Supplementary file

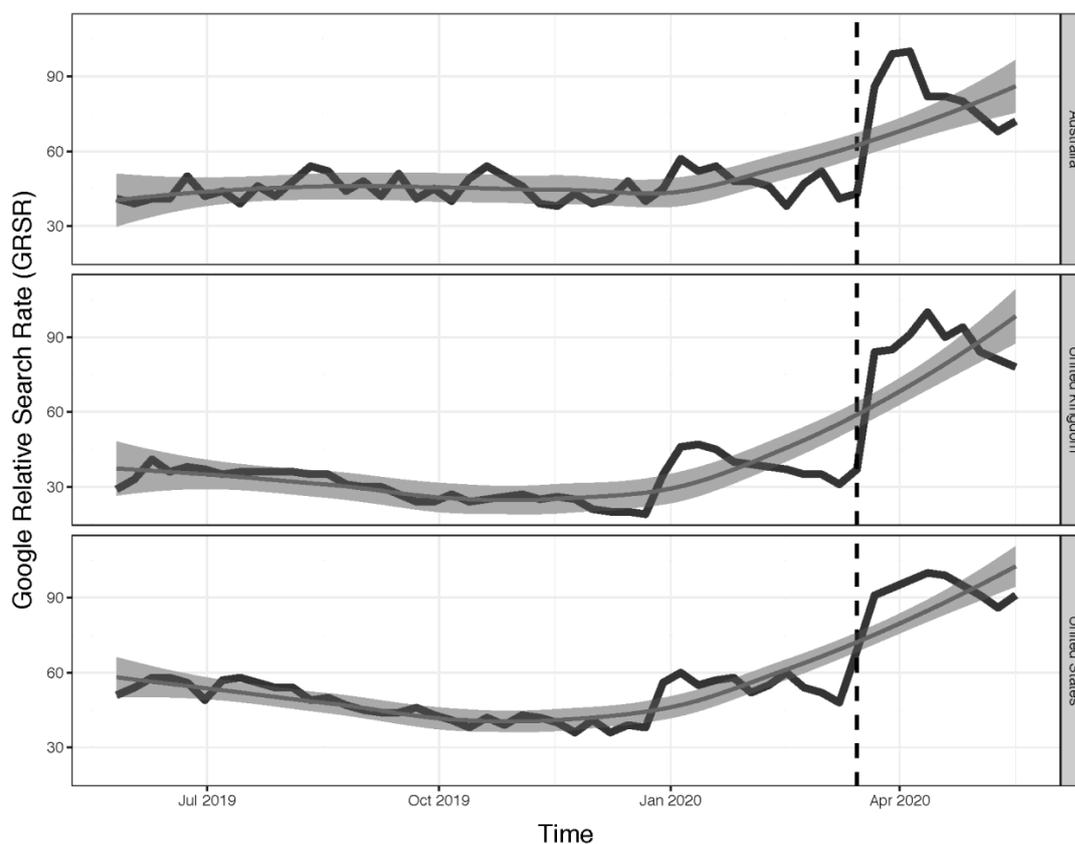### Explanation of Google Trends analysis methods

First, in Google Trends, one can search by "search terms" and "topics". In contrast to search terms, which captures queries based on specific words users type in without considering the underlying concept, search topics encompass a group of terms that share *the same concept* in any language. For example, "exercise" as a search term may pick up irrelevant searches that included the word "exercise", such as "a thinking exercise", "exercise" as a topic should theoretically include all queries related to the concept of "exercise", whether or not the word "exercise" was mentioned, such as "workout" and "high-intensity interval training", without mis-identifying irrelevant searches with the term "exercise".

Second, Google Trends does not provide the absolute number of search queries. Google Relative Search Rate [GRSR] represents the relative proportion of a search topic in relation to all search inquiries in a defined time frame and geography. Google Trends can present search data for one topic, where the highest proportional search on this topic during the defined period is defined as a value of 100, with the other data points shown as proportions of 100. Google Trends can also present comparative data on multiple topics in the same geographical area during the same time frame, where the highest proportionate search on any topic is defined as 100, and the other data points on all topics are presented relative to 100. For example, in the current study, because the highest GRSR in all three countries were related to the search topic "television show", GRSR for "exercise" was automatically rescaled in proportion to the GRSR for "television show". This rescaling allows for examining changes in "exercise" searches when accounting for changes in "television show" searches and has reduced the volatility in the GRSR data on "exercise" searches.

We used the ggplot2 R package (H. Wickham. ggplot2: Elegant Graphics for Data Analysis. Springer-Verlag New York, 2009) to produce the plots of this manuscript. We used a locally weighted scatter-plot smoothing (LOESS) curve to represent the estimated trend and 95% CI bandwidth of GRSR for the search topics of "exercise" and "television show". A 12-month period, where weekly GRSR data were provided, was chosen to account for the seasonal variability of both activities. We further explored data for the entire period that Google Trends covers (since January 2004), however, for this 16-year period, only monthly data were provided. We therefore chose to focus on data from the last 12 months.
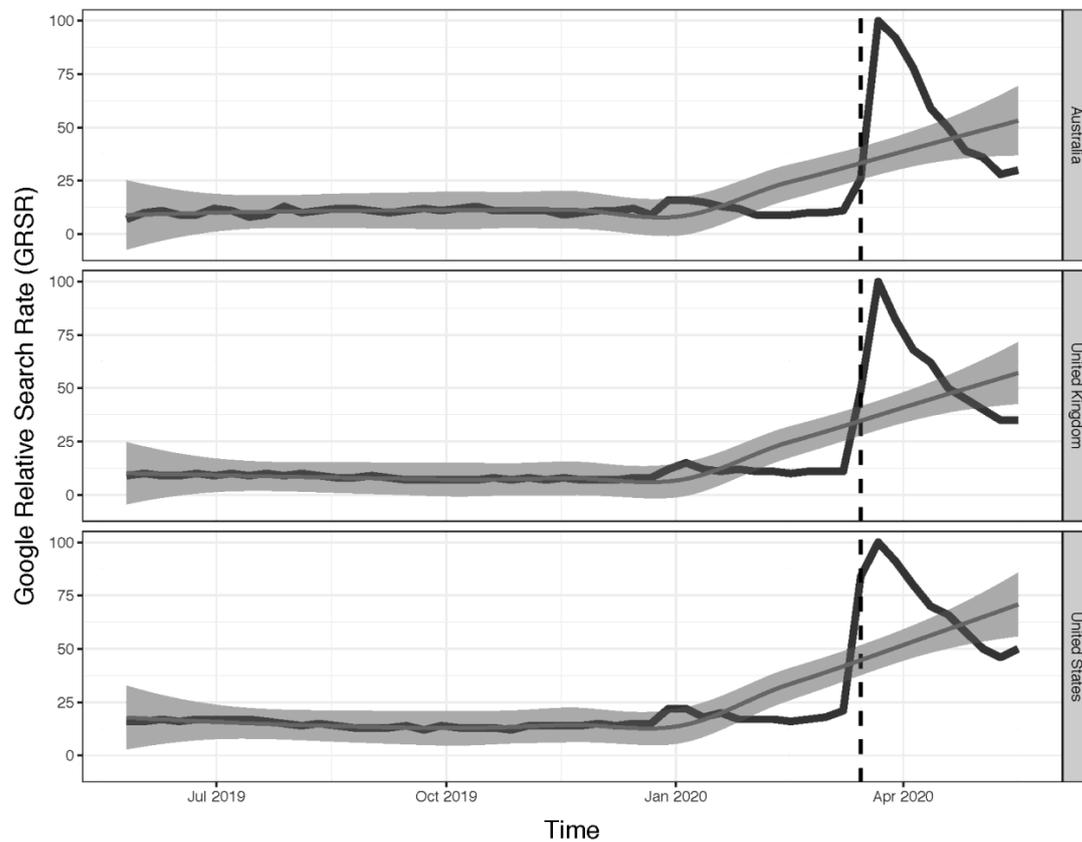
Sensitivity analysis

We conducted a sensitivity analysis using the topic "high-intensity interval training", as a sub-topic of "exercise", during the same period in the three countries. "high-intensity interval training" was chosen because it is a popular type of exercise that can be performed without equipment or facilities. Supplementary Figure 1 shows a significant increase in online search interest in "high-intensity interval training" in all three countries ($p<0.001$ in Australia and the UK, $p=0.003$ in the US)

Supplemental material

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Supplementary Figure 1. Locally weighted scatterplot smoothing curve represents the estimated trend and 95% CI bandwidth of weekly Google Relative Search Rates data for the topic "high-intensity interval training" during the 12-month-period of 26/05/2019 to 22/05/2020. The dashed vertical line represents the date when the lockdown policy started (the national lockdown started on 23/03/2020 in Australia and the United Kingdom; policies varied by state in the United States, with the earliest state-wise lockdown enforced in California on 03/19/2020).

We conducted an additional sensitivity analysis using search terms instead of search topics, with a focus on home-based exercise. We used a combined search syntax "home workout + no equipment exercise + home exercise" derived from tabulating the most common search terms for the first 20 pages of Google search results for "exercise at home". Supplementary Figure 2 shows a significant increase in online search interest in home-based exercise in all three countries ($p < 0.001$).

Supplemental material

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Supplementary Figure 2. Locally weighted scatterplot smoothing curve represents the estimated trend and 95% CI bandwidth of weekly Google Relative Search Rates data for search terms regarding home-based exercise during the 12-month-period of 26/05/2019 to 22/05/2020. The dashed vertical line represents the date when the lockdown policy started (the national lockdown started on 23/03/2020 in Australia and the United Kingdom; policies varied by state in the United States, with the earliest state-wise lockdown enforced in California on 03/19/2020).