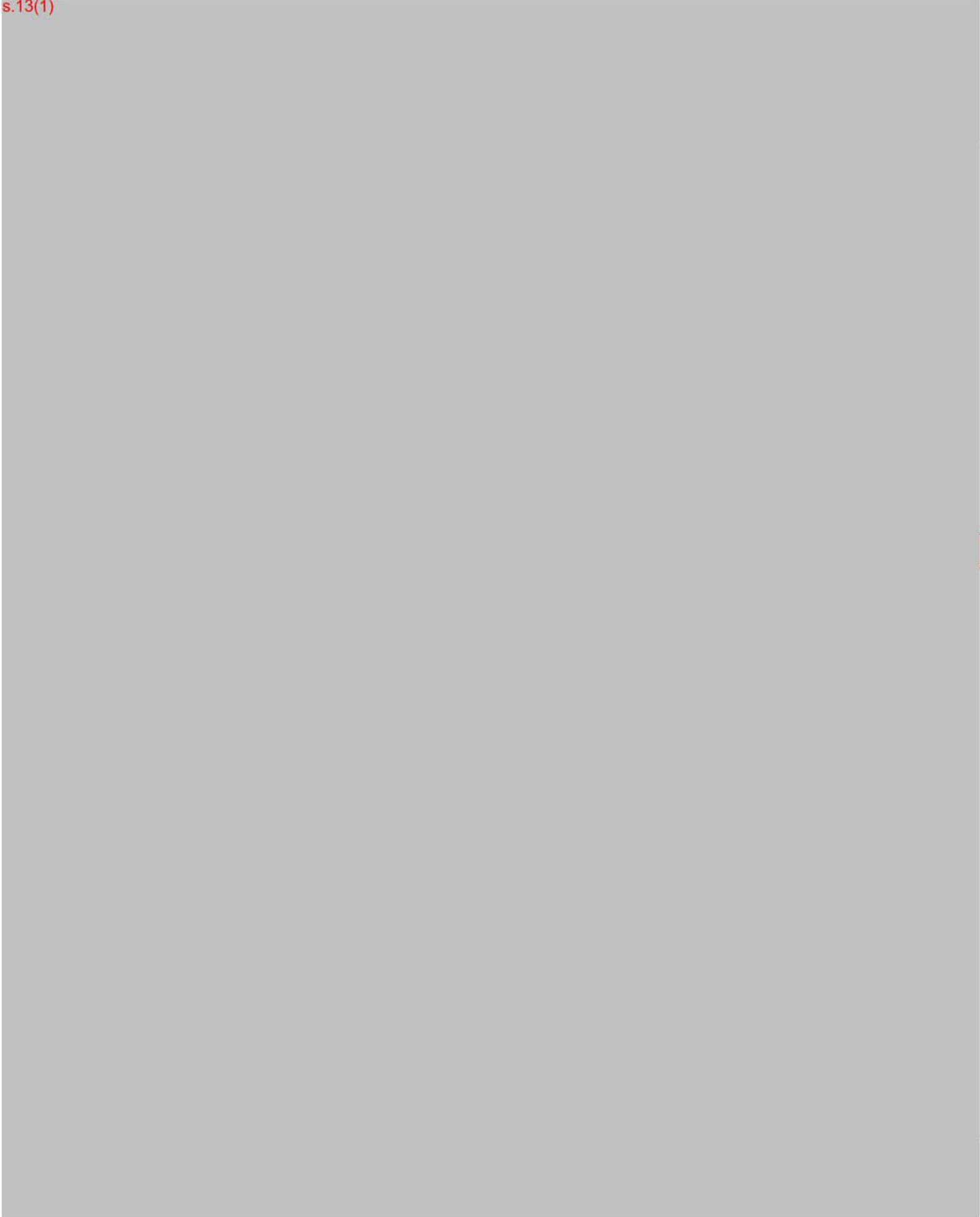


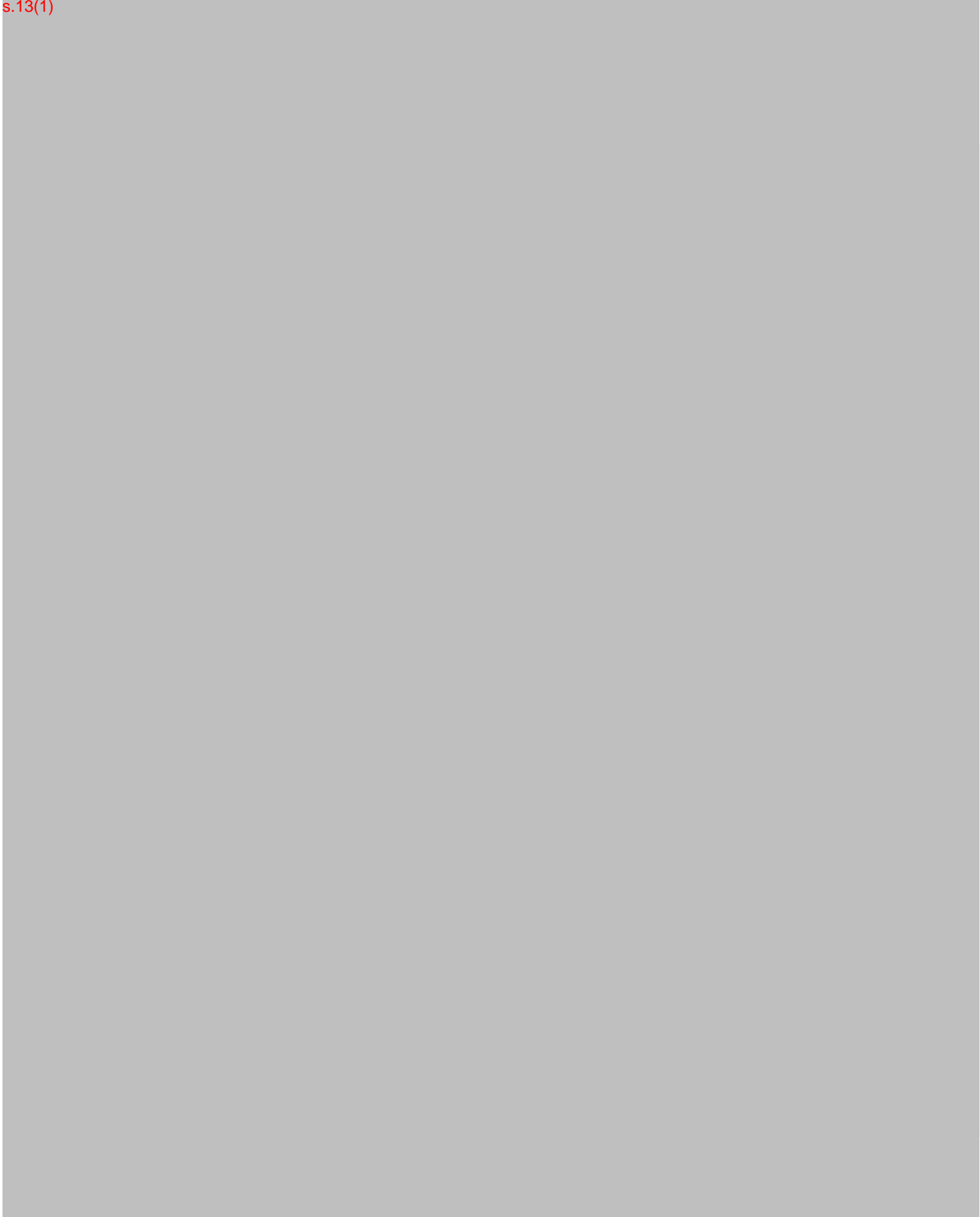


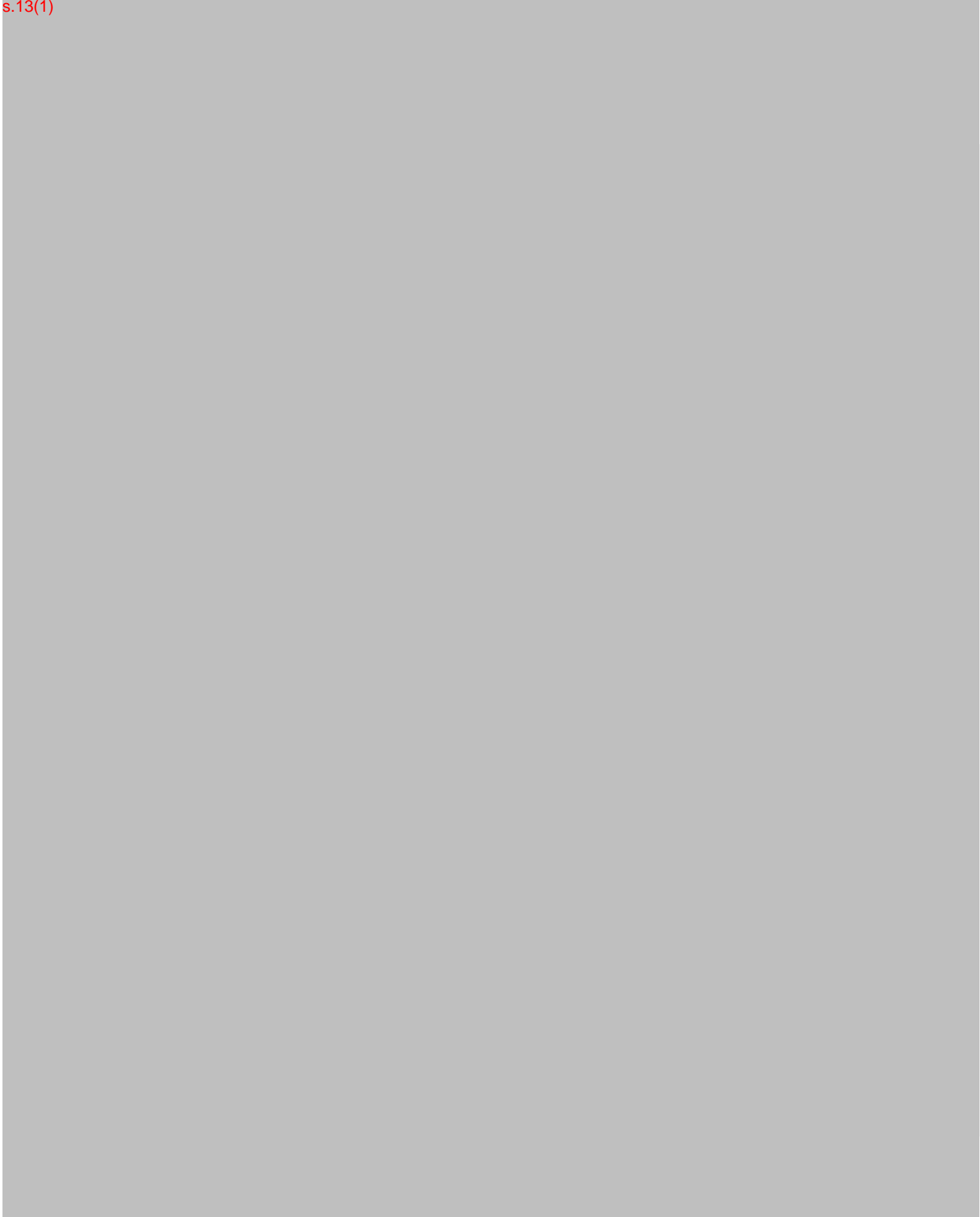


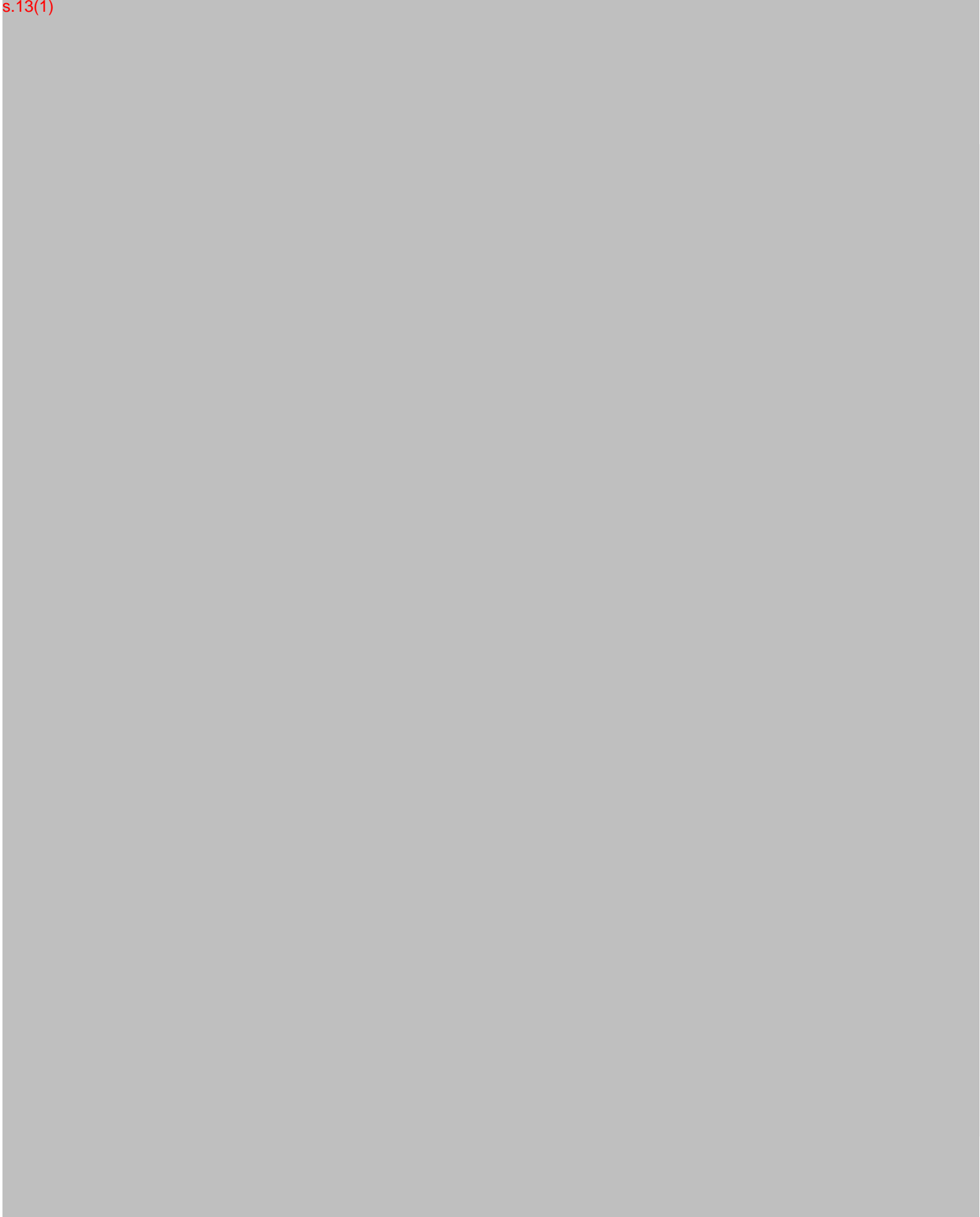


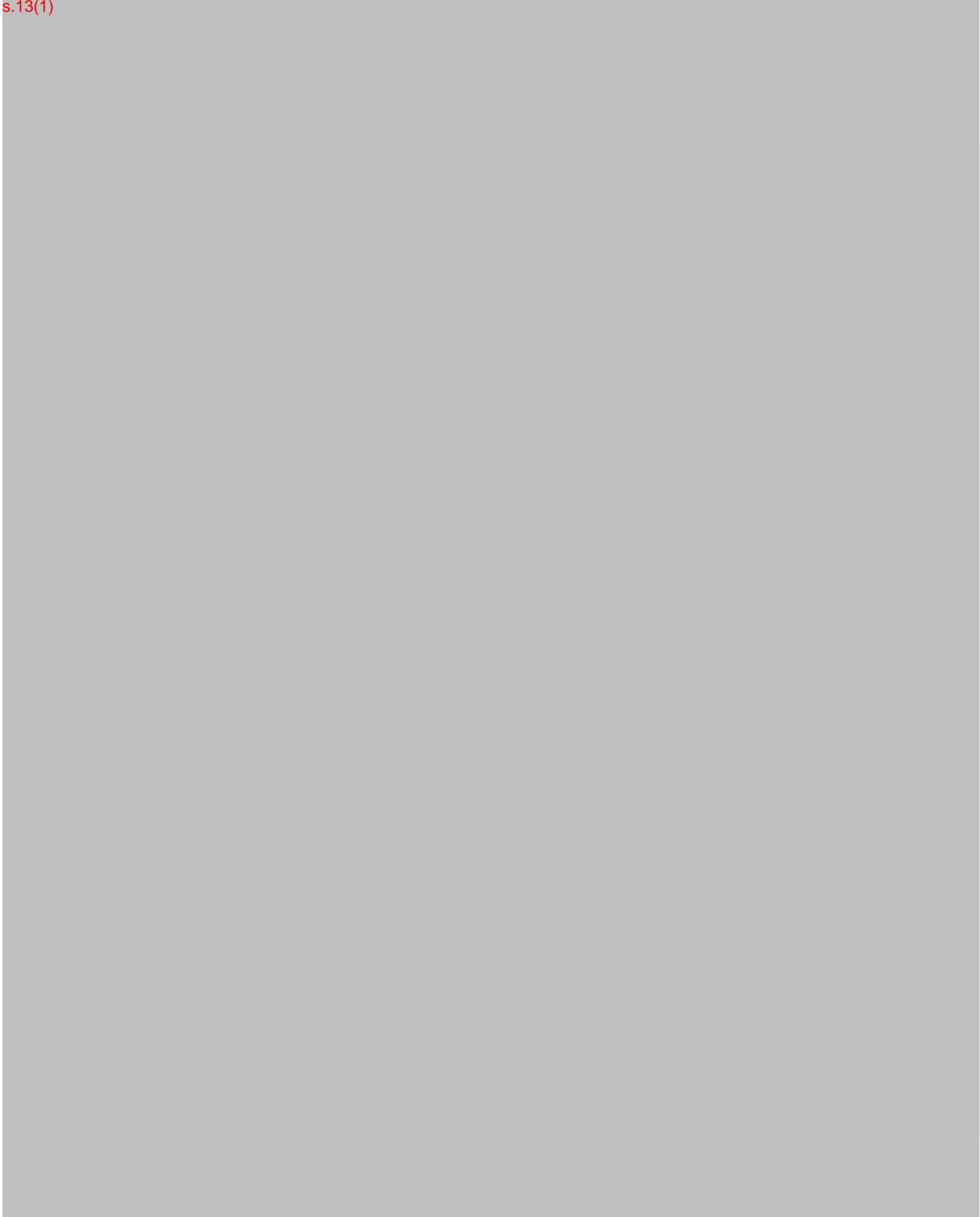












From: "Danny Taylor" <danny@focaleng.com>
To: "Li, Charling" <charling.li@vancouver.ca>
CC: "Susan MacDougall" <susan@focaleng.com>
Date: 6/7/2024 9:27:21 AM
Subject: RE: CoV v3.0a Report and Guidelines
Attachments: 23009 240607 Preliminary Weather Analysis.pdf
23009 240607 Preliminary Weather Analysis.xlsx

City of Vancouver Warning - This message is from an external sender

Do not click on links or open attachments unless you were expecting the email and know the content is safe.

Report Suspicious

Hi Charling,

Please see attached for the preliminary results for this weather analysis. Overall, the impact trend is similarly small to the building we had included our report without any major outliers for any occupancy or building size. We also plan to add a couple more high performance projects (Step 4 MURBs) in the final report updates for a few more data points at a lower TEDI design. Feel free to give us a call if you want to go over any of the data.

Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: Li, Charling
Sent: Wednesday, May 29, 2024 11:03 AM
To: Danny Taylor
Cc: Susan MacDougall
Subject: RE: CoV v3.0a Report and Guidelines

Thanks Danny and Susan!

Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Wednesday, May 29, 2024 10:32 AM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>
Subject: RE: CoV v3.0a Report and Guidelines

Thanks Charling!

Speaking with Susan yesterday, we'll aim to get preliminary results to you in the next 2 weeks and then follow up afterwards with any changes as we do a detailed review and make any necessary adjustments for the final, report-ready results package.

Danny Taylor, CPHC
Associate | he/him
t 250.516.6088 ext. 3 | m 778.995.9863
danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>
Sent: Wednesday, May 29, 2024 10:27 AM
To: Danny Taylor <danny@focaleng.com>
Subject: RE: CoV v3.0a Report and Guidelines

Hi Danny, here's the updated PO with the additional scope for your records.

For the preliminary results, please let me know if there are surprises as you are completing the models. We are aiming to have the next draft EMGs out with the whole 2025 VBBL package out by mid-June and I'd like to be prepared with a sense of what the NRC 1.0 weather files means (order of magnitude) as folks start seeing the updates.

Thanks,
Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Monday, May 27, 2024 10:14 AM
To: Li, Charling <charling.li@vancouver.ca>; Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3.0a Report and Guidelines

Thanks Charling, our team will get started on it this week. Our plan is to check in with you with preliminary results end of June and then wrap up the remaining work in July.

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From: Li, Charling <charling.li@vancouver.ca>
Sent: Thursday, May 23, 2024 4:31 PM
To: Danny Taylor <danny@focaleng.com>; Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>

Subject: RE: CoV v3.0a Report and Guidelines

Hi Danny, please go ahead with this work as it is approved, but I need a little more time to get it processed as a change order.

Please let me know when you can expect to have preliminary results to share.

Thanks,
Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Thursday, May 16, 2024 8:43 AM
To: Li, Charling <charling.li@vancouver.ca>; Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3.0a Report and Guidelines

Hi Charling,

Please see the attached PDF proposal for the additional future weather file analysis scope as discussed. Let us know if there are any adjustments or scope changes needed.

Also linked below on Sharepoint is the updated Recommendations Report (Word and PDF), and Guidelines 3.0a which include the changes for the revision to the NRC "GW1.0" and "GW2.0" weather file recommendations.

 [240516 Recommendations Report and Guidelines 3.0a](https://focaleng.sharepoint.com/240516/Recommendations%20Report%20and%20Guidelines%203.0a) [focaleng.sharepoint.com]

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danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>
Sent: Thursday, May 9, 2024 4:30 PM
To: Danny Taylor <danny@focaleng.com>; Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>
Cc: Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3 Report and Guidelines
Importance: High

Hi Focal team,

Thanks for your patience as I made my way through this very thorough draft final report – see attached! I have mostly minor changes, with the exception of the compliance weather files.

As discussed, please update your recommendation for the NRC weather files, and **provide an**

estimate of additional scope to complete modeling impacts of this recommendation on TEDI + TEUI for a reasonable number of buildings that Focal has access to and can provide by mid to late June. I'm looking mostly for low and high-rise residential or mixed use buildings, with a few office or commercial archetypes if these are available within the set of models you already have access to. If possible I'd like to have the proposed scope in the next week to confirm. Since this draft text of the Draft v3.0b out is expected to be out for public review as part of the 2025 VBBL package by end of May, I'd like to have your specific NRC recommendation in the text **by May 24**. During the review period (June-July) hopefully you are able to work on building the dataset of TEDI/TEUI impacts based on the NRC weather files and any changes you need to make to the final report text. **Please let me know if that is feasible!**

One last minor thing is to please update your version of the proposed text for the EMGs as draft version 3.0a (to differentiate it from the previously published v3.0 and the soon to be released for public comment v3.0b).

Thanks,
Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Monday, May 6, 2024 12:17 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>; Susan MacDougall <susan@focaleng.com>
Subject: RE: CoV v3 Report and Guidelines

Hi Charling,

We could certainly expand on the analysis for the NRC file which we're pivoting to (unless the upcoming PCF Scott mentioned says otherwise). It likely wouldn't be for the full gamut of the Metrics Archetypes, but could be expanded for a more types of building shapes, constructions, target performances, and occupancies to get a better idea of a typical impact. We expect the same general trend to apply to the other buildings, but agree more data points would be good here.

We also were just now discussing the option of looking at the NRC +1.0 file instead of +0.5 which will likely closer match the current CWEC file TEDI results, if that's something you wanted to discuss. Different methodologies, but the PCIC 2020s file falls roughly in the middle between the NRC +0.5 and +1.0 intended time periods. If it works for you, we can wait until the your other minor edits then update the weather analysis with these changes, and any other sections this would impact.

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danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>

Sent: Friday, May 3, 2024 5:04 PM

To: Susan MacDougall <susan@focaleng.com>; Danny Taylor <danny@focaleng.com>

Cc: Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>

Subject: RE: CoV v3 Report and Guidelines

Hi folks,

I'm almost through reviewing the final report draft and only have a few minor edits; however the only significant item is the update of the recommendation for the weather files from PCIC to NRC as discussed with Riley and Danny last week. I'm happy to move to the NRC files in anticipation of alignment with national code in the future. The only hesitation for me is the how the NRC +0.5C files (assuming this is the recommendation for compliance, instead of PCIC 2020s files – please confirm) shows an increase in both TEDI and TEUI in Table 3 (+8% and +5% respectively). As NRC +0.5C files may make compliance appear *slightly* more difficult (based on dataset of 1!), I'd be more comfortable if we had a few more data points to understand what NRC+0.5C means to more projects, and it may impact whether we make any changes to the corridor pressurization adjustment or not.

Looking forward to hearing your thoughts on this, whether you think that NRC+0.5C is expected to have that same general increase to TEDI/TEUI for more projects, or how many more data points you might have access to.

I'll follow up on Monday and we can talk more.

Thanks and have a great weekend!

Charling

From: Susan MacDougall <susan@focaleng.com>

Sent: Thursday, April 11, 2024 8:56 AM

To: Danny Taylor <danny@focaleng.com>; Li, Charling <charling.li@vancouver.ca>

Cc: Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>

Subject: RE: CoV v3 Report and Guidelines

Hi Charling and Patrick,

I wanted to echo Danny's thanks for choosing our team, working with us through so many challenging areas, and being flexible with the schedule.

It's been an interesting project but also very gratifying... I shared this with Riley and Danny already, but in 2022 I gave a keynote presentation at eSIM on how BC was doing 4 years into the Step Code and highlighted successes and challenges. I re-visited it this week as I'm preparing slides for AIBC (want to show improvement over older projects) and when I stumbled upon the challenges slide, I realized that all of the items listed have been addressed by the proposed EMG! Thought that was a nice realization right as we wrap this up ☐

Look forward to your final comments and getting this one out to industry! Best,

Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Danny Taylor <danny@focaleng.com>
Sent: Wednesday, April 10, 2024 5:20 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3 Report and Guidelines

Thanks for all your work also! We're excited to have this close to the finish line.

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danny@focaleng.com



From: Li, Charling <charling.li@vancouver.ca>
Sent: Wednesday, April 10, 2024 1:28 PM
To: Danny Taylor <danny@focaleng.com>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: RE: CoV v3 Report and Guidelines

Received, thanks to the whole team for your hard work and perseverance! I'll do my best to get back to you with comments in the next two weeks.

Cheers,
Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Wednesday, April 10, 2024 12:33 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>; Riley Beise <riley@focaleng.com>; Enright, Patrick <Patrick.Enright@vancouver.ca>
Subject: CoV v3 Report and Guidelines

Hi Charling,

See the Sharepoint link below for the Recommendations Report (Word and PDF) and red-lined Guidelines document. Once you've had a chance to do a final review and read through let us know if you have any final adjustments and comments, and we can wrap it up

and provide the signed and finalized report.

Let us know if you questions, want to schedule a meeting or call to go over anything, or have any issues accessing the files.

 [240410 Report and Guidelines \[focaleng.sharepoint.com\]](#)

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Focal Engineering

Project 23009 CoV EMG Recommendations
 File Weather File Change Impacts - Preliminary Draft Results
 Date 07-Jun-24

Impact of Weather File Change (YVR CWEC 2016 to NRC GW1.0) on selection of building types

Building Information	Building Type		High-Rise MURB 1	High-Rise MURB 2	Mid-Rise MURB 1	Mid-Rise MURB 2	Low-Rise MURB	Mixed Use Residential/Retail 1	Mixed Use Residential/Retail 2	Mixed Use Residential/Office	Office	Hotel	
	Occupancies		Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group D, Office	Group C – Hotel/Motel
	MFA	Storeys	VFAR										
		m ²	4,560	39,250	5,000	2,600	2,440	1,320	2,350	1,510	18,230	9,600	
			8	48	4	4	3	4	4	3	10	19	
			0.65	0.42	0.58	0.58	0.54	0.86	0.59	0.69	0.37	0.47	
Key Inputs	Effective Wall R-value	W/m ² K	0.568	1.140	0.305	0.284	0.259	0.360	0.310	0.381	0.568	0.598	
		ft ² F h/Btu	10.0	5.0	18.6	20.0	21.9	15.8	18.3	14.9	10.0	9.5	
	Window U-value	m ² K/W	0.79	0.82	0.79	0.79	0.79	0.63	0.67	0.61	0.50	0.83	
		Btu/h-ft ² F	0.14	0.14	0.14	0.14	0.14	0.11	0.12	0.11	0.09	0.15	
	Infiltration	L/s/m ² faç @ Op	0.22	0.20	0.15	0.31	0.24	0.10	0.22	0.27	0.21	0.14	
	Airtightness	L/s/m ² env @ 75 Pa	1.4	1.3	0.7	1.5	0.9	0.5	1.0	1.0	1.2	1.0	
ERV/HRV	SRE	75%	80%-84%	74%	80%	82%	80%	60-80%	77%	70%	85%		
Results	CWEC 2016	TEDI	kWh/m ² /yr	27.3	32.9	23.0	24.8	10.6	21.3	22.7	23.0	13.2	20.4
		TEUI	kWh/m ² /yr	80.0	102.8	104.8	97.6	87.6	106.3	94.5	85.6	88.4	73.8
	NRC GW1.0	TEDI	kWh/m ² /yr	27.4	33.1	23.5	25.3	11.5	21.8	22.6	23.3	13.4	20.7
		TEUI	kWh/m ² /yr	81.7	104.9	106.2	98.5	89.5	108.8	95.4	87.4	88.5	74.3
	Impact	ΔTEDI	kWh/m ² /yr	0.1	0.2	0.5	0.5	0.9	0.5	-0.1	0.4	0.2	0.3
			%	0.4%	0.6%	2.2%	2.0%	8.5%	2.3%	-0.4%	1.6%	1.5%	1.5%
		ΔTEUI	kWh/m ² /yr	1.7	2.1	1.4	0.9	1.9	2.5	0.9	1.8	0.1	0.5
			%	2.1%	2.0%	1.3%	0.9%	2.1%	2.3%	0.9%	2.0%	0.1%	0.7%

Methodology

10 buildings, modelled in IES VE 2023, were simulated under both the Vancouver CWEC 2016 weather file (CoV EMG v2 methodology) and under the NRC GW1.0 file (proposed CoV EMG v3) to observe the impact on the key compliance metrics of the TEDI and TEUI. These 10 buildings represent a range of buildings sizes with occupancies corresponding to those with absolute (floor area based) energy requirements under the current VBBL, and excluding those with comparative energy modelling requirements (e.g. NECB 2015 Part 8) such as public institution or industrial buildings. 9 of the buildings modelled represent actual building designs **s. 21(1)** created for this analysis referencing the Step Code metrics report archetypes for design elements. Some projects were originally designed under BCBC for Step Code compliance using different weather files and were updated for the Vancouver weather files and VBBL compliance.

Notes

Generally small impact to TEDI and TEUI results for Bylaw compliant building designs.
Positive impact values represent an increase in results when moving from CWEC 2016 (HDD18 2853) to NRC GW1.0 (HDD18 2774).
All results are reported without corridor adjustments.

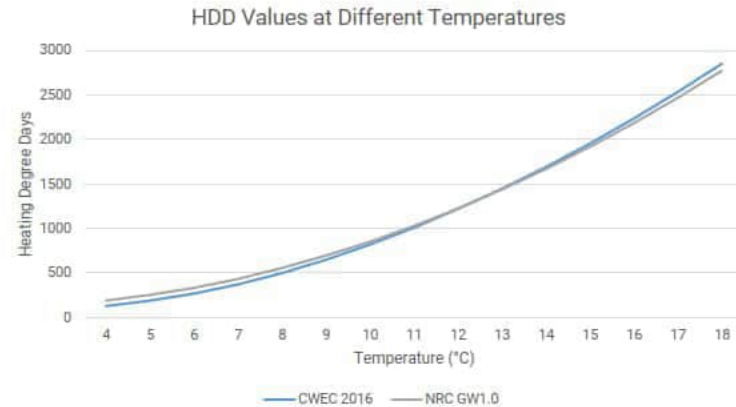
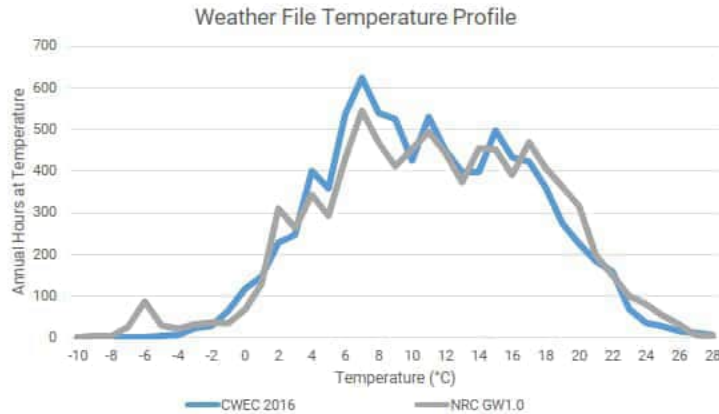
Results

Largest and smallest impacts for each of TEDI / TEUI are shown in bold.
TEDI impact ranges from -0.1 to 0.9 (-0.4% to 8.5%) across the 10 buildings - note that while the 8.5% is the highest change in percentage, it is a change of <1.0 kWh/m² in absolute terms.
TEUI impact ranges from 0.1 to 2.5 (0.1% to 2.3%) across the 10 buildings.
With the minimal impact to TEDI, the TEUI increase is due primarily to cooling load increases (increased cooling degree day 18°C value in NRC weather file).
Further internal review and commentary on impact and trends will be added for the inclusion of this data in the final recommendations report after review with the City.

Brief commentary on TEDI impact trends

As the temperature profiles of the 2 files are different (as it does not follow the same general "shifting" of the PCIC method), the slight variation of TEDI impacts is expected for buildings of different design, performance levels, and intended usage. While HDD value of NRC file is lower calculated at the conventional 18°C (generally corresponding to a warmer file), calculated at lower temperatures (below 12°C) the NRC file has a higher value.

Under steady state conditions, buildings will be in thermal equilibrium at different outdoor temperatures depending on internal gains and level of performance of the design (envelope, airtightness, ventilation) , so for most of these higher performance buildings it appears reasonable that the TEDI impact is a slight increase, corresponding to the NRC file being "effectively colder" for this methodology. However in a dynamic model with many interacting elements (variation schedules, solar gains, thermal mass impacts, etc.) specific conclusions may be hard to determine on an overall level.



Impact of Weather File Change (YVR CWEC 2016 to NRC GW1.0) on selection of building types

Building Information	Building Type	Occupancies	High-Rise MURB 1	High-Rise MURB 2	Mid-Rise MURB 1	Mid-Rise MURB 2	Low-Rise MURB	Mixed Use Residential/Retail 1	Mixed Use Residential/Retail 2	Mixed Use Residential/Office	Office	Hotel
			Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group C, Multi Unit Residential	Group E, Mercantile	Group E, Mercantile	Group C, Office
MFA			4,560	39,250	5,000	2,600	2,440	1,320	2,350	1,510	18,230	9,600
Storeys			8	48	4	4	3	4	4	3	10	19
VFAR			0.65	0.42	0.58	0.58	0.54	0.88	0.50	0.89	0.37	0.47
Key Inputs	Effective Wall R-value	(U-value) Winch m ² R-value	0.568	1.140	0.305	0.284	0.259	0.380	0.310	0.381	0.598	0.598
	Window U-value	Winch Bach m ² U	10.0	5.0	18.6	20.0	21.9	15.8	18.3	14.9	10.0	9.5
	Infiltration	Litres/m ³ @ 75 Pa	1.27	1.22	1.27	1.27	1.27	1.60	1.50	1.64	2.00	1.20
	Airtightness	Litres/m ³ @ 75 Pa	0.22	0.21	0.22	0.22	0.22	0.28	0.28	0.29	0.35	0.21
	ERV/HRV	ERV/HRV	1.4	1.3	0.7	1.5	0.9	0.5	1.0	1.0	1.2	1.0
Results	CWEC 2016	TEDI	27.3	32.9	23.0	24.8	10.6	21.3	22.7	23.0	13.2	20.4
	NRC GW1.0	TEUI	80.0	102.8	104.8	97.6	87.6	106.3	94.5	85.6	88.4	73.6
		TEDI	27.4	33.1	23.5	25.3	11.5	21.8	22.8	23.3	13.4	20.7
	Impact	TEUI	81.7	104.9	106.2	98.5	89.5	108.8	95.4	87.4	88.5	74.3
		ΔTEDI	0.1	0.2	0.5	0.5	0.9	0.5	-0.1	0.4	0.2	0.3
		ΔTEUI	0.4%	0.6%	2.2%	2.0%	8.5%	2.3%	-0.4%	1.6%	1.5%	1.5%
		ΔTEUI	1.7	2.1	1.4	0.9	1.9	2.5	0.9	1.8	0.1	0.5

Methodology

10 buildings, modelled in IES VE 2023, were simulated under both the Vancouver CWEC 2016 weather file (CoV EMG v2 methodology) and under the NRC GW1.0 file (proposed CoV EMG v3) to observe the impact on the key compliance metrics of the TEDI and TEUI. These 10 buildings represent a range of building sizes with occupancies corresponding to those with absolute (floor area based) energy requirements under the current VBLL, and excluding those with comparative energy modelling requirements (e.g. NECB 2015 Part 8) such as public institution or industrial buildings. 9 of the buildings modelled represent actual building designs while the office building was created for this analysis referencing the Step Code metrics report archetypes for design elements. Some projects were originally designed under BCBC for Step Code compliance using different weather files and were updated for the Vancouver weather files and VBLL compliance.

Notes

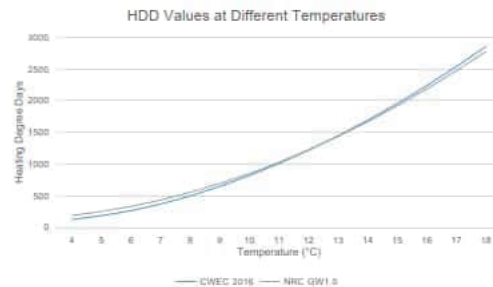
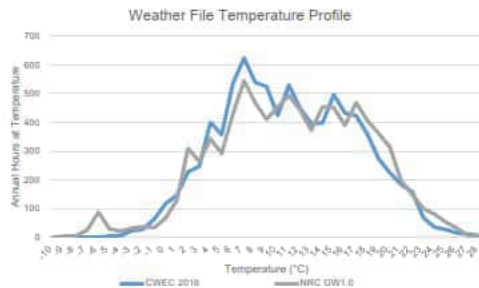
Generally small impact to TEDI and TEUI results for Bylaw compliant building designs.
 Positive impact values represent an increase in results when moving from CWEC 2016 (HDD18 2853) to NRC GW1.0 (HDD18 2774).
 All results are reported without corridor adjustments.

Results

Largest and smallest impacts for each of TEDI / TEUI are shown in bold.
 TEDI impact ranges from -0.1 to 0.9 (-0.4% to 8.5%) across the 10 buildings - note that while the 8.5% is the highest change in percentage, it is a change of <1.0 kWh/m² in absolute terms.
 TEUI impact ranges from 0.1 to 2.5 (0.1% to 2.3%) across the 10 buildings.
 With the minimal impact to TEDI, the TEUI increase is due primarily to cooling load increases (increased cooling degree day 18°C value in NRC weather file).
 Further internal review and commentary on impact and trends will be added for the inclusion of this data in the final recommendations report after review with the City.

Brief commentary on TEDI impact trends

As the temperature profiles of the 2 files are different (as it does not follow the same general "shifting" of the PCIC method), the slight variation of TEDI impacts is expected for buildings of different design, performance levels, and intended usage. While HDD value of NRC file is lower calculated at the conventional 18°C (generally corresponding to a warmer file), calculated at lower temperatures (below 12°C) the NRC file has a higher value.
 Under steady state conditions, buildings will be in thermal equilibrium at different outdoor temperatures depending on internal gains and level of performance of the design (envelope, airtightness, ventilation), so for most of these higher performance buildings it appears reasonable that the TEDI impact is a slight increase, corresponding to the NRC file being "effectively colder" for this methodology. However in a dynamic model with many interacting elements (variation schedules, solar gains, thermal mass impacts, etc.) specific conclusions may be hard to determine on an overall level.



From: "Li, Charling" <charling.li@vancouver.ca>
To: "Enright, Patrick" <Patrick.Enright@vancouver.ca>
Date: 7/10/2023 7:28:30 AM
Subject: Re: EMG - NFRC100

Hi Patrick, that is part of the plan. Brady who is leading the discussions with Scott is aware of the timeline for the EMGs update.

I'm waiting for the discussions to come to a simple solution.

Charling

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From: Enright, Patrick
Sent: Thursday, July 6, 2023 8:21:47PM
To: Li, Charling
Subject: Fw: EMG - NFRC100

Hi Charling,

Can we fold the NFRC issue into the update to the EMGs? For all the emails and meetings flying around, it seems like there's a simple-ish fix in here somewhere, if we can find a moment to tease it out.

Please let me know if that makes sense or if you'd like to discuss.

Thanks!
Patrick

From: Chad Cranswick (BCBS)
Sent: July 6, 2023 12:17PM
To: Enright, Patrick
Cc: Farshid Bagheri (BCBS); Li, Charling
Subject: [EXT] RE: EMG - NFRC100

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Ok great, thanks for the reply.

Its one of the situations where things *could* be more accurate with more effort but arguably the simpler approach is good enough for what we are trying to achieve. The tolerances in the exercise of energy modelling as a whole far outweighs this slight loss of precision with this NFRC100 simplification.

I think the wording just needs to say..

Project-specific area-averaging within a single system using NFRC100 sizing is an acceptable approach to determining the value for energy model glazing inputs.

Something like that. The majority of the glazing contractors out there have enough trouble with this concept at this current time.

And yes for sure, pls share these comments – whatever it takes to get an consensus either way.

Regards,

s.15(1), s.22(1)

Chad , P.Eng.
Cranswick
bcbuildingscience.com



From: Enright, Patrick
Sent: Thursday, July 6, 2023 12:00 PM
To: Chad Cranswick (BCBS)
Cc: Farshid Bagheri (BCBS) ; Li, Charling
Subject: RE: EMG - NFRC100

Hi Chad,

Thanks for this. I've clearly heard a desire for a simple and clear procedure going forward. I do not believe it was ever intended that every single window for every single project needs to be individually NFRC rated. We are very open changing the guidelines and incorporating it into our next update; all we need is a near-consensus on what that change should be.

I've seen this topic bouncing around recently, including some meetings that included Scott from BSSB and someone from NFRC I believe. Would it be OK if I shared your comments below with Scott at BSSB?

We'll touch base with Scott as we were unable to attend their last meeting on this, and let you know what we hear for next steps.

Thanks again,

Patrick Enright, P.Eng | Senior Green Building Engineer

(he/him/his)

Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver

patrick.enright@vancouver.ca | [604.871.6158](tel:604.871.6158)

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I am humbly thankful that I live and work on the territories of the xʷməθkʷəy̓əm (Musqueam [musqueam.bc.ca]), Sḵwxwú7mesh (Squamish [squamish.net]), and səliłwətaʔ / səliłwítulh (Tsleil-Waututh [twnation.ca]) nations.

From: Chad Cranswick (BCBS) <Chad@bcbuildingscience.com>

Sent: Wednesday, July 05, 2023 1:07 PM

To: Enright, Patrick <Patrick.Enright@vancouver.ca>

Cc: Farshid Bagheri (BCBS) <farshid@bcbuildingscience.com>; Li, Charling <charling.li@vancouver.ca>

Subject: [EXT] EMG - NFRC100

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Hi Patrick,

Hope your summer is going well so far.

The EMG Clause 3.2a. is causing a bit of controversy and I would like your thoughts.

3.2 Fenestration and Doors

The overall thermal transmittance of fenestration and doors shall be determined in accordance with NFRC 100, "Determining Fenestration Product U-factors", with the following limitations:

- (a) The thermal transmittance for fenestration shall be based on the actual area of the windows and not the standard NFRC 100 size for the applicable product type. It is acceptable to area-weight the modelled fenestration U-value based on the relative proportions of fixed and operable windows and window sizes. It is also acceptable to simplify the calculations by assuming the worst case by using the highest window U-value for all fenestration specified on the project.

Most glazing contractors (including major window wall suppliers) do not appear to be following this and some appear to be.

What many are doing:

They pay an NFRC Modeller to calculate their NFRC100 sizes for each product once. Then they area-average each of their products using those NFRC100 values distributed over the project specific areas (% vents, % doors, % fixed, etc). This approach does not appear to be quite aligned with the EMG.

This approach, however, is practical, gives a decent value, and is already hard enough to enforce – given the limited understanding of many glazing contractors.

What some are doing:

They pay an NFRC Modeller to use NFRC100 methods applied to project specific sizes for every project. Then

area-average these for project-specific geometry. This approach does appear to align with the EMG. This approach, however, is tedious, gives worse results than that above, and is over-the-heads of many glazing contractors. Plus geometry at BP when the model is expected is still not really nailed down to the level that is required for these calcs and the glazing contractor is probably not onboard yet either.

What I think you should do:

I think for practical reasons, this Clause should be slightly revised to allow NFRC100 sizing applied over project specific areas. This is more reflective of the industry at the current time as many glazing contractors do not appear to have the resources to be as accurate as the EMG indicates. In the future, maybe we will get there but at this time, I think we should keep it simple. We need to have a level playing field and its not right now and we are miles for getting there.

Regards,

s.15(1),

s.22(1)

Chad [redacted], P.Eng.

Cranswick

bcbuildingscience.com



From: "Li, Charling" <charling.li@vancouver.ca>
To: "Danny Taylor" <danny@focaleng.com>
Date: 4/9/2025 12:29:00 PM
Subject: RE: EMGs quick Q

Thank you Danny!

From: Danny Taylor
Sent: Wednesday, April 9, 2025 10:36 AM
To: Li, Charling
Subject: RE: EMGs quick Q

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I think just the EPW files are needed, there are a few options for tools if anyone needs to pull out the data into spreadsheets. IES and E+ uses EPWs, and eQUEST has a conversion tool for .epw to .bin.

Danny Taylor, CPHC

Associate

t 250.516.6088 ext. 3 | m 778.995.9863 | danny@focaleng.com

















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From: Li, Charling <charling.li@vancouver.ca>
Sent: April 9, 2025 10:30 AM
To: Danny Taylor <danny@focaleng.com>
Subject: RE: EMGs quick Q

Hi Danny,

One more question on climate files – do you think folks would want access to the Excel file in addition to the epw file as well? When I downloaded them from [NRC](https://www.nrc.digital-repository.canada.ca) [[nrc-digital-repository.canada.ca](https://www.nrc.digital-repository.canada.ca)] they provided both. I'm setting up the Vancouver specific download links for the TMY 1.0 and 2.0 files for the EMG and not sure what would be most helpful to industry.

-  Weatherfile_FSStat typical year_GW0.5_1108395.epw
-  Weatherfile_FSStat typical year_GW1.0_1108395.epw
-  Weatherfile_FSStat typical year_GW1.5_1108395.epw
-  Weatherfile_FSStat typical year_GW2.0_1108395.epw
-  Weatherfile_FSStat typical year_GW2.5_1108395.epw
-  Weatherfile_FSStat typical year_GW3.0_1108395.epw
-  Weatherfile_FSStat typical year_GW3.5_1108395.epw
-  Weatherfile_FSStat typical year_Historical_1108395.epw
-  Weatherfile_FSStat typical year_GW0.5_1108395
-  Weatherfile_FSStat typical year_GW1.0_1108395
-  Weatherfile_FSStat typical year_GW1.5_1108395
-  Weatherfile_FSStat typical year_GW2.0_1108395
-  Weatherfile_FSStat typical year_GW2.5_1108395
-  Weatherfile_FSStat typical year_GW3.0_1108395
-  Weatherfile_FSStat typical year_GW3.5_1108395
-  Weatherfile_FSStat typical year_Historical_1108395

Thanks,
Charling

From: Li, Charling
Sent: Wednesday, April 2, 2025 4:40 PM
To: Danny Taylor <danny@focaleng.com>
Cc: Susan MacDougall <susan@focaleng.com>
Subject: RE: EMGs quick Q

Thank you Danny!

One last thing to bring to your attention, I ran the new spandrel panel calculation section (3.1.1) on the "Reference procedure for simulating spandrel panel u-factors" by Fen Canada technical committee chair after the last draft changes from your team, below.

s.13(1)



They let me know that that specific procedure is outdated and recommended that we refer to the NFRC guidance instead, so here's what I've changed it to based on Fen Can's recommendation. Attached is the rationale, if you're interested to know. No action necessary from your end.

s.13(1)

Thanks folks!

Charling

From: Danny Taylor <danny@focaleng.com>
Sent: Wednesday, April 2, 2025 2:22 PM
To: Li, Charling <charling.li@vancouver.ca>
Cc: Susan MacDougall <susan@focaleng.com>
Subject: RE: EMGs quick Q

Those two look correct. From the NRC site and the OSF page they were named "*Weatherfile_FSStat typical year_GW1.0_1108395.epw*".

Danny Taylor, CPHC

Associate

t 250.516.6088 ext. 3 | m 778.995.9863 | danny@focaleng.com

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From: Li, Charling <charling.li@vancouver.ca>
Sent: April 2, 2025 2:12 PM
To: Danny Taylor <danny@focaleng.com>
Cc: Susan MacDougall <susan@focaleng.com>
Subject: RE: EMGs quick Q

Thanks for the updated clarification! For the future weather files, I want to confirm that for both the GW1.0 and GW2.0 from NRC, we are asking people to use TMY files, correct? For the Vancouver specific links, we only need to host the two files circled below, correct?

- 📎 CAN_BC_VANCOUVER-INTL-A_1108395_CWEC-2016.epw
- 📎 CAN_BC_VANCOUVER-INTL-A_1108395_CWEC-2020.epw
- 📎 Tas typical year_GW0.5_1108395.epw
- 📎 Tas typical year_GW1.0_1108395.epw
- 📎 Tas typical year_GW1.5_1108395.epw
- 📎 Tas typical year_GW2.0_1108395.epw
- 📎 Tas typical year_GW2.5_1108395.epw
- 📎 Tas typical year_GW3.0_1108395.epw
- 📎 Tas typical year_GW3.5_1108395.epw
- 📎 Tas typical year_Historical_1108395.epw
- 📎 TMY typical year_GW0.5_1108395.epw
- 📎 TMY typical year_GW1.0_1108395.epw
- 📎 TMY typical year_GW1.5_1108395.epw
- 📎 TMY typical year_GW2.0_1108395.epw
- 📎 TMY typical year_GW2.5_1108395.epw
- 📎 TMY typical year_GW3.0_1108395.epw
- 📎 TMY typical year_GW3.5_1108395.epw
- 📎 TMY typical year_Historical_1108395.epw

From: Susan MacDougall <susan@focaleng.com>
Sent: Monday, March 31, 2025 5:55 PM
To: Danny Taylor <danny@focaleng.com>; Li, Charling <charling.li@vancouver.ca>
Subject: Re: EMGs quick Q

Hi both,

Danny's explanation is spot on and I like his proposed change.

Best,
Susan

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From: Danny Taylor <danny@focaleng.com>
Sent: Monday, March 31, 2025 5:21 PM
To: Li, Charling <charling.li@vancouver.ca>; Susan MacDougall <susan@focaleng.com>
Subject: RE: EMGs quick Q

I believe this was meant to be a max LPD target for the final lighting design when that information wasn't available, to avoid the loophole of modellers targeting higher suite LPDs to benefit the TEDI. Maybe "assumed" would work better? The intent was along the lines of:

*"...where design is not complete it is acceptable to model an **assumed** lighting power density of **up to 5 W/m²**. Modelled lighting powers may exceed 5 W/m² only if supported by lighting design information."*

Susan may have thoughts to add as well.

Danny Taylor, CPHC

Associate

t 250.516.6088 ext. 3 | m 778.995.9863 | danny@focaleng.com

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From: Li, Charling <charling.li@vancouver.ca>

Sent: March 31, 2025 5:07 PM

To: Susan MacDougall <susan@focaleng.com>; Danny Taylor <danny@focaleng.com>

Subject: EMGs quick Q

Hi Susan and Danny, I need a quick confirmation where the red text below says 'target' lighting power....and 'design' lighting power, what do we actually mean – see Patrick's comment. Can you provide a recommended clarification?

s.13(1)



Thank you!

Charling

Charling Li, P.Eng., M.Urb. | Green Building Engineer

(she/her/hers)

Green & Resilient Buildings Branch | Sustainability Group | City of Vancouver

Charling.Li@vancouver.ca | 604.871.6833

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From: "Li, Charling" <charling.li@vancouver.ca>
To: "Williams, Scott B OHCS:EX" <Scott.B.Williams@gov.bc.ca>
Date: 2/8/2023 3:15:00 PM
Subject: RE: EMGs references

Hi Scott, I sent you an invite for Friday at 11AM, I hope that works. We have a joint proposal from Evoke/RDH/AME and one from Focal.

Talk to you Friday!

Charling

From: Williams, Scott B OHCS:EX
Sent: Wednesday, February 8, 2023 3:10 PM
To: Li, Charling
Subject: [EXT] RE: EMGs references

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Hey Charling,

Sure thing. I am free most of Friday, if that works for you.
Who were the 2 proponents?

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Housing
Phone: 236-478-2043 cell: 250-880-7712
Email: Scott.B.Williams@gov.bc.ca

From: Li, Charling <charling.li@vancouver.ca>
Sent: Wednesday, February 8, 2023 11:00 AM
To: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>
Subject: EMGs references

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Hi Scott, you were listed as a reference for our EMGs update RFP that has just wrapped up. Do you have time this week to have a quick chat about your experience with two of the proponents?

Please let me know what works for you, otherwise I'll give you a call later this afternoon 😊

Charling

Charling Li, P.Eng., M.Urb. | Green Building Engineer

(she/her/hers)

Sustainability Group | Planning, Urban Design & Sustainability | City of Vancouver

Charling.Li@vancouver.ca | 604.871.6833

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From: ["Enright, Patrick" <Patrick.Enright@vancouver.ca>](mailto:Patrick.Enright@vancouver.ca)
To: ["Faught, Brady" <Brady.Faught@vancouver.ca>](mailto:Brady.Faught@vancouver.ca)
["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
Date: 8/24/2023 9:30:36 PM
Subject: Re: Fenestration 3.2 next steps

Thanks Brady,

Can you forward the text of the draft changes to section 3.2 to Charling?

If the spreadsheet and paper aren't available in time for an update to the EMGs, we'll just figure out something simpler to go with.

Thanks,
Patrick

From: Faught, Brady
Sent: August 24, 2023 2:11PM
To: Li, Charling; Enright, Patrick
Subject: Fenestration 3.2 next steps

FYI

Nearing the finish line for the fenestration changes in EMG's. We need a few things from industry to make it all work:

- a National Fenestration Rating Council (NFRC) 'window sizing calculator' spreadsheet,
- an ASHRAE guideline that outlines the methodology
- and general agreement of the revised direction from their energy modeller working group.

Brady

Brady Faught (he/him), P.Eng, Green Buildings Engineer
City of Vancouver | Sustainability
604-673-8299

From: Faught, Brady
Sent: Thursday, August 24, 2023 11:58 AM
To: JEFF BAKER ; Jonathan Layton ; surich@nfr.org; adrian.edge@innotech-windows.com
Cc: Lau, Edward ; Terry Adamson ; Sophie Mercier - Evoke Buildings
Subject: COV next steps

Hi all,

Thanks for all your collective work on this. My notes on action items:

Jeff, Steve: NFRC calculator spreadsheet – steps to finalize & distribute –6-9 month timeframe?

Jeff: ASHRAE copyright and how to make the 2023 ASHRAE paper available

FenCAN team:

- o could a “Guideline for Modelling Structural Components” be something doable within FenCan scope & budgets?
- o How about research on thermal impact of structural components?

JoMo, Sophie, others:

- o Separate Path A into Part 9 and Part 3. Or more specifically, ‘Energuides’ projects and all others
- o Can I request: general approval of overall structure (and ideally details) of Jomo’s 3.2 edits by end of September? With that, we’ll take it and incorporate in as draft language for industry and Province of BC (BSSB) review

Thanks all,

Brady Faught (he/him), P.Eng, Green Buildings Engineer
City of Vancouver | Sustainability
604-673-8299

From: "Faight, Brady" <Brady.Faight@vancouver.ca>
To: "Williams, Scott B OHCS:EX" <Scott.B.Williams@gov.bc.ca>
CC: "Lau, Edward" <Edward.Lau@vancouver.ca>
"Jensen, Jun'ichi OHCS:EX" <Junichi.Jensen@gov.bc.ca>
Date: 4/20/2023 1:36:48 PM
Subject: RE: Fenestration and CoV EMGs

Hi Scott,

Charling has updated me that she plans to have a final draft of updated CoV Energy Modelling Guidelines for review by July.

Therefore I hope to find a resolution for the Fenestration language before then. Are you OK if I reach out to Terry, Al at Fen Canada, and Anton to organize a little workshop? Anyone else? Does BSSB team members want to attend?

Thanks,
Brady

Brady Faight, P.Eng, Green Buildings Engineer
City of Vancouver | Sustainability
604-673-8299

From: Faight, Brady
Sent: March 22, 2023 10:54 AM
To: Williams, Scott B OHCS:EX
Cc: Jensen, Jun'ichi OHCS:EX ; Lau, Edward
Subject: RE: Fenestration and CoV EMGs

Hi Scott,

Thanks for the offer. It'd be great to book 1-1.5 hours with Fen Canada and their key contacts sometime in the upcoming weeks to get this EMG's Fenestration issue all sorted.

Do you prefer:

BSSB organizes a time & hosts

Or if you send me the contact list I can send a Doodle poll and organize a session

Let me know!
Brady

From: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>
Sent: March 7, 2023 1:54 PM
To: Faight, Brady <Brady.Faight@vancouver.ca>; Lau, Edward <Edward.Lau@vancouver.ca>
Cc: Jensen, Jun'ichi OHCS:EX <Junichi.Jensen@gov.bc.ca>; Li, Charling <charling.li@vancouver.ca>

Subject: [EXT] RE: Fenestration and CoV EMGs

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Hi Brady,

Thanks so much for the follow-up.

From our end, I can convene some members of FenCanada to provide input on direction moving forward.

Thanks!

Scott Williams P.Eng, CPHD, LEED AP | Senior Codes Engineer

Building and Safety Standards Branch | Ministry of Housing

Phone: 236-478-2043 cell: 250-880-7712

Email: Scott.B.Williams@gov.bc.ca

From: Faught, Brady <Brady.Faught@vancouver.ca>

Sent: Friday, March 3, 2023 4:56 PM

To: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>; Lau, Edward <Edward.Lau@vancouver.ca>

Cc: Jensen, Jun'ichi OHCS:EX <Junichi.Jensen@gov.bc.ca>; Li, Charling <charling.li@vancouver.ca>

Subject: RE: Fenestration and CoV EMGs

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Hi Edward and Scott

I spoke with Charling, and she is supportive of a project to identify industry-supported, clearer language for fenestration modelling in CoV EMG's.

I propose the following:

- **Brady:** acting COV representative, I can ultimately steer the COV EMG language to get updated to reflect agreed upon solution by end of Q3 2023
- **Scott:** you said you could help convene? If we can workshop a solution with Anton, Terry and the others you mentioned, that feels the quickest path to resolution.
- **Edward:** our internal SME and neutral party, who after industry feedback I'd request he help me draft the final language for industry / BSSB review, and ultimately COV EMG adoption.

Please let me know if this works for you. If so I'll find a time to discuss next steps. Thanks both!

Brady

Brady Faught, P.Eng, Green Buildings Engineer
City of Vancouver | Sustainability
604-673-8299

-----Original Appointment-----

From: Williams, Scott B OHCS:EX <Scott.B.Williams@gov.bc.ca>

Sent: March 2, 2023 11:03 AM

To: Williams, Scott B OHCS:EX; Lau, Edward; Faught, Brady

Cc: Jensen, Jun'ichi OHCS:EX

Subject: Fenestration and CoV EMGs

When: March 2, 2023 2:30 PM-3:00 PM (UTC-08:00) Pacific Time (US & Canada).

Where: Microsoft Teams Meeting

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From: ["Li, Charling" <charling.li@vancouver.ca>](mailto:charling.li@vancouver.ca)
To: ["Susan MacDougall" <susan@focaleng.com>](mailto:susan@focaleng.com)
["Danny Taylor" <danny@focaleng.com>](mailto:danny@focaleng.com)
Date: 10/30/2024 1:14:00 PM
Subject: RE: Focal Engineering Inc. - 23009 CoV EMG Update [INV#1199]
Attachments: 2025 VBBL Propose Change Comments - for Focal.xlsx

Hi Susan, Danny,

Thanks for your patience and I've forwarded that invoice to AP for payment. I think we're largely on the same page about the next steps for this project. I'll attach the comments we got from the VBBL public review period (see excel). They seem minor to me, please let me know if you require additional scope to address them and make any edits to the EMGs draft. I'm not sure where Danny and Greg left off with the small/slim buildings adjustment and whether you were making any further edits.

Please have a look and let me know your thoughts on the next steps. In terms of timeline, we are looking to wrap this up in the next month. The EMGs draft is a higher priority than the final report if that helps. Let me know if that works with your capacity.

Cheers,
Charling

From: Susan MacDougall
Sent: Thursday, October 17, 2024 7:54 AM
To: Li, Charling ; Danny Taylor
Subject: RE: Focal Engineering Inc. - 23009 CoV EMG Update [INV#1199]

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Sorry I missed addressing your question!

1. We have had a few more calls with Greg- I explained the overall approach and Danny went through the proposed approach in more detail with him.
2. I hadn't seen anything further from Curt about weather files, but had assumed that our analysis from the summer addressed those points. Did he get to see that and have further comments, or was that an earlier email?

We're ok staying in a holding pattern on the final (final) report until after any other comments may come in, if it's decided that additional analysis/ explanation is required to address any of

them. I'd just wanted to invoice the original contract to completion ☹️

Thanks!
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Susan MacDougall
Sent: October 17, 2024 7:51 AM
To: Li, Charling <charling.li@vancouver.ca>; Danny Taylor <danny@focaleng.com>
Subject: RE: Focal Engineering Inc. - 23009 CoV EMG Update [INV#1199]

Hi Charling,

Thanks for letting us know. We'd invoiced the full amount because the original contract only had the one public review period (completed in 2023). Here's what I'd been thinking:

- We made the changes from the public review and then issued the draft report to you, then made final changes based on your review comments.
- Over the summer we added on the weather file analysis (additional scope), which is now complete. We wanted to make the changes to the report while the data was fresh in our minds.
- My understanding was that a second public review was added, so you and Danny had chatted (I think in July when I was away?) that if anything comes out of it again, additional scope can be added to address that piece.

But I did want to invoice the full original contract, since the work therein is complete. Hope that makes sense, but let me know if there's an area where our understanding differs. Thanks!
Susan

Susan MacDougall P.Eng., FEC, LEED AP BD+C, CPHC
Principal | she/her
t 604.318.3596 x1 | m 604.842.7893
susan@focaleng.com

From: Li, Charling <charling.li@vancouver.ca>
Sent: October 16, 2024 3:23 PM
To: Susan MacDougall <susan@focaleng.com>; Danny Taylor <danny@focaleng.com>
Subject: FW: Focal Engineering Inc. - 23009 CoV EMG Update [INV#1199]

Hi Susan, Danny, I haven't sent this invoice for processing yet as I don't believe we've wrapped up the recommendations report just yet. We are reviewing the VBBL comments now and so far there's nothing major for the EMGs - I believe you saw the email from Curt re: weather files and there was some discussion with Greg McCall re: the small/slim buildings adjustment. We're still consolidating feedback so I can't confirm yet if there's anything else coming your way. Are you ok to stay in a holding pattern for a few weeks longer?

My apologies this is dragging out longer than any of us wanted.

Charling

From: Jennifer Blagborne <jennifer@focaleng.com>
Sent: Thursday, September 26, 2024 1:47 PM
To: Li, Charling <charling.li@vancouver.ca>
Subject: Focal Engineering Inc. - 23009 CoV EMG Update [INV#1199]

Hello Charling Li,

Please find attached Invoice 1199, dated 09/30/2024, for work related to the CoV EMG Update project.

If you have any questions, please reach out to the email noted below.

Thank you,

Jennifer Blagborne

Focal Engineering Inc.,
250.516.6088 | accounts@focaleng.com

Jennifer Blagborne
Administrator
t 250.516.6088 x8
jennifer@focaleng.com

