Data Article

Survey data regarding perceived air quality in Australia, Brazil, China, Ghana, India, Iran, Italy, Norway, South Africa, United States before and during Covid-19 restrictions

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The dataset deals with the air quality perceived by citizens before and during the enforcement of COVID-19 restrictions in ten countries around the world: Australia, Brazil, China, Ghana, India, Iran, Italy, Norway, South Africa and the United States. An online survey conveniently translated into Chinese, English, Italian, Norwegian, Persian, Portuguese collected information regarding the perceived quality of air pollution according to a Likert scale. The questionnaire was distributed between 11-05-2020 and 31-05-2020 and 9394 respondents took part. Both the survey and the dataset (stored in a Microsoft Excel Workbook) are available in a public repository. The collected data offer the people's subjective perspectives related to the objective improvement in air quality occurred during the COVID-19 restrictions. Furthermore, the dataset can be used for research studies involving the reduction in air pollution as experienced, to a different extent, by populations of all the ten countries.

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**Specification table**

| Subject                          | Social Sciences                                      |
|---------------------------------|------------------------------------------------------|
| Specific subject area           | Health psychology, Perceived air pollution           |
| Type of data                    | Primary data, Table                                  |
| How data were acquired          | The data were collected by an online survey hosted on two platforms: Google Forms (English, Italian, Norwegian, Persian, Portuguese versions) and WenjuanXing (Chinese version). An English copy is available in the data repository. The survey was distributed by means of professional and social networks |
| Data format                     | Raw Analyzed                                         |
| Parameters for data collection  | The survey data were obtained from 9,394 respondents older than 18 years old having internet access |
| Description of data collection  | The online survey was distributed using a combination of purposive and snowball techniques |
| Data source location            | Countries: Australia, Brazil, China, Ghana, India, Iran, Italy, Norway, South Africa and the United States |
| Data accessibility              | Dataset is uploaded on Mendeley Data                 |
|                                 | Repository name: Perceived air pollution in Australia, Brazil, China, Ghana, India, Iran, Italy, Norway, South Africa, USA before and during COVID-19 restrictions |
|                                 | Data identification number: DOI: 10.17632/fb38h4tyzn.2 |
|                                 | Direct URL to data: [https://data.mendeley.com/datasets/fb38h4tyzn/2](https://data.mendeley.com/datasets/fb38h4tyzn/2) |

**Value of the data**

- The data are related to the perception of air quality and air pollution during the COVID-19 restrictions as experienced by a large pool comprising 9,394 respondents located in ten countries on six continents.
- The data can be useful for researchers dealing with the environmental and tropospheric changes occurring during the COVID-19 restrictions.
- The data can be used to assess the relationship between the perceived and the quantified change in air quality and air pollution during the COVID-19 restrictions.
- The data can be of interest to both citizens and policymakers to realise the tremendous lesson learned during COVID-19, being air quality a key indicator for sustainable development.

1. **Data description**

The dataset provides information regarding the quantity of air pollution perceived before and during the restrictions enforced in ten countries around the world as a consequence of the COVID-19 pandemic: Australia, Brazil, China, Ghana, India, Iran, Italy, Norway, South Africa and the United States (also referred to as AU, BR, CH, GH, IN, IR, IT, NO, ZA and USA, respectively). The dataset is stored in a public repository as Microsoft Excel Worksheet [1]. The total amount of the respondents who joined the survey is 9,394, their geographical distribution is reported in Table 1. Information regarding gender and age are reported in Fig. 1 with box-and-whisker plots: overall, the largest portion of the surveyed population is composed of young and middle-aged individuals. Furthermore, the participants have high education (Fig. 2). The two questions of the survey are “How do you regard the amount of air pollution before the epidemic?” and “How do you regard the amount of air pollution during the restrictions?”: the respondents expressed their opinions according to a 7-point Likert scale varying from “extremely low/absent air pollution” to “extremely high air pollution”. The responses pertaining to before and during the applications of the COVID-19 restrictions are reported in Fig. 3a and Fig. 3b, respectively.
Table 1
Geographical distribution of survey respondents.

| AUSTRALIA - AU (N = 387)         | Victoria                  | New South Wales | Queensland | South Australia |
|----------------------------------|---------------------------|-----------------|------------|-----------------|
| 40.6 %                           |                           | 29.2 %          | 16.3 %     | 11.9 %          |
| Western Australia                | Tasmania                  | Northern Territory |          | Australian Capital Territory |
| 0.8 %                            |                           | 0.5 %           | 0.5 %      | 0.3 %           |
| BRAZIL - BR (N = 930)            |                           |                 |            |                 |
| Minas Gerais                     |                           |                 |            |                 |
| 60.0 %                           |                           |                 |            |                 |
| Distrito Federal                 |                           |                 |            |                 |
| 2.3 %                            |                           |                 |            |                 |
| Goiás                            |                           |                 |            |                 |
| 1.0 %                            |                           |                 |            |                 |
| Rio Grande do Norte              |                           |                 |            |                 |
| 0.5 %                            |                           |                 |            |                 |
| Mato Grosso do Sul               |                           |                 |            |                 |
| 0.3 %                            |                           |                 |            |                 |
| Piauí                            |                           |                 |            |                 |
| 0.1 %                            |                           |                 |            |                 |
| CHINA - CH (N = 1731)            |                           |                 |            |                 |
| Guangdong                       |                           |                 |            |                 |
| 14.9 %                           |                           |                 |            |                 |
| Anhui                            |                           |                 |            |                 |
| Shandong                         |                           |                 |            |                 |
| 3.6 %                            |                           |                 |            |                 |
| Sichuan                          |                           |                 |            |                 |
| 2.0 %                            |                           |                 |            |                 |
| Jiangxi                          |                           |                 |            |                 |
| 1.6 %                            |                           |                 |            |                 |
| Jilin                            |                           |                 |            |                 |
| 1.1 %                            |                           |                 |            |                 |
| Shanghai                         |                           |                 |            |                 |
| 1.0 %                            |                           |                 |            |                 |
| Qinghai                          |                           |                 |            |                 |
| 0.6 %                            |                           |                 |            |                 |
| Macau                            |                           |                 |            |                 |
| 0.4 %                            |                           |                 |            |                 |
| GHANA - GH (N = 437)             |                           |                 |            |                 |
| Greater Accra                    | Ashanti                   | Northern        |            | Eastern         |
| 29.7 %                           |                           |                 | 10.3 %     | 8.5 %           |
| Central                          | Western Region            | Volta Region     |            | Bono Region     |
| 6.4 %                            |                           |                 | 3.4 %      | 2.1 %           |
| Upper East                       | Bono East Region          | Upper West       |            | Ahafo Region    |
| 2.1 %                            |                           |                 | 1.6 %      | 1.1 %           |
| Oti                              | Savannah                  | North East       |            | Western North   |
| 0.5 %                            |                           |                 | 0.2 %      | 0.2%            |
| INDIA - IN (N = 1334)            |                           |                 |            |                 |
| West Bengal                      | Maharashtra               | NCR Delhi        |            | Rajasthan       |
| 15.0 %                           |                           |                 | 9.2 %      | 7.4 %           |
| Uttar Pradesh                    | Tamil Nadu                | Karnataka        |            | Bihar           |
| 6.8 %                            |                           |                 | 6.1 %      | 6.1 %           |
| Madhya Pradesh                   | Haryana                   | Uttarakhand      |            | Gujarat         |
| 4.9 %                            |                           |                 | 3.7 %      | 2.8 %           |
| Assam                            | Telangana                 | Punjab           |            | Jammu & Kashmir |
| 2.0 %                            |                           |                 | 1.6 %      | 1.4 %           |
| Andhra Pradesh                   | Odisha                    | Himachal Pradesh |            | Kerala          |
| 1.2 %                            |                           |                 | 0.8 %      | 0.8 %           |
| Goa                              | Jharkhand                 | Chhattisgarh     |            | Meghalaya       |
| 0.7 %                            |                           |                 | 0.4 %      | 0.3 %           |

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Table 1 (continued)

|                  | Chandigarh | Ladakh | Puducherry | Tripura |
|------------------|------------|--------|------------|---------|
| 0.1 %            | 0.1 %      | 0.1 %  | 0.1 %      | 0.1 %   |
| other            |            |        |            |         |
| 0.0 %            |            |        |            |         |
| IRAN - IR (N = 778) |          |        |            |         |
| Kerman           | Tehran     | Fars   | Razavi Khorasan |
| 48.7 %           | 28.5 %     | 5.1 %  | 5.0 %      |
| Isfahan          | Yazd       | Mazandaran | East Azarbaijan |
| 3.3 %            | 1.5 %      | 1.4 %  | 1.2 %      |
| Alborz           | Hormozgan  | Hamedan | West Azerbaijan |
| 0.8 %            | 0.6 %      | 0.6 %  | 0.5 %      |
| Qazvin           | Sistan Baluchestan | Kermanshah | Kohg. B.-Ahmad |
| 0.5 %            | 0.4 %      | 0.4 %  | 0.3 %      |
| Golestan         | Ilam       | Bushehr | North Khorasan |
| 0.3 %            | 0.1 %      | 0.1 %  | 0.1 %      |
| South Khorasan   | Zanjan     | Semnan | other      |
| 0.1 %            | 0.1 %      | 0.1 %  | 0.0 %      |
| ITALY - IT (N = 604) |          |        |            |         |
| Emilia-Romagna   | Lombardiao | Lazio  | Veneto     |
| 32.5 %           | 17.7 %     | 12.1 % | 9.8 %      |
| Piemonte         | Toscana    | Campania | Puglia    |
| 8.8 %            | 3.6 %      | 2.5 %  | 2.3 %      |
| Friuli-Venezia Giulia | Sicilia | Marche | Calabria  |
| 2.2 %            | 1.7 %      | 1.3 %  | 1.2 %      |
| Liguria          | Sardegna   | Trentino-Alto Adige | Abruzzo |
| 1.0 %            | 0.8 %      | 0.8 %  | 0.5 %      |
| Molise           | Umbria     | Valle d'Aosta | other   |
| 0.5 %            | 0.5 %      | 0.3 %  | 0.0 %      |
| NORWAY - NO (N = 681) |        |        |            |         |
| Trøndelag        | Rogaland   | Oslo   | Viken      |
| 54.2 %           | 13.4 %     | 9.0%   | 5.9 %      |
| Agder            | Inlandet   | Møre og Romsdal | Vestland |
| 5.4 %            | 5.0 %      | 2.8 %  | 1.9 %      |
| Troms og Finnmark | Vestfold og Telemark | other |           |
| 1.6 %            | 0.9 %      | 0.0 %  |            |
| SOUTH AFRICA - ZA (N = 582) |          |        |            |         |
| KwaZulu-Natal    | Gauteng    | Western Cape | Eastern Cape |
| 61.7 %           | 16.0 %     | 10.5%  | 6.4 %      |
| North West       | Mpumalanga | Free State | Limpopo   |
| 2.4 %            | 1.2 %      | 1.0%   | 0.9 %      |
| other            |            |        |            |         |
| 0.0 %            |            |        |            |         |
| UNITED STATES - USA (N = 1928) |          |        |            |         |
| Connecticut      | Ohio       | Texas  | California |
| 13.9 %           | 13.6 %     | 12.7 % | 11.3 %     |
| Idaho            | Florida    | Virginia | Washington |
| 6.9 %            | 6.8 %      | 6.7 %  | 5.9 %      |
| North Carolina   | Illinois   | Arizona | New York   |
| 2.7 %            | 2.1 %      | 1.3 %  | 1.3 %      |
| Colorado         | Oregon     | Pennsylvania | Michigan |
| 1.2 %            | 1.2 %      | 1.1 %  | 1.0 %      |
| Massachusetts    | New Jersey | Wisconsin | Georgia   |
| 1.0 %            | 1.0 %      | 0.6 %  | 0.6 %      |
| Maryland         | Vermont    | Indiana | Iowa       |
| 0.5 %            | 0.5 %      | 0.4 %  | 0.4 %      |
| Nevada           | South Carolina | Minnesota | Missouri |
| 0.4 %            | 0.4 %      | 0.4 %  | 0.4 %      |
| Tennessee        | Kentucky   | Washington D.C. Columbia | Alaska |
| 0.4 %            | 0.3 %      | 0.3 %  | 0.3 %      |

(continued on next page)
Table 1 (continued)

|                | West Virginia | Alabama | Arkansas | Kansas  |
|----------------|---------------|---------|----------|---------|
| 0.3 %          | 0.2 %         | 0.2 %   | 0.2 %    | 0.2 %   |
| Louisiana      | New Hampshire | Montana | Wyoming  | North Dakota |
| 0.2 %          | 0.2 %         | 0.2 %   | 0.1 %    | 0.1 %   |
| Maine          | Rhode Island | Wyoming | Hawaii   |         |
| 0.1 %          | 0.1 %         | 0.1 %   | 0.1 %    |         |
| Nebraska       | New Mexico    | Oklahoma| South Dakota |     |
| 0.1 %          | 0.1 %         | 0.1 %   | 0.1 %    |         |
| Utah           | Guam          | US Virgin Islands | other |
| 0.1 %          | 0.1 %         | 0.1 %   | 0.0 %    |         |

Fig. 1. Age and gender of the respondents for each country.

Fig. 2. Education of the respondents for each country.

2. Experimental design, materials, and methods

The online survey has assessed the air quality as subjectively perceived by citizens in ten countries: Australia, Brazil, China, Ghana, India, Iran, Italy, Norway, South Africa and the United States. The online questionnaire was hosted on two platforms: Google Forms (English, Italian,
Norwegian, Persian, Portuguese versions) and WenJuanXing (Chinese version) and promoted on professional and social networks. The survey content was the same for each language; only the question regarding the respondents’ geographical location was tailored for each country. A Likert scale was employed to collect information about subjective perceptions [2] regarding both the situation before and during the enforcement of the restrictions due to the COVID-19 pandemic [3,4]. The online survey was distributed using a combination of purposive and snowball techniques between 11-05-2020 and 31-05-2020. Previously, other opinion surveys at regional and national scale also dealt with the perception of air quality [5–7] and examined the psychological impacts on people’s subjective emotional state [8]. The created dataset can allow to explore how air quality was experienced by the populations dealing with different levels of air pollution before the COVID-19 outbreak [9–11].
Ethics statement

All the survey respondents informed their consent before joining the survey consistent with the Declaration of Helsinki.

Credit Author Statement

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Declaration of competing interest

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.dib.2020.106169.

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