Risk communication in tables vs. text: a Registered Report randomised trial on 'fact boxes'

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Abstract

Objectives

Identifying effective summary formats is fundamental to multiple fields including science communication, systematic reviews, evidence-based policy, and medical decision making. This study will test whether table or text-only formats lead to better comprehension of the potential harms and benefits of different options, here in a medical context.

Design

Pre-registered, longitudinal experiment: between-subjects factorial 2 (message format) x 2 topic (topic: therapeutic or preventative intervention) on comprehension and later recall (CONSORT-SPI 2018).

Setting

Longitudinal online survey experiment.

Participants

[[N]] census-matched UK residents recruited through the survey panel firm YouGov.

Primary outcome measure

Comprehension of harms and benefits and knowledge recall after one month.

Results

Fact boxes—simple tabular messages—led to [[less, equal, more]] comprehension than text-only formats and [[greater, equal, lower]] knowledge recall after one month. Fact boxes led to [[more, equivalent, fewer]] treatment decisions compared to the text-only control. These patterns of results were [[the same, different]] between the two topics [[explain any differences]].

Conclusions

The brief table format of the fact box [[improved, did not improve]] comprehension of harms and benefits relative to the text-only control. Effective communication supports informed consent and decision making and brings ethical and practical advantages. Fact boxes and other summary formats may be effective in a wide range of communication contexts.

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To make an informed decision, individuals need to understand the potential impacts of their options. However, decision makers are rarely given a balanced, clear, and quantitative summary of the potential outcomes of a decision[2]. Identifying effective summary formats is fundamental to multiple fields including science communication, systematic reviews, evidence-based policy, and medical decision making. Communicators ranging from governments or companies to medical professionals are struggling to provide balanced, thorough, and comprehensible summaries of options. This requires: 1) identifying the most important outcomes, 2) gathering and summarising the evidence, and 3) communicating the evidence such that it is easily comprehended. There is some limited evidence that summary formats such as tables may improve comprehension and short-term recall of the benefits and harms of health interventions[3–5], but the effect and its magnitude are unclear. The studies vary widely in outcomes and the messages have different benefit-to-harm ratios. In this study, we examine effective communication with a promising and simple evidence communication format, the *fact box*, using a high-powered, pre-registered, longitudinal, representative-sample design across two medical topics (preventative and therapeutic).

Much of the previous research on effective communication assumes a correct behaviour such as exercise or treatment adherence and tries to change attitudes or behaviour (e.g.,[6]). However, it is rarely clear which choice or option is universally correct. In line with the UK Montgomery ruling[7] and similar laws in Australia and elsewhere, standard practice across many fields is orienting towards the ethical principle of informed choice. Communications that are designed to boost comprehension can support individuals in aligning choices with their own values. Communications that support individuals in choosing based on their own values have legal, ethical, and psychological advantages[8]. For example, only the patient can know the relative personal importance of quantity vs. quality of life in their decision-making, yet communications can aim to ensure that the magnitude of these outcomes is communicated clearly to facilitate their choice. Therefore, it is necessary to identify communication formats that lead to better understanding.

Previous research has examined how to describe potential harms and benefits to effectively inform rather than to persuade[9]. It is best practice to test the effectiveness of communications within the target population for validity[10] and across different populations for generalisability (as in the current design). The risk communication literature provides general principles on how to identify types of uncertainty[11] and represent them visually[12], how to accomplish quality graphical design[13], and how to communicate numbers (e.g., avoid expressing risk in the poorly understood $1/n$ format; for a review, see[14]). However, many studies evaluating different formats communicate only a few pieces of information (e.g., one harm and one benefit) rather than multiple quantities (e.g., multiple harms and benefits), which is the more realistic use case (for exceptions, see[15,16]). What is lacking is a robust, well-powered study to test the comprehension of numeric benefits and harms in a table vs. text only.

The results of the current study will support evidence-based communication in fields where harms and benefits need to be summarised for multiple options. A key area of public need is communicating policy options to decision makers and voters. A recent review identified four key challenges for communicating the impacts of policy options[17]: broad and heterogeneous effects, outcomes with different metrics, potentially long timescales, and large uncertainties. These challenges increase the inherent tension between coverage and comprehensibility in

messages. Currently, there isn't enough evidence to deliver confident recommendations to policy communicators on how to communicate policy options[18]. This study is focused on individual decision-making (e.g., which treatment one would recommend for a family member) but is designed to allow easy extension in the future to policy decisions (eg. 'should this treatment be recommended to everyone') if the tabular format is more successful than plain text in communicating potential harms and benefits in this study.

Fact boxes

The fact box is a brief tabular presentation of expected outcomes between interventions based on an earlier tabular format[19]. Fact boxes are designed to be read quickly and be understood even by lower-numeracy individuals[16]. They are a promising evidence communication format with a growing number of evaluation studies and also a start-up company[20]. Fact boxes may lead to greater ease of use and liking compared to text[21]. In particular, information may be easier to locate and extract and/or be attended to more because of visual features that lead to engagement. More attention and engagement is likely to be helpful; decision latency appears to lead to better decisions[22].

Evidence is emerging that treatment outcomes including side effects can be adequately understood from fact boxes[3–5], but most studies did not use a control with the same content. One paper compared a table, bar chart, risk scale, frequency (flow) diagram, and an icon array, and found that the table and flow diagram were best understood[23]. Another experiment compared fact boxes to control messages and measured comprehension and liking, but the control message was the U.S. FDA drug information leaflets[21], which are long, hard to understand, and do not contain the same harms and benefits information as the fact boxes. Therefore, it is not clear how much the better performance of the fact boxes was affected by differences in content rather than format. A recent paper found that whether icon arrays were included in fact boxes did not affect comprehension, so icon arrays appear to be equivalently effective[15]. The study included a rare six-month follow-up to test for knowledge, but did not compare fact boxes to text alone.

Overall, the fact box evaluation literature has not focused on testing the format while controlling for content. The outcomes were diverse, ranging from message liking to comprehension to treatment decisions. So far, 10 papers contain 11 experiments, and nine are convenience samples. Two of the studies registered a study protocol, none pre-specified statistical tests, and all experiments reported better outcomes in the fact box condition. Due to a lack of text-only control condition with the same content, a lack of controlled trials, and the potential in this area for unpublished studies with no effect, a meta-analysis of this literature might not accurately represent the true effect size of fact boxes on comprehension relative to other formats. The area needs a robust study testing different scenarios that vary in the ratio of benefits to harms, across different presentation formats, keeping the content the same.

Evidence summary formats

Many similar evidence summary formats have been proposed recently, including the: Cochrane summary of findings[24]; evidence summary[25]; plain language summary or significance statements, etc. These summaries share the key feature of being short (less than a page). Otherwise, their format and content varies widely and it is not clear which features lead to better outcomes. Therefore, the current study focuses on the promising fact box format using tables to represent harms and benefits for different treatment options.

Current study

The current pre-registered study was based on a pilot and offers high power, two medical topics (preventative and therapeutic), a follow-up assessment, two quality checks on the key outcome, and a representative UK sample. The outcome measures were designed to assess the usability and universality of the experimental messages[9]. The key aim is to test whether fact boxes lead to better comprehension compared to narrative text with the same information. After one month, knowledge will be tested again, to see if any difference in initial comprehension led to longer-term improvements in recall memory. Additionally, after the recall measure, participants will be shown the summary again and will complete the comprehension test a final time, to look for practice effects with the tabular format. Another aim is to evaluate treatment decisions based on summary format. Whether improved comprehension will lead to changes in treatment will depend on the effectiveness and side effects of the described treatment. In this study, both treatments have some benefits but also harms. It will not be judged objectively good or bad if treatment decision frequencies change between conditions, but it will be important to recognise these changes to inform medical practice.

Hypotheses

H1: The fact boxes will lead to greater comprehension than the text-only control at Time 1.

H2: The fact boxes will lead to greater knowledge (recall memory) than control at Time 2.

H3: The fact boxes will lead to greater comprehension than control at Time 2.

H4: The fact boxes will lead to feeling more informed than control.

H5: The fact boxes will not change treatment decision compared to control.

H6: The fact boxes may lead to more consistent decisions over time than text alone.

H7: The fact boxes will lead to more engagement than the control.

H8: *H1*-*H6* will not differ between medical topics (preventative and therapeutic).

H9: Greater comprehension will be shown by high- compared to low-numeracy individuals at Time 1.

Methods

Sampling

A first pilot study served to test the procedure and iterate the materials (see below). A second pilot test is proposed for $N = 100$ through the survey company Prolific to serve as a quality check for the distribution of the key comprehension measure. If skew and kurtosis are each < 3 , the main study will continue; otherwise the measure will be redesigned. For the main study, participants will be recruited online from the survey company YouGov to participate in a two-part survey experiment. Respondents will be matched to the UK census by weighting on age, gender, social class, region, level of education, how respondents voted at the previous election, how respondents voted at the EU referendum, and their level of political interest. Participants will be compensated with the equivalent of £5 in vouchers for about 12 minutes in the study. The first pilot study ($N = 103$) had a survey completion time of $M (SD) = 767 (376)$ seconds for Time 1. See

<https://web.archive.org/web/20190421035047/https://yougov.co.uk/about/panel-methodology/>.

Exclusion criteria: not a UK resident. No outliers will be excluded. When the completion target is reached, recruitment will end.

Experimental procedure

The survey flow, questionnaire images and text, cleaning and analysis code (in *R*), and data are all available at the Open Science Framework,

https://osf.io/n3r5g/?view_only=3e0e2135eac040199e6b0f1e0f0498be [[code and data not

available until Stage 2]]. In the online survey, participants will respond to Likert-type questions, see a health communication, and answer some questions about the health information. The design will be 2 (medical topic) x 2 (message type) between-subjects across two time points. All measures and tasks are shown below in order. The key independent variables are medical topic and message type (each randomised), and the key outcome is comprehension.

Medical topic manipulation. Participants will be randomised to receive information about one of two topics: antibiotics for ear infection or vaccines for influenza. One treatment is preventative (vaccine) and the other is therapeutic (antibiotics).

Attitudes. Baseline attitudes will be measured towards different treatment topics: influenza (flu) vaccine; teeth cleaning; genetic testing; antibiotics (randomised order). Participants will be asked to rate each of three items (presented in a randomised order) on whether they feel it is: effective; safe; based on high-quality science. Each item will be measured on Likert scales ranging from 1 (*not at all*) to 5 (*very much*). Mean composites will be formed within each treatment. The pattern of attitudes will provide a descriptive context for the preventative and therapeutic scenarios selected in this test.

Fact box manipulation. Participants will be randomised to either a fact box summary or a text-only summary (control), and both conditions will contain the same information. Prior to seeing the summary, a brief vignette (<210 words in each topic) will explain the context of the disease, treatment, and efficacy studies. Then participants will see the summary and continue to the next page. On this second page they will see the summary again and answer seven comprehension questions. On the third page, they will see the summary again and answer five comprehension questions.

The fact boxes are factually accurate and built from Cochrane systematic reviews[26]. The influenza vaccine fact box was modified to present central estimates rather than ranges for several values. These two topics and fact boxes were chosen due to several advantages: 1) they provide coverage of two types of medical treatments: preventative and therapeutic, providing greater generalisability; 2) the two examples have similar complexity between harms and benefits; 3) each summary reflects a balance of harms and benefits without a clear best option; 4) the fact boxes were already summarised from systematic reviews, and 5) these topics would be appropriate for extension in future work to policy-level decisions. The paragraphs beginning "Assume..." were not part of the original fact boxes and serve as task instructions. The text-only control messages were written to match all content of the fact boxes in narrative form for a stringent comparison. All pages with the summary messages will be separately timed for participant engagement. No timing exclusions will be made.

Middle ear infections in children (Acute Otitis Media)

Assume you found the following information about antibiotics for treating inner ear infections in children. Please read the information to consider whether or not you would decide to choose antibiotic treatment for your child.

The numbers below are for children 0-15 years of age with an acute middle ear infection who either received antibiotics or placebo (sugar pill) over a period of 7-14 days.

	100 children who took <u>placebo</u> (sugar pill)	100 children who took <u>antibiotics</u>
Benefits		
How many children had pain 4-7 days after diagnosis?	11	9
How many children continued to have impaired hearing 4-6 weeks after diagnosis?	40	40
How many children experienced a ruptured (perforated) eardrum as a result of the infection?	4	1
Harms		
How many children experienced adverse effects (e.g., vomiting, diarrhoea or rash) during treatment?	19	26

Sources: Institute for Quality and Efficiency in Health Care, May 2013; Lieberthal et al. (2012), doi: 10.1542/ peds.2012-3488; Venekamp et al. (2013), Cochrane Database Syst Rev, 1, CD000219.

Figure 1a: Middle ear infections in children (Acute Otitis Media)

Influenza (flu) vaccination for older adults

Assume you found the following information about vaccines to prevent influenza in older adults. Please read the information to consider whether or not you would decide to recommend a vaccine for an older relative.

The numbers below are for adults aged 60 or older who were observed for one year. Older adults with placebo received an injection with a saline solution (no vaccine) instead of the influenza vaccine.

	1,000 older adults with <u>placebo</u> (saline)	1,000 older adults with <u>influenza</u> vaccine
Benefits		
How many older adults developed confirmed influenza (flu)?	85	31
How many older adults developed an influenza-like illness?	68	52
How many older adults died from any cause?	11	9
Harms		
How many older adults experienced pain or tenderness in their arm?	37	132
How many older adults experienced redness, swelling, or hardening at the injection site?	9	71

Older adults with placebo received an injection with a saline solution instead of the influenza vaccine.

Sources: RKI guide: Influenza (Pt. 1). 2016; Buda et al. Epidemiological report on influenza in Germany 2014/2015; Jefferson et al. Cochrane Database Syst Rev 2010;2:CD004876; Darvishian et al. J Clin Epidemiol 2014;67(7):734-44; Beyer et al. Vaccine 2013;31(50):6030-3. Updated: 2016

Figure 1b: Influenza (flu) vaccination for older adults

Figure 1. Fact box messages.

Table 1. *Text-only messages (control).*

Middle ear infections in children (Acute Otitis Media)

Assume you found the following information about antibiotics for treating inner ear infections in children. Please read the information to consider whether or not you would decide to choose antibiotic treatment for your child.

The numbers below are for children 0-15 years of age with an acute middle ear infection who either received antibiotics or placebo (sugar pill) over a period of 7-14 days.

Benefits: Of the 100 children who took antibiotics, 9 children had pain 4-7 days after diagnosis compared to 11 out of the 100 children who took the placebo (sugar pill). There was no difference between groups in how many children had impaired hearing 4-6 weeks after diagnosis (40 in each group). One out of 100 children who took antibiotics had a ruptured (perforated) eardrum as a result of the infection, compared to 4 out of 100 children who took placebo.

Harms: 26 out of 100 children taking antibiotics experienced an adverse effect (e.g., vomiting, diarrhoea or rash), compared to 19 out of 100 children who took the placebo.

Sources: Institute for Quality and Efficiency in Health Care, May 2013; Lieberthal et al. (2012), doi: 10.1542/peds.2012-3488; Venekamp et al. (2013), Cochrane Database Syst Rev, 1, CD000219.

Influenza (flu) vaccination for older adults

Assume you found the following information about vaccines to prevent influenza in older adults. Please read the information to consider whether or not you would decide to recommend a vaccine for an older relative.

The numbers below are for adults aged 60 or older who were observed for one year. Older adults with placebo received an injection with a saline solution (no vaccine) instead of the influenza vaccine.

Benefits: Of 1,000 adults ages 60 and older who received the influenza vaccine, 31 developed confirmed influenza (flu) over the next year, compared to 85 out of 1,000 older adults who received a placebo. Of older adults receiving the influenza vaccine, 52 out of 1,000 developed an influenza-like illness, while 68 out of 1,000 did in the placebo group. In the influenza vaccine group, 9 out of 1,000 died of all causes over the next year, while 11 out of 1,000 died in the placebo group.

Harms: Of the 1,000 older adults receiving the influenza vaccine, 132 experienced pain or tenderness in their arm, compared to 37 out of 1,000 in the placebo group. In the influenza vaccine group, 71 out of 1,000 experienced redness, swelling, or hardening at the injection site, compared to 9 out of 1,000 in the placebo group.

Sources: RKI guide: Influenza (Pt. 1). 2016; Buda et al. Epidemiological report on influenza in Germany 2014/2015; Jefferson et al. Cochrane Database Syst Rev 2010;2:CD004876; Darvishian et al. J Clin Epidemiol 2014;67(7):734-44; Beyer et al. Vaccine 2013;31(50):6030-3. Updated: 2016

Objective comprehension. The key outcome will be objective comprehension of the study results. Of 12 questions, eight will be multiple-choice questions with five options, and four will be open-response requests for numbers. The questions were designed to cover both gist and verbatim understanding, were adapted from a range of previous papers using comprehension measures, and were pilot tested (see below). Additionally, an objective, validated measure of numeracy (see below) will serve as a quality check: it is expected to relate moderately positively with the comprehension measure because performance on both requires overlapping skills such as sustained attention and facility with numbers. The comprehension questions are highly similar across the two medical topics, and differ only in what number or comparison is specified, since each topic contains a different intervention and also outcomes. Great care was taken to standardise the questions between conditions. Each of the 12 items will be scored exactly correct or not and a composite of comprehension will be calculated from the proportion of correct items. A representative question is: "Out of 100 children with a middle ear infection who took antibiotics, how many experienced a ruptured eardrum?" (open response; correct = "1").

Decision. Participants will be prompted to imagine that a relative is making a decision on this subject and the participant will be asked whether they would recommend the treatment. The response options were phrased around the particular intervention, e.g., antibiotics or vaccine, and are only summarised here: *yes; no; unsure; no difference*.

Informed decision making. Participants will report whether they felt they understood the available options; the benefits; and the risks and side effects, rated from 1 (*strongly disagree*) to 7 (*strongly agree*). These items constitute the informed subscale of the Decisional Conflict Scale[27] and will be averaged into a composite.

Message engagement. Participants will rate how much others would want to read the message; whether the participant is interested in the information; and whether they like how it is presented, rated from 1 (*not at all*) to 5 (*very much*), adapted from[28]. Participants will also report how reliable the information is, 1 (*not at all*) to 5 (*very reliable*), how trustworthy it is 1 (*not at all*) to 5 (*very trustworthy*), and optionally write a comment in an open-response field.

Objective numeracy. Participants will complete the adaptive Berlin Numeracy Scale[29] to measure facility with numbers and mathematical operations. This will serve as a quality check for the comprehension measure: they are expected to relate moderately positively (see *objective comprehension*). Of four numeracy questions, participants will complete either two or three depending on their accuracy, and will be sorted into numeracy categories between 1-4. Each correct answer is a free-response number. Only exact values will be scored correct.

Demographics. Participants will report their age, gender, ethnicity/race, highest completed education, perceived social status by clicking one of ten rungs on a ladder[30], and general health rated from 1 (*poor*) to 4 (*excellent*). These measures will be used to describe the generalisability of the results.

Time 2. After 20 days, participants will be emailed with the invitation to the second survey. They will complete the decision measure again. To measure knowledge (recall memory), they will see instructions and complete the objective comprehension test without any summary information (no message). Then to measure comprehension, they will complete the test again in the same format as in Time 1 (seeing the study summary on each page).

Analysis plan

Comprehension. The primary analysis will test whether objective comprehension differs between the fact box and the text control across both topics using ANOVA at Time 1 and ANCOVA at Time 2 (using Time 1 comprehension as a covariate). Using this design, no post-

hoc tests are required because the main effects will reveal any differences between means. The choice of AN(C)OVA focuses the tests and results on the differences between conditions (as opposed to the change over time) and will allow for easier interpretation of power analyses and results. The fact box is expected to lead to higher comprehension than the text-only control, so this hypothesis will be evaluated with a one-tailed test. No distribution shape requirements will be used for the main test, as the distribution of comprehension was adequately normal in the pilot (skew = -1.6, kurtosis = 2.3; non-normal defined here as >3). The main study items were also improved based on the pilot (see below), so the distribution is expected to become more normal.

Design. Alpha will be set initially at .05. To correct for multiple tests and reduce the chance of false positives, this threshold will be reduced to $\alpha = .01$. Because the hypotheses are directional and pre-registered, they can be evaluated with one-tailed tests. The study design is 2 (topic) x 2 (message) between-subjects. As justified and computed below, all hypotheses will be powered to at least .9 at $\alpha = .02$ for one-tailed tests to detect $d = .2$ accounting for multiple comparisons and attrition.

Tests

H1: Two-way ANOVA of topic and message on Time 1 comprehension

H2: Two-way ANCOVA of topic and message on Time 2 recall memory with Time 1 comprehension as a covariate

H3: Two-way ANCOVA of topic and message on Time 2 comprehension with Time 1 comprehension as a covariate

H4: Two-way ANOVA of topic and message on Time 1 informed subscale

H5: Equivalence test of topic and message on Time 1 decision (yes/no)

H6: *T*-test by condition on difference score between Time 1 and Time 2 decisions (yes/no)

H7: Two-way ANOVA of topic and message on engagement

H8: Equivalence testing between medical topics for H1-6

H9: One-way ANOVA of numeracy on Time 1 comprehension

Effect sizes. Cohen's $d = .2$ is a plausible lower bound for the smallest effect sizes of interest for our key variables based on the previous fact box literature and the broader context of psychological effects[31], and additionally is a conservative lower bound for the effect in the pilot study. The published studies on fact boxes consist of 15 studies in 11 papers, including 10 convenience samples. Two of the studies had brief, registered study protocols, none pre-registered their statistical tests, one had a follow-up test (there was no effect of fact boxes at six months compared to control), and all experiments reported better outcomes in the fact box condition across a wide range of control conditions. Only five studies compared comprehension of fact boxes to other non-tabular texts, but only two of those reported *Ms* & *SDs*. Overall, some of the reported effects were very large ($d > 1$), but these may be inflated due to a file drawer of unpublished studies and other researcher degrees of freedom. The pre-registered pilot study was underpowered to estimate effect sizes, but ANOVA suggested $d = .45$ in the predicted direction (fact boxes led to more comprehension than text alone).

Power analysis and sample size. For H1, H4, & H9 (all have four groups), G*Power[32] estimates that $N = 1720$ are needed in ANOVA to detect an effect of $F = .1$ (Cohen's $d = .2$) at .9 power and $\alpha = .02$ (one-tailed test). For H2 & H3, G*Power estimates that $N = 1305$ are needed for a 2x2 ANCOVA to detect an effect of $F = .1$ (Cohen's $d = .2$) at .9 power and $\alpha = .02$ (one-tailed test). H5 & H8 will be conducted with equivalence tests using the *toster* package in R[33]. H8 is based on two-tailed tests between medical topics for H1-7. A power analysis with *toster*

using $\alpha = .02$, power = .9, and upper/lower bounds for Cohen's $d = \pm 0.2$ yielded $N = 342$. All tests will be performed in *R* (R Project for Statistical Computing, RRID:SCR_001905).

The ANOVA estimate was largest and will be used for a minimum sample size. Longitudinal attrition is estimated at 25% from online surveys in this population with similar tasks, length, and compensation, so 34% more participants will be recruited ($[N * 1.34] * .75 \sim N$), final $N = 2305$ (576 per 2x2 cell).

Pilot 1

A pre-registered first pilot study ($N = 103$) on Prolific tested the proposed methods, estimate the effect size of H1, determined appropriate payment, and provided a quality check, e.g., of distribution normality, https://osf.io/nwe23/?view_only=d3d581aeca544aa5b894d664762f3785. Seven participants did not complete the comprehension measure (6.3%; original $N = 110$).

In a single session, participants were randomised to topic and message type and completed the proposed measures. All measures and procedures functioned as planned. There was a slight ceiling effect for comprehension, $M (SD) = 5.89 (2.06)$, range 0-8, skew = -1.6, kurtosis = 2.3; non-normal defined as skew or kurtosis > 3 . An Item Response Theory analysis served to estimate the difficulty and quality of each item. To improve the measurement of the latent construct, and increase difficulty and therefore normality by reducing the ceiling effect, three changes were made before the main study: 1) four questions were added based on the highest quality questions from the Item Response Theory analysis; 2) the multiple choice questions were changed from four to five response options; and 3) four multiple choice questions were changed to open-response (exact response required). The pre-registered pilot study was underpowered to estimate effect sizes, but a one-way ANOVA of message type suggested $F(3, 101) = 5.21$, $d = .45$ in the predicted direction (fact boxes led to more comprehension than text alone).

Data accessibility statement

The survey flow, questionnaire images and text, cleaning and analysis code (in *R*), and raw data are all available at the Open Science Framework, https://osf.io/n3r5g/?view_only=3e0e2135eac040199e6b0f1e0f0498be [[code and data not available until Stage 2]]

Research ethics statement

The study ethics were approved by the Institutional Review Board of the University of Cambridge, PRE.2018.102.

Animal ethics statement

No animals were involved in the research.

Permission to carry out fieldwork statement

No fieldwork was involved in the research.

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Competing interests statement

The authors declare no competing interests.

Authors' contributions statement

CB, MM, and AF designed the studies and materials. CB collected the data. CB drafted the Registered Report including power analyses, and MM and AF contributed editing and revision. All authors gave final approval for publication.

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