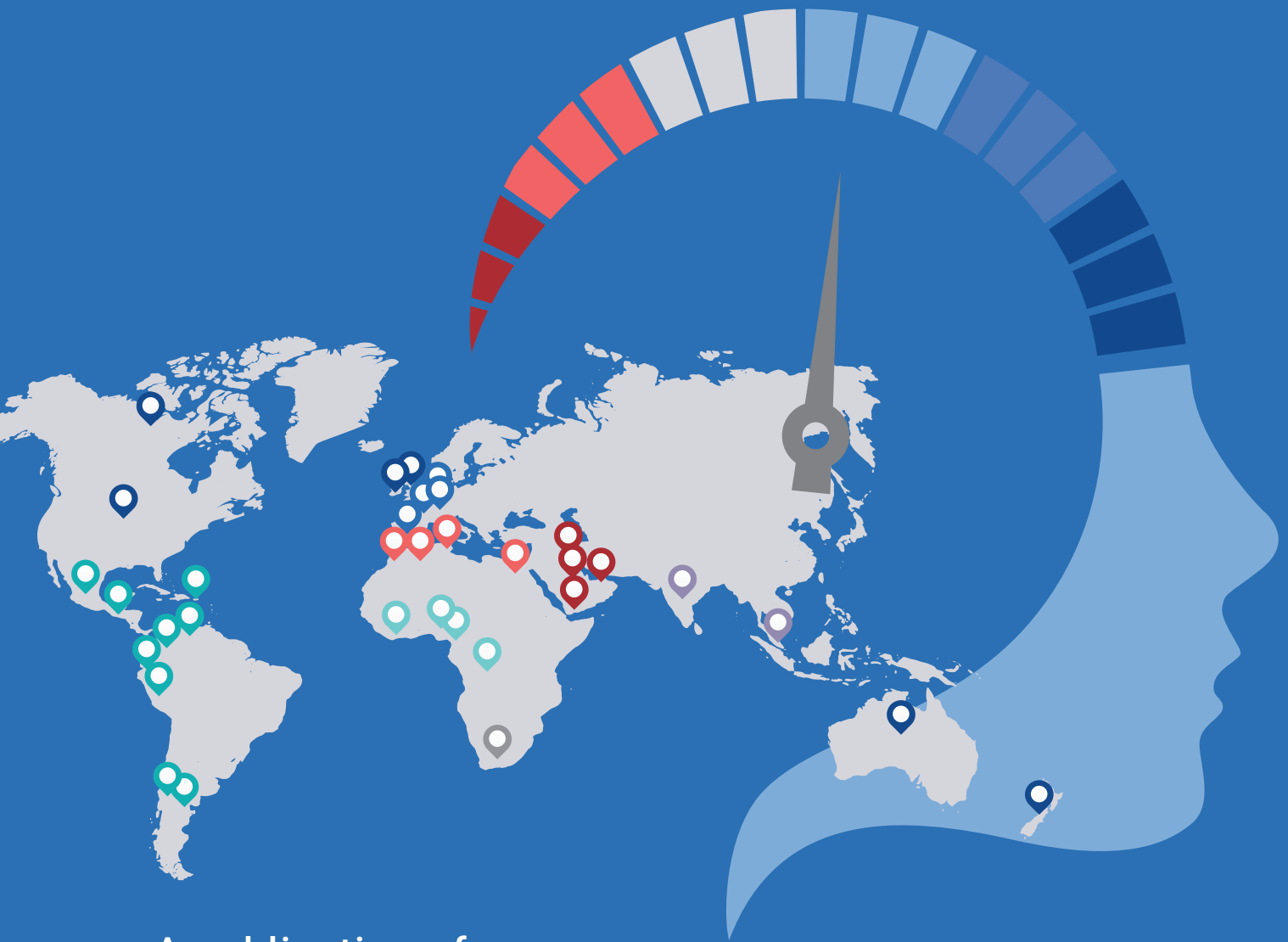# Mental State of the World 2021

SAPIEN LABS

A publication of the Mental Health Million Project

Dear Reader,

We are very happy to present our second annual Mental State of the World report for 2021 describing the mental wellbeing of Internet-enabled populations around the globe. With additional translations in Spanish, French and Arabic, we expanded our reach from ~49,000 respondents in 8 English speaking countries in 2020 to 223,087 respondents in 2021 across 34 countries in Spanish-speaking Latin America, the Arab world, Spanish and French speaking continental Europe and Africa. This now represents the largest and most comprehensive study of global mental wellbeing currently in progress. The results provide a stark illustration of the growing magnitude of mental health challenges around the world.

The most immediate concern raised by the data is that an alarming plummet in mental wellbeing across successively younger generations is prevalent across every single country population that we sampled. The reasons behind this decline are likely numerous and complex but add to the ongoing debate around the consequences of growing up in an Internet-dominated and inequitable world. We offer perspectives and hypotheses on how we might understand this better.

Another significant finding was that mental wellbeing was poorest overall in English-speaking countries and highest in Latin American and European countries. Surprisingly, MHQ scores of countries were significantly negatively correlated with cultural indicators such as *Performance Orientation* and *Individualism* as well as economic indicators such as *GDP and GNI per capita*. This stands in stark contradiction to the belief that economic growth enhances societal wellbeing.

Thus we are left to ponder the following: That perhaps a system that relentlessly sorts us into performers and non-performers in the singular service of economic growth is not the path to human wellbeing. That a structural paradigm that connects us digitally but disconnects us physically and emotionally is antithetical to human need. And that perhaps it is not material hardship itself that breaks us, but the lack of belonging and being in it together. Even as we must understand these relationships more fully, these data make clear that to nurture the human spirit we need a new paradigm.

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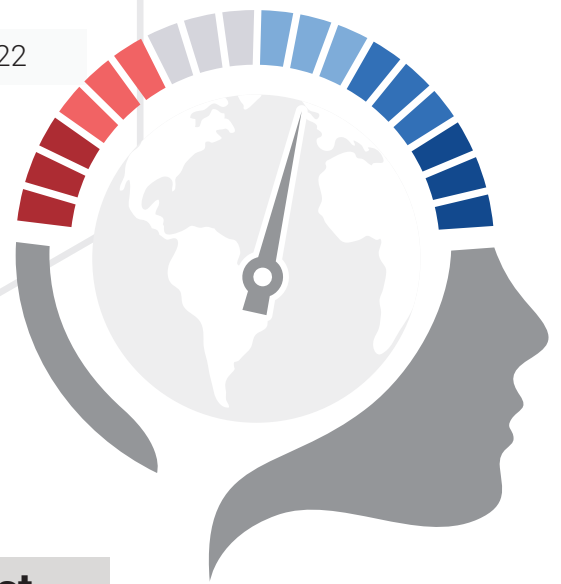
A report of the Mental Health Million project

sapienlabs.org/mental-health-million-project

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Take part at sapienlabs.org/mhq

Executive Summary

The Mental State of the World report provides insight into the mental wellbeing of *Internet-enabled* populations around the globe. This report for 2021 covers 223,087 respondents across 34 countries in the Core Anglosphere, Spanish-speaking Latin America, the Arab world, Spanish & French speaking continental Europe and Africa sampled in 2021 based on responses to the MHQ assessment in English, Spanish, French and Arabic. The MHQ provides an aggregate metric of mental wellbeing (the MHQ) as well as multiple dimensional views. Key findings this year are as follows:

A smaller decline in mental wellbeing relative to 2020: Across the 8 English speaking countries measured from 2019 to 2021, there was a decline in mental wellbeing of 3% in 2021, smaller than the 8% decline in 2020. The decline across countries from 2019 to 2021 was significantly correlated to the stringency of Government Covid-19 measures and directionally correlated to the cases and deaths per million.

Latin America and continental Europe reported the highest mental wellbeing: 8 out of 10 countries with the highest MHQ scores were located in Spanish-speaking Latin America and continental Spanish and French-speaking Europe. In contrast, 8 out of 10 countries with the lowest MHQ scores were from the English-speaking world. The relative MHQ scores of countries were significantly negatively correlated with cultural indicators such as *Performance Orientation* and *Individualism* as well as with core economic indicators such as *GDP per capita* and *GNI per capita*, correlations that were particularly strong for males aged 18-64.

The alarming decline in mental wellbeing of younger generations was a global phenomenon: Whereas only 7% (6% to 9% across different regions) of those aged 65+ were *Distressed* or *Struggling* with their mental wellbeing at a level that impacts functioning and would be considered clinical, 44% (38% to 50% across different regions) of 18-24 year olds had mental wellbeing scores within this *Distressed* or *Struggling* range. This represents a growing gap between generations that, while present prior to the Covid-19 pandemic, has since been exacerbated. It also stands in stark contrast to the happiness and wellbeing patterns documented prior to 2010 across several regions of the world, where young adults 18-24 typically had the highest wellbeing.

The gender gap was highest in Spanish-speaking Latin America: The gap between males and females was highest in Spanish-speaking Latin America followed by West Africa and the Middle East, but many fold smaller than the age gap, the education gap, the employment gap or

the difference between countries. In English-speaking Internet-enabled populations there was near parity between males and females overall, although both genders were lower than their counterparts in other regions of the world. Across the world, those identifying as non-binary/third gender (<1%) had the lowest mental wellbeing of any group with 51% (31% to 85% across different regions) distressed or struggling at a clinical level.

Higher education and employment were associated with higher MHQ scores: Across all countries, higher education was associated with higher mental wellbeing with those with Masters and PhDs scoring highest. In addition, being employed or self-employed was associated with substantially higher mental wellbeing compared to being unemployed, most significantly in the Core Anglosphere.

What are the implications? It should be of particular concern that across countries, lower MHQ scores, and in particular the dimensional scores of Social Self (how we view ourselves and our ability to form strong, stable relationships with others) were correlated with national statistics of rates of suicide, sexual violence and violent assault. As today's young adults and children become tomorrow's older generations, the current trends suggest that aggregate societal mental wellbeing and Social Self will decline even more substantially in the next two decades. This portends grave challenges for the future of civil society.

Looking ahead: There is yet much we need to understand, particularly with respect to the alarming global generational decline of mental wellbeing overall, and in particular the Social Self. We consider and discuss various possible underlying causes from inequality to environmental causes and the growth of mobile phones and Internet use. In 2022, as we continue to expand our view of the mental state of the world to 10 languages and 70 countries, we hope to bring you deeper insights into the societal frameworks and structures that drive our Social Self, and our mental wellbeing as a whole.

Introduction

Our collective mental wellbeing in 2021

The Mental State of the World Report 2021 is the annual report of the Mental Health Million project and provides a comprehensive view of the evolving mental wellbeing of the Internet-enabled world and insights into significant underlying trends. As of January 2021 there were 4.66 billion active Internet users worldwide, representing 59.5% of the global population. 2021 was the second year of the project and consolidates responses from 223,087 people across 34 countries in the Core Anglosphere, Spanish and French-speaking Continental Europe, Spanish-speaking Latin America, West and North Africa with translations in English, Spanish, French and Arabic and spanning a wide range of demographic groups.

It is important to keep in mind that trends reported here are not likely to be reflective of offline populations who typically live in a different context. This is particularly relevant for developing countries such as those in Africa where the Internet-enabled population are a minority and generally represent higher socioeconomic groups or those who have achieved greater levels of education.
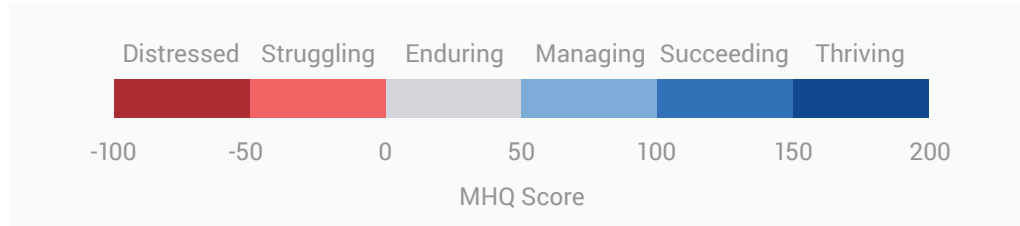
The Mental Health Million Project

The objective of the Mental Health Million Project is to provide an evolving global map of mental wellbeing, and enable deep insights into its drivers that can be used for more effective management of population mental wellbeing through evidence-based social policy and interventions. This project utilizes the Mental Health Quotient, or MHQ (Newson and Thiagarajan, 2020; Newson et al., 2022), delivered as an open online anonymous survey that takes approximately 15 minutes to complete and returns overall wellbeing scores as well as a comprehensive report with tailored self-care and help-seeking recommendations via email. The MHQ has been demonstrated to relate systematically to productivity in work and life as well as clinical burden (Newson et al., 2022 , see also Appendix 1) and is a functional reflection of how well-equipped we are to handle both life's adversities and opportunities. More information on the MHQ can be found here. Feel free to take it yourself.

Mental wellbeing on a spectrum from distressed to thriving

The MHQ assessment captures a comprehensive spectrum of emotional, social and cognitive attributes encompassing both problems (or symptoms) across 10 different mental health disorders (as defined

by the DSM-5), as well as positive mental attributes. An aggregate mental wellbeing score based on these aspects (the MHQ) positions individuals on a spectrum from *Distressed* to *Thriving* (Newson and Thiagarajan, 2020; Newson et al., 2022). The scale is divided into positive and negative components.

	Distressed	Struggling	Enduring	Managing	Succeeding	Thriving	
-100		-50	0	50	100	150	200

MHQ Score

The positive range of the scale represents the spectrum of normal functioning, and is a 200-point scale calibrated to a mean of 100 based on pre-pandemic responses in 2019, similar to the IQ scale. The negative range of the scale represents mental wellbeing scores associated with a negative impact on the ability to function and is associated with clinical level risks and challenges. Five functional dimensions of Drive & Motivation, Mood & Outlook, Cognition and Social Self and Mind-Body Connection are also computed. In addition, the assessment captures information on demographics, lifestyle factors, and traumas and adversities, providing a rich context for understanding key drivers of risks. You can learn more about the MHQ and its scale in Appendix 1.

Interpreting the MHQ

Mental wellbeing, a reflection of how we 'feel', is by its very nature subjective. The MHQ captures the impact of each mental aspect on a life impact scale. Thus, individual judgement of how much a mental aspect impacts our ability to function must necessarily be within our individual context. For one person this may mean being able to carry out a particular type of work in the day, while for another it may mean managing a household. Furthermore, each person will have in their own mind what appropriate functioning looks like. Thus, mental wellbeing, as we measure it, inherently reflects an individual's sense of how their inner state impacts their ability to function within *their* life context rather than an absolute of human mental function.
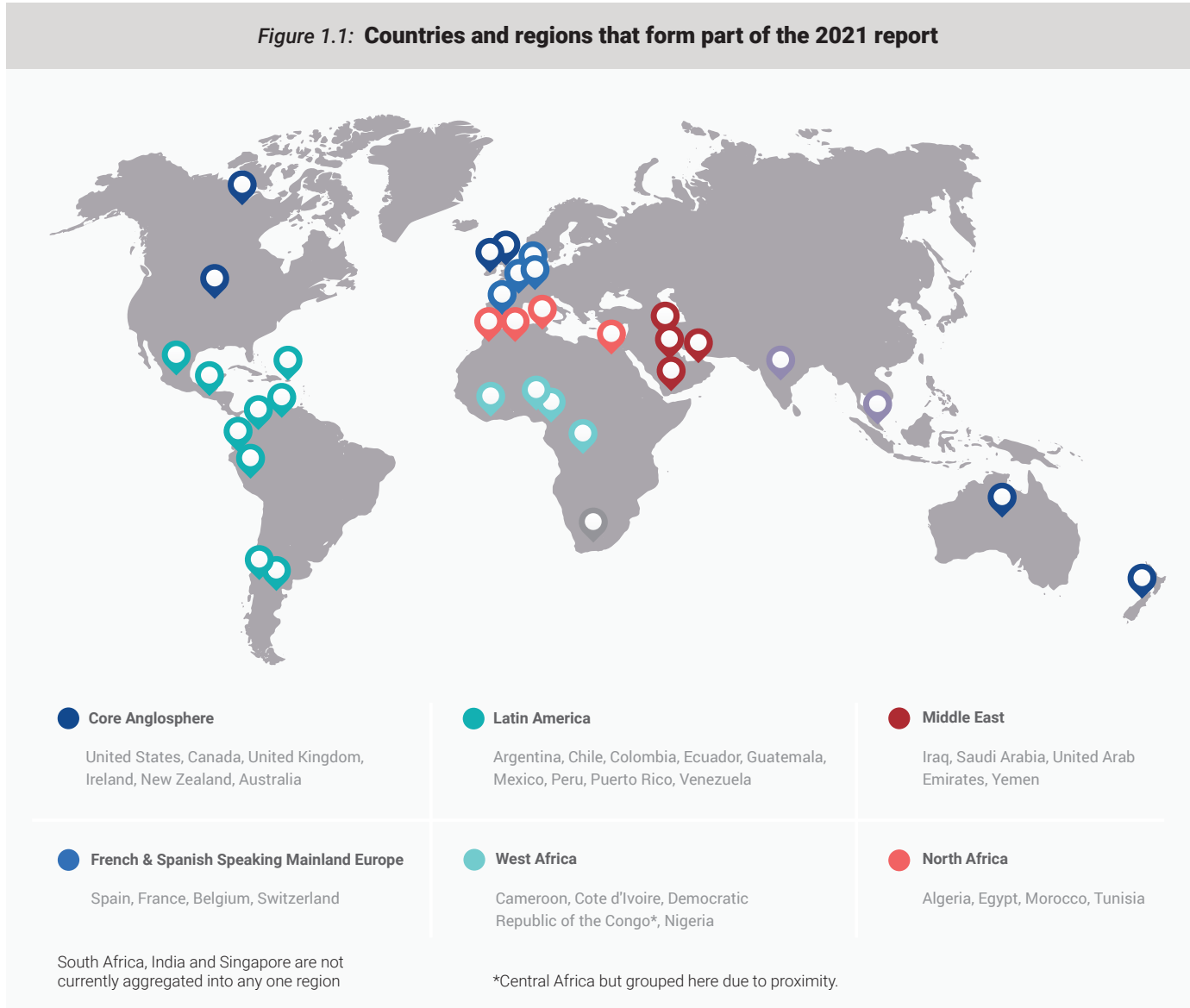
What's in this report

In this report we show the mental wellbeing of the Internet-enabled populations of 34 countries, spanning 6 continents. In addition to comparisons of countries and regions we highlight trends in mental wellbeing across age, gender, employment and education. Finally, we provide insights into possible key drivers of the trends described.

1. The Mental State of the Internet-Enabled World

In 2021, the Mental Health Million Project collected MHQ assessment data from 223,087 Internet enabled respondents, spanning 34 countries across 6 continents in English, Spanish, French and Arabic (Figure 1.1). We show here regional views that reflect an aggregation of the countries within each region where there was data from 4 or more countries. (For details on construction of these regional views see Appendix 2).

Figure 1.1: **Countries and regions that form part of the 2021 report**

Core Anglosphere
United States, Canada, United Kingdom, Ireland, New Zealand, Australia

Latin America
Argentina, Chile, Colombia, Ecuador, Guatemala, Mexico, Peru, Puerto Rico, Venezuela

Middle East
Iraq, Saudi Arabia, United Arab Emirates, Yemen

French & Spanish Speaking Mainland Europe
Spain, France, Belgium, Switzerland

West Africa
Cameroon, Cote d'Ivoire, Democratic Republic of the Congo*, Nigeria

North Africa
Algeria, Egypt, Morocco, Tunisia

South Africa, India and Singapore are not currently aggregated into any one region

*Central Africa but grouped here due to proximity.

Mental wellbeing across world regions

Figure 1.2: **Average MHQ scores across regions**

The distribution of mental wellbeing across broad regions of the world shows more people distressed or struggling, and lower MHQ score overall, in the core Anglosphere compared to all other regions of the world.
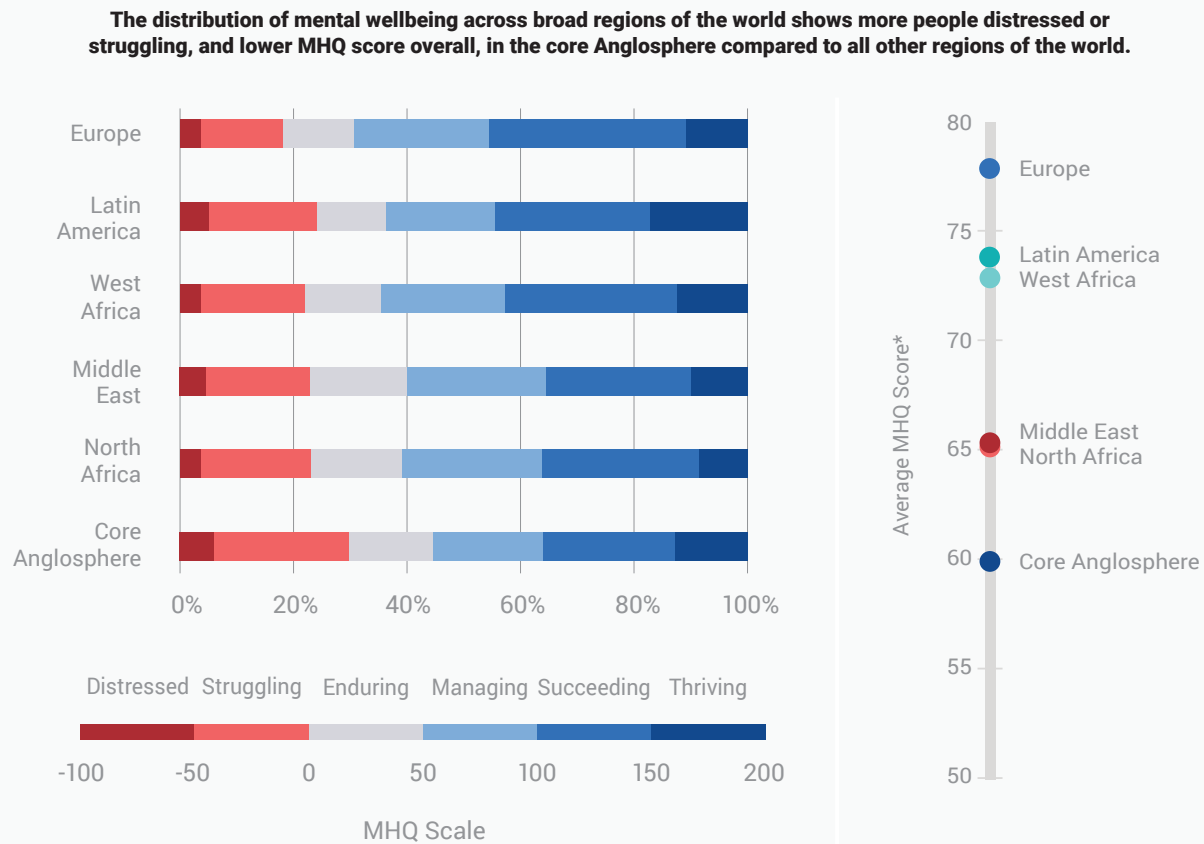
Weighted by age and gender of the population. Results therefore reflect the age/gender demographic make-up. For example, only 3% of West Africa is over age 65 compared to 20% of Europe. Regional averages are weighted by the Internet population of each country in the region.

*Note that MHQ scores are on a 300-point scale.

Altogether 30% of respondents in the Core Anglosphere had mental wellbeing scores in the *Distressed* or *Struggling* range, compared to 23% for the Middle East, 23% for North Africa, 24% for Latin America and 18% for Europe (Figure 1.2). Conversely, only 36% in the Core Anglosphere, Middle East and North Africa were *Thriving* or *Succeeding* compared to 45% and 46% in Latin America and Europe, respectively.

The Core Anglosphere had the poorest mental wellbeing of six regions worldwide.

On average, this translated to mental wellbeing scores being highest for Europe (78), followed by Spanish-speaking Latin America and French-speaking West Africa (74 and 75), differences that were not statistically significantly different from one another. In contrast, mental wellbeing scores were significantly lower for the Core Anglosphere (5% lower on the 300-point scale). The Middle East and North Africa were similar to one another and fell in between. Thus, altogether the Core Anglosphere had the poorest mental wellbeing of 6 regions worldwide.
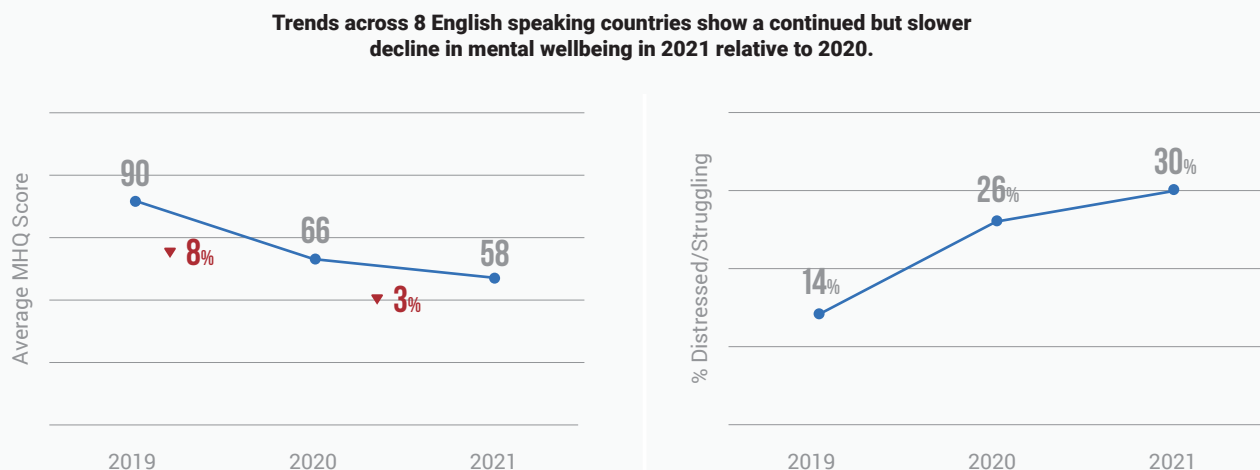
Changes in 2021 in the English-Speaking World

Data collection for the Mental Health Million Project began in 2019 in English and was followed by an official launch and expansion in 2020. Presently therefore, we are only able to show trends for 8 English speaking countries which include the Core Anglosphere (the United States, United Kingdom, Canada, Australia and New Zealand) as well as India, Singapore and South Africa (see Newson et al., 2021a for more on the 2020 results). Altogether, compared to 2020, there was a decline in mental wellbeing in these countries of 3% along the MHQ scale in 2021 (Figure 1.3) Overall, this was smaller than the 8% decline from 2019 to 2020 (Newson et al., 2021a). Correspondingly the number of respondents with MHQ scores in the *Distressed* or *Struggling* range increased from 26% in 2020 to 30% in 2021. This 4% jump however was smaller than the 12% increase seen from 2019 to 2020.

In English-speaking countries, the percentage of people Distressed or Struggling increased from 26% to 30% in 2021.

These declines in mental wellbeing from 2019 to 2021 were significantly correlated with the aggregate stringency of government Covid-19 measures across both years (Oxford COVID-19 Government Response Tracker, 2022; r=-0.54) as well as directionally correlated with Covid-19 cases and deaths per million (Johns Hopkins, 2021).

Figure 1.3: **Mental wellbeing trend in the English-speaking world 2019-2021**

Trends across 8 English speaking countries show a continued but slower decline in mental wellbeing in 2021 relative to 2020.

% change in MHQ scores is based on decrease in percentage along the 300-point MHQ scale

Functional dimensions of mental wellbeing

The Mental Health Million Project also examines global trends across 5 different functional dimensions of mental wellbeing: Mood & Outlook, Social Self, Drive & Motivation, Mind-Body Connection, and Cognition. These dimensions represent scores constructed from subsets of elements within the MHQ to reflect specific aspects of our mental functioning (See Appendix 1 for more details).

Mood & Outlook

The ability to manage and regulate your emotions effectively and to have a constructive or optimistic outlook for the future.

Social Self

How you interact with, relate to, and see yourself with respect to others.

Drive & Motivation

The ability to work towards achieving your desired goals and to initiate, persevere and complete activities in your daily life.

Mind-Body Connection

The regulation of the balance between your mind and body.

Cognition*

Your ability to perform basic cognitive functions, make sense of complex sets of events and situations and display a longer-term perspective in your thoughts and behavior.

* Two dimensions shown in 2020 – Core Cognition and Complex Cognition have now been consolidated into a single dimension of Cognition. These dimensions are constructed on the same scale as the MHQ and represents a rescaling from the way they were previously represented. See appendix for details.
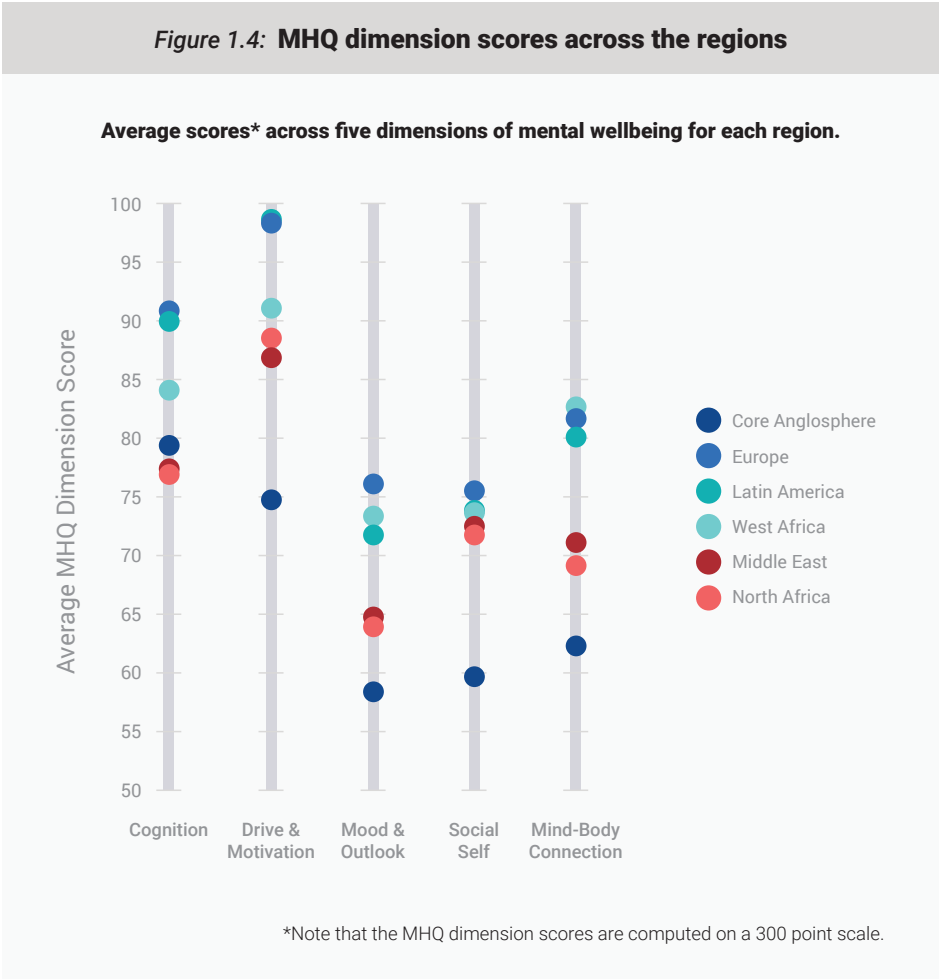
Within almost every region, scores for Cognition and Drive & Motivation were highest while Mood & Outlook and Social Self were the lowest. In aggregate, 30% of respondents were *Distressed or Struggling* with their Social Self while 27% of respondents were *Distressed or Struggling* with their Mood & Outlook. In contrast, only 17% and 18% were *Distressed or Struggling* with their Drive & Motivation and Cognition, respectively.

Compared to all other regions, the Core Anglosphere scored lower on 4 out of the 5 dimensions. The difference between the Core Anglosphere and other regions was particularly notable for the dimension of Social Self, where average MHQ dimension scores were 4% lower on the scale relative to all other regions,

which clustered close together. Similarly, the Core Anglosphere was lowest on the dimensions of Mood & Outlook and Mind-Body Connection while Europe, Latin America and West Africa were highest on both. On these dimensions the Middle East and North Africa were in between.

Along the dimensions of Cognition and Drive & Motivation, Europe and Latin America stood out for having higher scores than all other regions (on average 2-4% higher). Cognition was the only dimension where the Core Anglosphere did not score the lowest. Here, scores were lowest for the Middle East, and North Africa, though not significantly so.

The Core Anglosphere scored lowest on most dimensions of mental wellbeing relative to other regions, most notably the dimension of Social Self


Figure 1.4: **MHQ dimension scores across the regions**

Average scores* across five dimensions of mental wellbeing for each region.

*Note that the MHQ dimension scores are computed on a 300 point scale.

2. The Mental Wellbeing of Countries

How countries rank

Here we show how each of the 34 countries fared relative to one another (Figure 2.1). This includes India, Singapore and South Africa, which were not included in the regional views. The MHQ scores of countries represent weighted averages of the age and gender groups as they are represented in the populations (See Appendix 2 for more details). Surprisingly, Venezuela topped the list with an average MHQ of 91 while the UK and South Africa had the lowest scores at 46. This difference of 45 MHQ points represents a 15% difference along the 300-point scale. Further, 8 out of 10 countries with the highest MHQ scores were located in Latin America and Europe (MHQ score range of 74 to 91). In contrast, English-speaking respondents reported the greatest challenges with their mental wellbeing. Eight out of ten countries with the lowest MHQ scores (MHQ score range of 46 to 63) were from the Core Anglosphere or were countries where there is a large English-speaking population (i.e. South Africa, India). Overall, most countries (15 out of 34) clustered together with aggregate scores within a narrow range of 70 to 75, less than 2% apart on the scale, a difference that is typically not statistically significant. We note that the statistical significance of any difference varies with sample size, and variance, which differs by country, and caution the reader to consult the associated statistical tables to determine if a difference between any two countries is in fact significant.

Within the Latin American countries in our sample, Venezuela had the highest MHQ scores (91), followed by Peru (78) and Argentina (75). Lowest within Latin America were Colombia and Guatemala (both 70). Among the four European countries, Spain topped the list at 85, followed by Switzerland at 82, while French speaking Belgium and France were similar at 75 and 73. Within the Core Anglosphere, the United States and Canada were the highest (both at 63) while the UK, at 46, was lowest, representing the widest regional range. We note that among other English-speaking countries outside of the Core Anglosphere, Singapore was highest at 74 while South Africa was lowest at 46, along with the UK. India was in the lowest 5 at 56. Among the Middle East and North Africa, the United Arab Emirates and Tunisia were highest on the list at 73 while Iraq was lowest at 57. Within West Africa, the Democratic Republic of Congo topped the list with an average MHQ of 82 while Nigeria and Cameroon were the lowest at 71. We note that West African countries have the lowest Internet penetration (23-50%, Data Reportal, 2021), and the Internet populations are typically more educated and have higher employment rates relative to the Internet populations of countries where Internet penetration is higher.

Figure 2.1: **MHQ scores across countries**
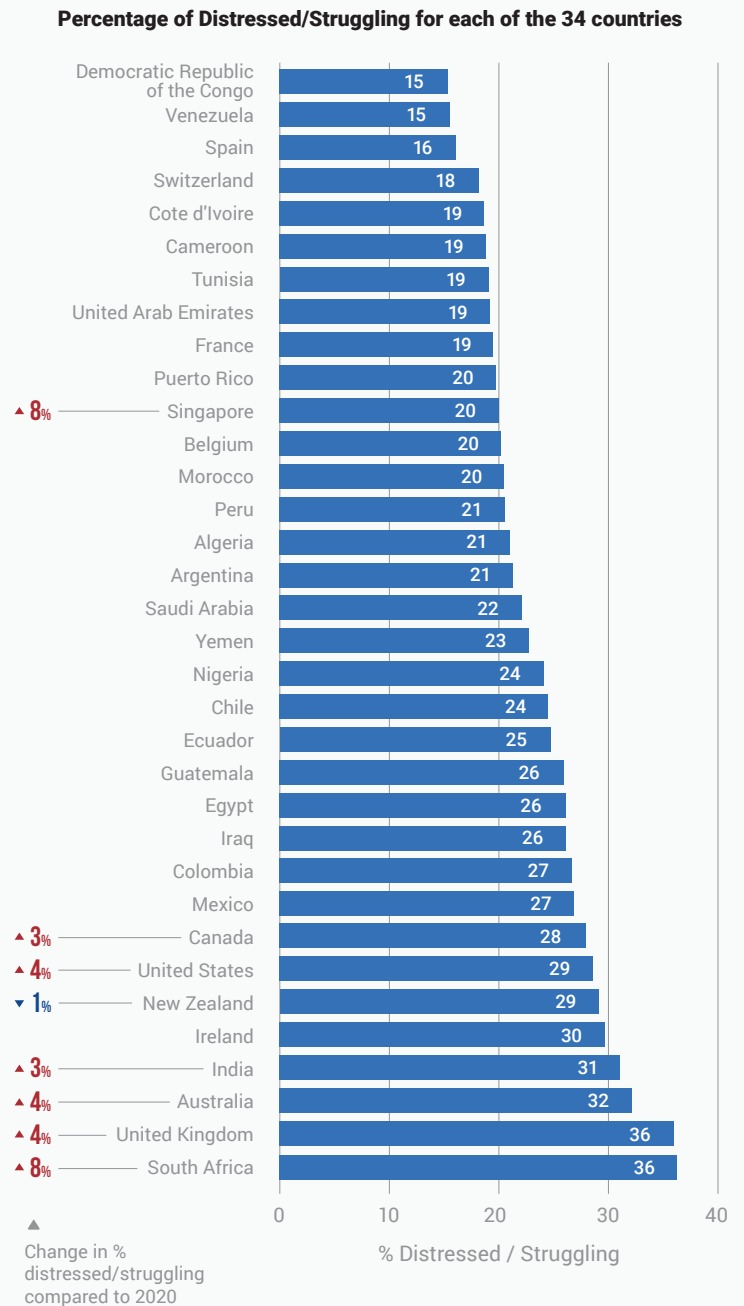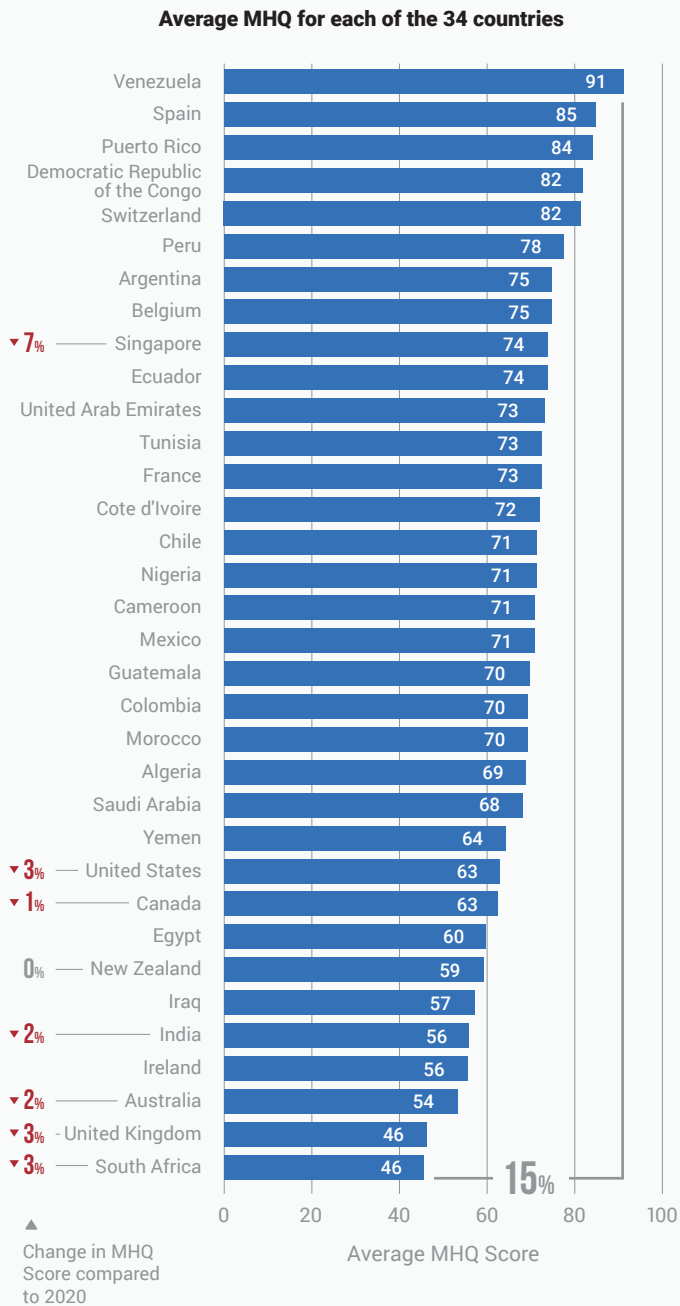
Across the 34 countries, the percentage with scores in the negative range of *Distressed* or *Struggling* varied from 19% to 36%. While the ordering of countries along this metric is largely similar to that of the average MHQ score, it is interesting to note that several West African and North African countries move up on the list, indicating that a smaller fraction within the Internet-enabled population of these countries had severe mental health challenges.

Finally, for the subset of English-speaking countries for which data was collected in 2020, we note in Figure 2.1 the percentage drop of average MHQ scores along the scale relative to the previous year. Most countries dropped by 2-3% on the MHQ scale with corresponding increases in the percentage of people *Distressed* or *Struggling* of 3-4%. Standouts were Singapore where the MHQ drop was 7%, and South Africa where the percentage *Distressed* or *Struggling* increased by 8% from 28.5% in 2020 to 36%.

Explaining the differences between countries

With countries such as Venezuela and Peru higher on mental wellbeing than the United States and Canada, at first glance the ordering of mental wellbeing across the Internet-enabled world does not correspond with country level economic prosperity. What then explains the ordering of countries? We took a look at a number of factors; demographic, economic, cultural and Covid related in search of answers. The outcomes surprised us.
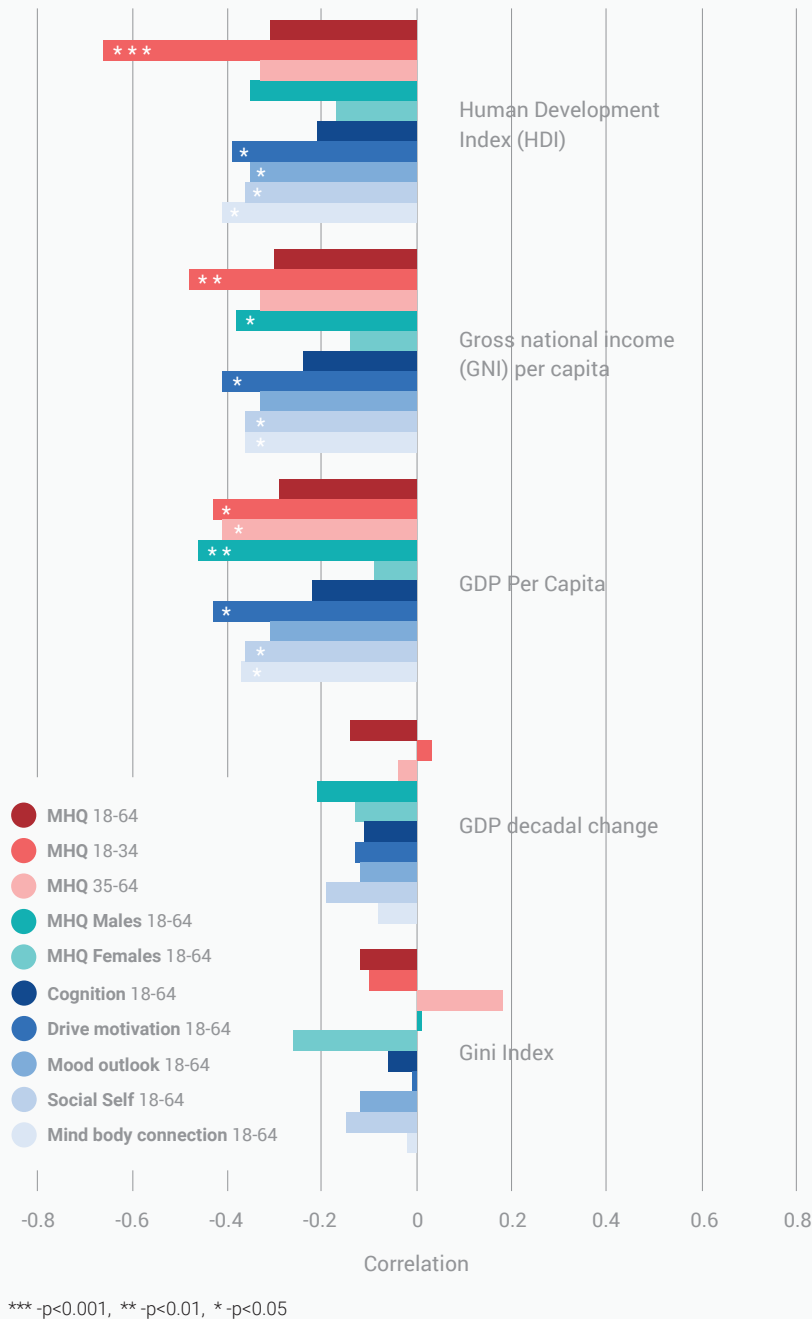
Demographic factors

First, there are various demographic differences among the Internet populations of these countries. For example, West Africa's population in general is much younger, with only 3% over age 65 (United Nations, 2019). This is in stark contrast to European countries where over 20% of the population are above age 65 (United Nations, 2019). Second, the Internet-enabled population of West African countries are typically more educated and more likely to be employed. Figure 2.3 shows the correlations between different demographic factors and MHQ scores of countries. The percentage of older adults, the percentage with a bachelors or higher and the percentage of employed are all directionally positively correlated with country MHQ scores (although not significantly), hinting that these factors play a role, but also that they are not the whole story (see Statistical Tables for details). Significantly correlated was only the percentage of the sample for each country with a Master's degree or higher (r=0.4). Note that demographics of age and gender are factored into the calculation of Country MHQ scores while education and employment are not. Mental wellbeing along these various demographic dimensions are discussed in a subsequent section.

Covid Factors

Another factor that might be expected to play a role are Covid related metrics. Here we looked at both Cases and Deaths per 1M population in 2021 in each country (Johns Hopkins, 2021) as well as an aggregate metric of the stringency of Covid response measures in 2021 (Oxford COVID-19 Government Response Tracker, 2022). Stringency of Covid measures were significantly negatively correlated with MHQ scores of the populations 18-34, though not for the overall population, and directionally negatively correlated with deaths and cases per 1M. (r=-0.4 for stringency, see Statistical Tables).
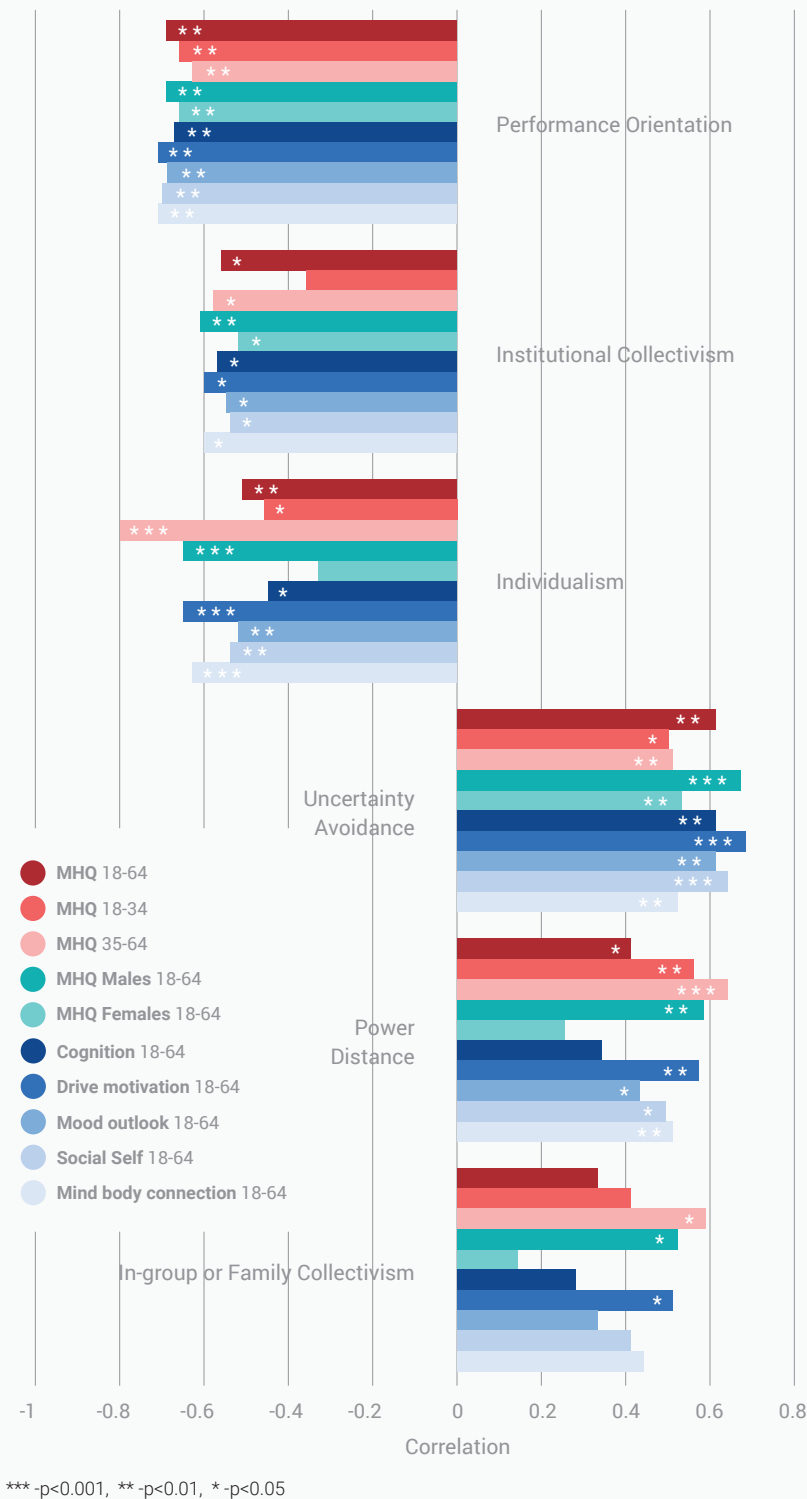
Economic factors

Is there a relationship between economic indicators and mental wellbeing? We looked for correlations between MHQ scores of countries and key economic and development indicators including GDP per capita, GNI per capita, Decadal GDP growth, 2020 GDP growth, Gini index (World Bank) and the Human Development Index (HDI; UNDP). Surprisingly, GDP per Capita, GNI per Capita and the Human Development Index were all significantly *negatively* correlated with MHQ scores. While the correlation for overall MHQ was not significant, when only considering those 18-64 (i.e. excluding the elderly), these negative correlations became highly significant for Drive and Motivation, Social Self and Mind Body Connection. In addition, correlations were highly significant for Males 18-64 and for younger adults under 34 (both males and females) but not significant for older Females. We note that Drive and Motivation includes various factors such as energy levels and desire to achieve goals, which on the negative ends are also the key factors of burnout. As this sample is specific to the Internet-enabled populations, there is the possibility that this reflects the greater prosperity of the Internet-enabled in countries with lower per capita GDP and internet penetration. However, the negative correlations persisted

Figure 2.2: **Correlation of country MHQ scores to economic indicators**

Legend:
- MHQ 18-64
- MHQ 18-34
- MHQ 35-64
- MHQ Males 18-64
- MHQ Females 18-64
- Cognition 18-64
- Drive motivation 18-64
- Mood outlook 18-64
- Social Self 18-64
- Mind body connection 18-64

Indicators: Human Development Index (HDI), Gross national income (GNI) per capita, GDP Per Capita, GDP decadal change, Gini Index

*** -p<0.001, ** -p<0.01, * -p<0.05

17

Country indicators of economic prosperity are negatively correlated with mental wellbeing, particularly for young adults and males, and belies the commonly held belief that national economic prosperity translates to greater social wellbeing

Figure 2.3: **Correlations of MHQ and dimension scores with country level cultural indicators**

Legend:
- **MHQ** 18-64
- **MHQ** 18-34
- **MHQ** 35-64
- **MHQ Males** 18-64
- **MHQ Females** 18-64
- **Cognition** 18-64
- **Drive motivation** 18-64
- **Mood outlook** 18-64
- **Social Self** 18-64
- **Mind body connection** 18-64

Categories: Performance Orientation, Institutional Collectivism, Individualism, Uncertainty Avoidance, Power Distance, In-group or Family Collectivism

X-axis: Correlation (-1 to 0.8)

*** -p<0.001, ** -p<0.01, * -p<0.05

after removing African countries where Internet penetration is lower. Furthermore, when considering only the countries in western Europe and the Core Anglosphere, the direction of correlation for GDP and GNI per capita were still negative though no longer significant given the smaller number of countries. However, the negative correlations of MHQ scores to the Gini Index and decadal changes in GDP increased substantially to -0.45 and -0.46 from -0.14 and -0.12 for all 34 countries. **This belies the commonly held belief that national economic prosperity translates to greater social wellbeing,** where these correlations would be expected to be positive and not significantly negative.

Cultural Factors

How much does culture play a role? Here we looked at correlations between MHQ scores and country-level cultural indicators of the Globe Project (House et al., 2004) as well as those compiled by Geert Hofstede at Maastricht University (Hofstede, 2013). Surprisingly, several indicators of culture had exceptionally strong correlations with mental wellbeing scores of countries. At the top of the list was the Globe Project's indicator of *Performance Orientation* (House et al., 2004), a measure of how much rewards and recognition are based on

18

Countries high on indicators of Performance Orientation and Individualism had the poorest mental wellbeing across all dimensions and age groups.

work performance. Of all indicators examined, this was the most significantly negatively correlated to MHQ scores overall, all MHQ dimensional scores, and for all age and gender groups. Following this were two additional metrics *Institutional Collectivism* (Globe Project) and *Individualism* (Geert Hofstede; GH), which were also significantly negatively correlated with mental wellbeing and its various dimensions. Institutional Collectivism reflects a country's practice of Institutional redistribution of wealth while the indicator of Individualism reflects a social framework in which individuals are expected to take care of only themselves and their immediate families. Countries high on Performance Orientation and Individualism also tend to practice greater Institutional Collectivism. Thus all three metrics are highly positively correlated to one another.

On the other hand, the indicators of *Power Distance* (GH), *Uncertainty Avoidance* (GH) and *In-group or Family Collectivism* (Globe Project) were positively correlated with mental wellbeing. Particularly, these were most positively correlated for Males and for the MHQ dimensions of Drive & Motivation and Social Self. A high Power Distance refers to cultures where there is a high acceptance of an unequal, hierarchical distribution of power, where people understand "their place" in the system. Similarly high Uncertainty Avoidance refers to the degree to which a society relies on social norms and rules to alleviate unpredictability, and in particular, social unpredictability. Finally, In-group or Family Collectivism refers to the degree to which societies express pride, loyalty and cohesion within their family groups.

We also note that other cultural indicators such as the Masculinity Index (GH), Gender Egalitarianism (Globe Project) and Humane Orientation (Globe Project) were not significantly correlated with any aspect of mental wellbeing and are not shown here but can be seen in the Statistical Tables.
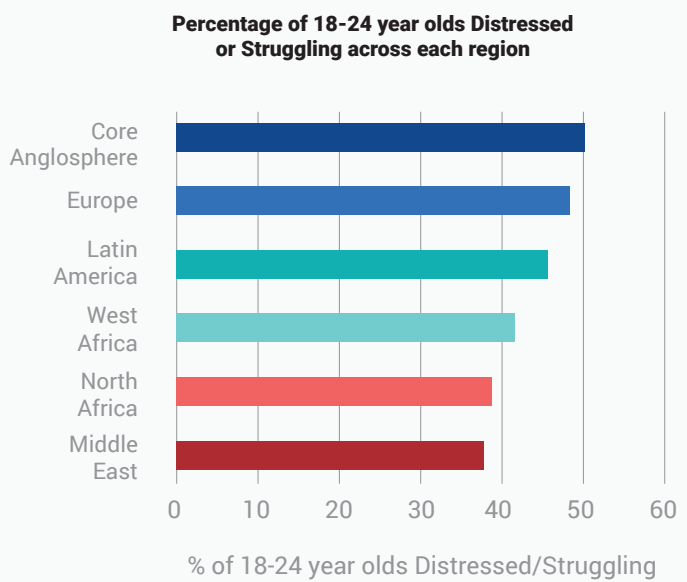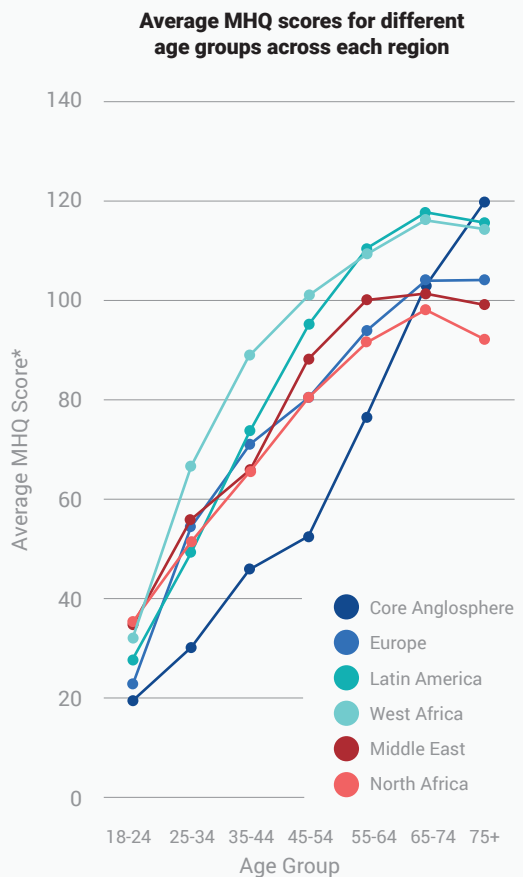
Altogether these relationships paint a surprising but consistent picture: a culture where we are each for ourselves and judged and sorted by performance may be good for economic growth but damaging to our collective mental wellbeing. What does this say about who we are and what the goals of our social, economic and political systems should be? We hope that these findings will foster deeper investigation and active debate.

3. Demographic factors that impact mental wellbeing and key trends

A global decline in younger generations

Last year we highlighted the trend of declining mental wellbeing with each successively younger generation in English-speaking countries. This trend was present even in 2019 although it was amplified in 2020 during the Covid-19 pandemic when mental wellbeing declined significantly more for younger adults than older adults (Newson et al., 2021a). This year we show a similar decline in mental wellbeing across successively younger generations for all 34 countries, irrespective of language or region.

Figure 3.1: **MHQ score across age groups**

Average MHQ scores for different age groups across each region

Percentage of 18-24 year olds Distressed or Struggling across each region

*Note that MHQ Scores are on a 300-point scale.

Figure 3.1 shows a consolidated view for each region. Respondents aged 18-24 had an average MHQ score of 29, with ~44% of respondents (50% for Core Anglosphere to 38% for Middle East) in the *Distressed* or *Struggling* range and only 19% in the *Succeeding* or *Thriving* range. In contrast, adults aged 65 and over had an average MHQ score of 107, 26% higher on the scale than those aged 18-24. Correspondingly, only 7% among those aged 65+ were in the *Struggling or Distressed* range (6% for West Africa to 9% for Middle East), while 63% were in the *Succeeding* or *Thriving* range. While we don't show this here, we note that this pattern was consistent across all dimensions of mental wellbeing and in particular the dimensions of Mood & Outlook and Social Self where the decrease in scores with younger age was steeper. In addition, it was steeper for females than for males.
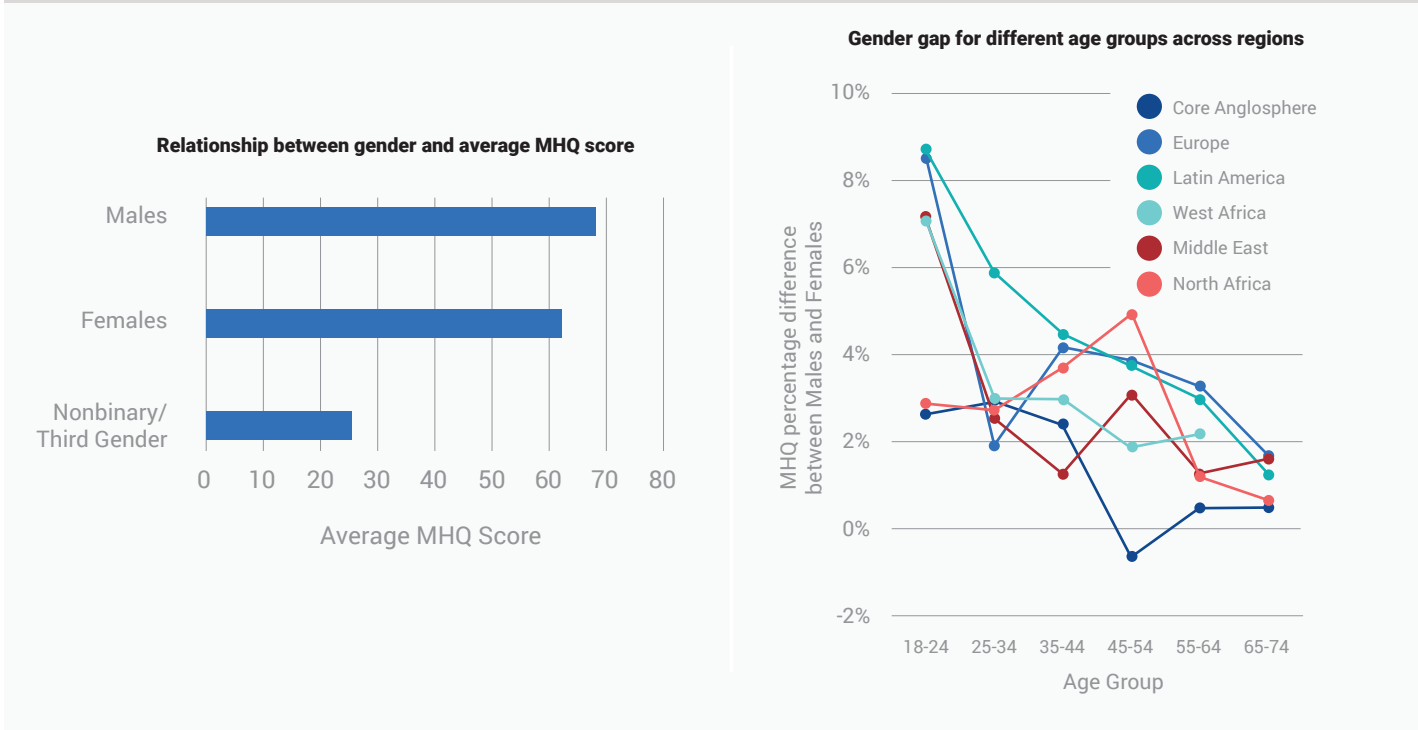
Does this suggest that mental wellbeing increases systematically as we age? The data suggests not. In patterns of wellbeing observed prior to 2010, young people typically had the greatest happiness and wellbeing. In the United States wellbeing followed a U-shaped curve where younger and older adults fared best with a dip among the middle age groups (Stone et al., 2010). In Latin America on the other hand, wellbeing was highest among young adults, declining steadily with older age groups (Steptoe et al., 2015). While these older studies measured wellbeing specifically in terms of happiness and elements of our Mood & Outlook measure, we note that Mood & Outlook now shows an even steeper decline than other dimensions with Feelings of Sadness, Distress and Hopelessness the most prevalent mental challenge among those aged 18-24. The profound change in the patterns of mental wellbeing by age group, and findings that mental health challenges in young adulthood tend to persist over adult life (Richmond-Rakerd et al., 2021), suggests a progressive decline across generations rather than a trend of improving mental wellbeing with age.

The globally consistent nature of this phenomenon suggests a common underlying cause, particularly since patterns of wellbeing by age were shown to differ quite significantly across regions prior to 2010 (Steptoe et al., 2015). While we are unable to present a proven explanation for this global trend, we discuss multiple possibilities in section 5 from changes in inequality to environmental causes and the impact of the Internet.

A persistent gender gap most pronounced in Latin America

Gender differences in mental wellbeing have been reported previously, with rates of depression, post-traumatic stress disorder (PTSD), eating disorders and generalized anxiety disorder higher for women compared to men (Kessler et al., 1993; Van de Velde et al., 2010; McLean et al., 2011; Ditlevsen and Elklit, 2012; Salk et al., 2017; Udo and Grilo, 2018). In line with these findings, we showed that female respondents had a slightly lower MHQ scores overall relative to male respondents in our 2020 report (Newson et al., 2021a). However, one of the most striking findings from 2020 was that those who identified as nonbinary/third gender were experiencing substantially more serious challenges with their mental wellbeing, consistent with other studies (Cochran et al., 2003; Russell and Fish, 2016; Trevor Project, 2021).

Figure 3.2: **MHQ score across genders**

Gender gap for different age groups across regions

Relationship between gender and average MHQ score

In 2021 as well, mental wellbeing, as measured by the MHQ, was slightly higher in males (68) compared to females (62), and dramatically lower in nonbinary/third gender respondents (25). This translates to just a 2% difference between males and females on the MHQ scale but 12-13% between nonbinary or third gender and either males or females (Figure 3.2). This year we extend these findings to multiple regions. Overall it was greatest in Latin America and lowest in the Core Anglosphere, although the pattern was distinct for young adults 18-24.

The gender gap, generally in the range of 2 to 4%, was many-fold smaller than the age gap reported above, and the magnitude of this gap diminished with age. For example, for young adults aged 18-24 years, there was a 6% difference in mental wellbeing scores, with men having higher mental wellbeing compared to women. However, for those aged 65+ this gap had diminished to only 1.5%. Possibly this reflects the greater decline of mental wellbeing with age for females than for males.

4. Education, Employment and Mental Wellbeing

More education, better mental wellbeing

Previous evidence suggests a bidirectional relationship between mental wellbeing and education attainment where poor mental wellbeing can lead to lower levels of attainment and vice versa (Esch et al., 2014; Gariépy et al., 2021). Figure 4.1 demonstrates the relationship between mental wellbeing, as measured by MHQ scores, and education level – defined as the highest level of education that a person has achieved. The results show higher mental wellbeing scores with increasing levels of education. Respondents with PhD or Master's qualifications had the highest levels of mental wellbeing with average MHQ scores of 101 and 94, respectively. Those with Bachelor's or Vocational certifications had mental wellbeing scores approximately 6% lower at 78 and 79, respectively. Those individuals with education levels below a Bachelor's degree (i.e. high school or below) had the lowest mental wellbeing scores (range 47-58), approximately 9% lower on the MHQ scale than those with Bachelor's degrees or Vocational certifications. This pattern was similar across all regions, although the magnitude of

Figure 4.1: **MHQ scores across education levels**
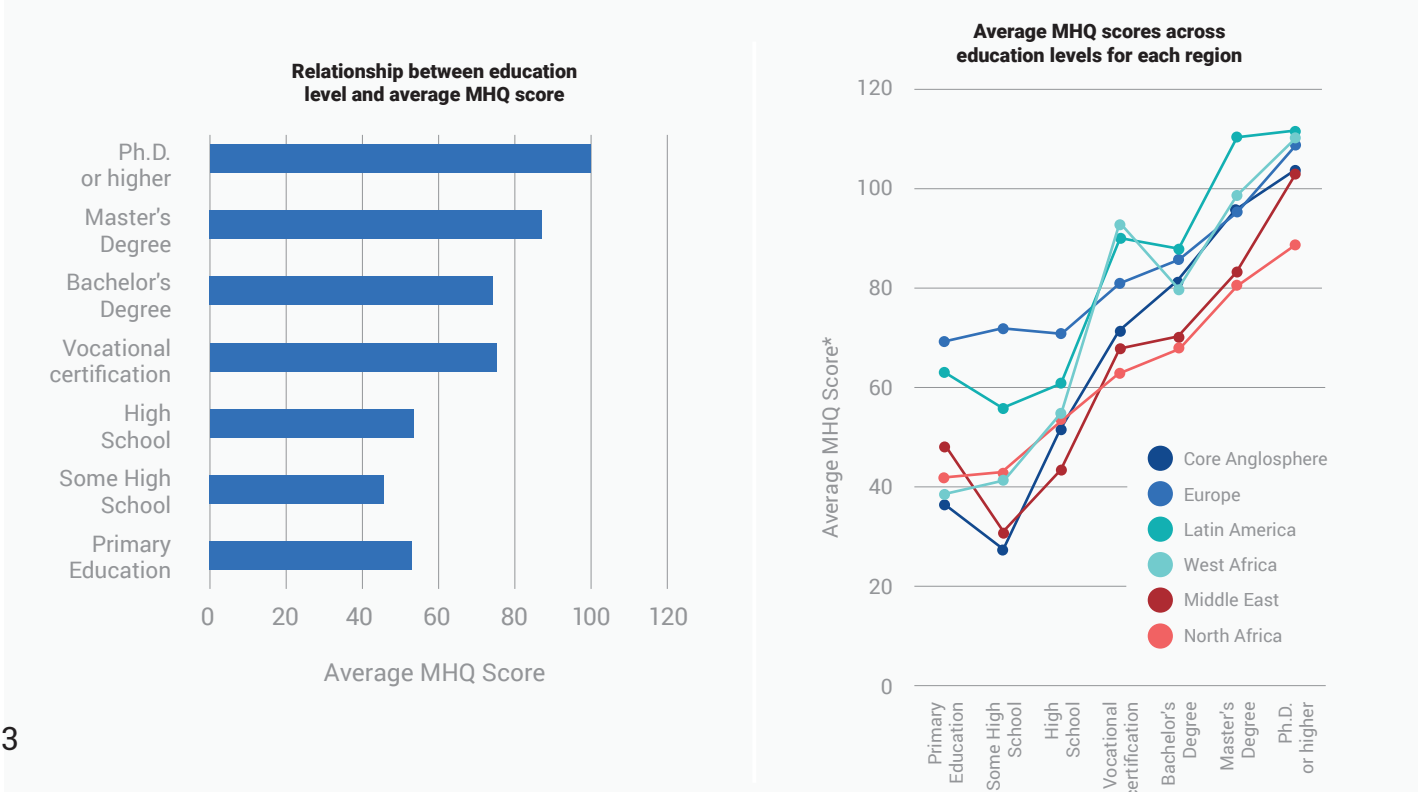
difference between education levels varied slightly. For example, there was a smaller difference between those who had a high school education or less compared to those with higher degrees in Europe than all other regions, while the Core Anglosphere had the steepest difference.

This relationship of MHQ scores to education may also be a reflection of increased income associated with higher educational attainment, a factor we do not consider here.

Employment, mental wellbeing and productivity

Work is an integral part of life that occupies much of our waking time and can provide people with a strong sense of identity, self-worth, purpose and economic stability (Modini et al., 2016). Conversely, unemployment has been shown to have a negative impact on mental wellbeing (Brouwers, 2020).

In aggregate, the data showed similar mental wellbeing scores for respondents who identified themselves as employed/self-employed or homemakers, with average MHQ scores of 75 and 69, respectively (figure 4.2). In contrast, those who were either unemployed or unable to work reported MHQ scores that were 11% and 19% lower on the MHQ scale respectively compared to those who were employed or homemakers. The percentage of those who were employed was highest between ages 25 and 54 in all regions and substantially lower among those 18-24 and 65+.

Figure 4.2: **MHQ scores across employment groups**
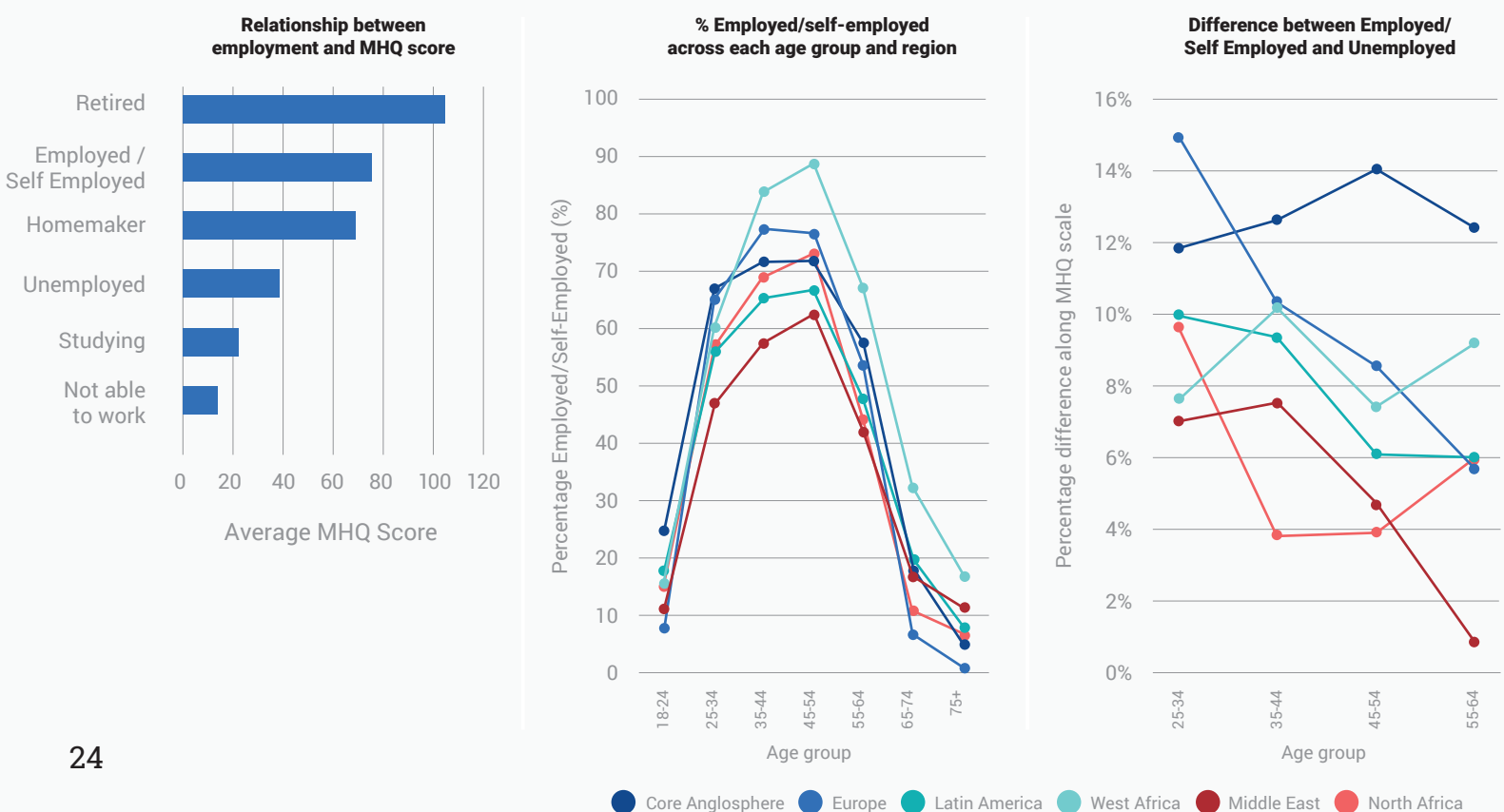
Those retired are typically 65 and older, while those studying are typically 18-24, where the average MHQ scores ranged from 90-120 and 20-38 across regions respectively. Thus, the higher MHQ scores of those Retired and low MHQ scores of those Studying is likely a reflection of the decline in mental wellbeing with younger generations than specifically to do with being Retired or Studying per se. Across the age ranges of 25 to 54 where the majority were employed, the difference between the MHQ scores of those Employed/Self-Employed to those Unemployed was substantially higher in the Core Anglosphere (12-14% for all age groups) and lowest in North Africa and the Middle East (as low as 1% for ages 55-64 in the Middle East to as high as 10% for ages 24-34 in North Africa). Overall, with the exclusion of the Core Anglosphere, the difference was typically 4-10%.

Evidence has long suggested that poor mental health leads to productivity loss (Kessler and Frank, 1997; Lim et al., 2000; Hemp, 2004; Burton et al., 2008; Evans-Lacko and Knapp, 2016; Bubonya et al., 2017) and economic loss (Marcotte and Wilcox-Gök, 2001; Stewart et al., 2003; Trautmann et al., 2016; Whiteford, 2021) indicating that the relationship between mental wellbeing and productivity is likely to be bidirectional such that those unemployed may be so because of challenges to their mental wellbeing. We note that there is a systematic relationship between MHQ scores and self-reported productivity (also shown previously in Sapien Labs, 2021; Newson et al., 2022). Absenteeism and presenteeism increase substantially in the negative ranges of the MHQ scale (see Appendix 1). This both supports the bidirectional relationship between employment and productivity and demonstrates that the MHQ is an effective measure of a person's productive capabilities.

5. Summary and Insights

A comparison of key demographic factors

In Figure 5.1 we show side by side the magnitude of differences in MHQ scores (the mental wellbeing gap) within each region along each of the various demographic dimensions described in section 4. These include age (18-24 year olds vs 65+), gender (males vs females), education (Bachelor's degrees or higher vs lower), employment (employed vs unemployed) and country (highest vs lowest country score within each region, and overall). Across all of these, the biggest gap was the generational gap where the difference in mental wellbeing between those age 18-24 and those 65 and older was 20-31% across regions. In all regions, the generational mental wellbeing gap was 2- to 3-fold larger than that of gender, employment or education (noting that employment status is also

Figure 5.1: **Magnitude of differences by demographic factors**

Difference along MHQ Scale
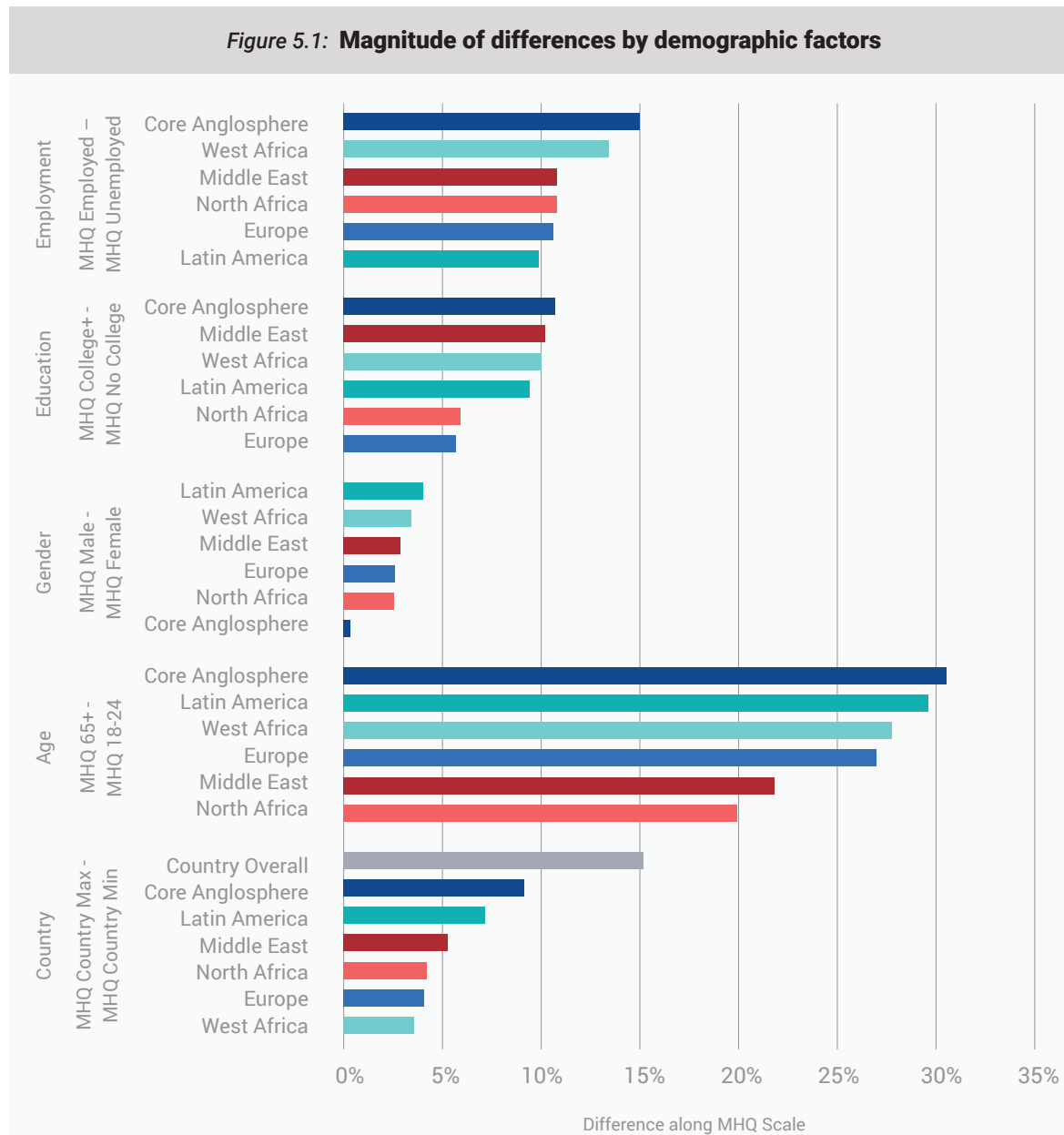
influenced by age). Even the maximum difference between countries overall, although relatively large (15%), was still smaller than the generational gap within any region.

Thus, of all trends, understanding what is behind the global shift in the pattern of mental wellbeing by age since 2010 is of profound importance.

The difference in mental wellbeing between younger and older adults was 2- to 3-fold larger than the differences along the dimensions of age, gender, employment or country within a region.

Possible causes of the generational decline

The rapid shift from region specific patterns of wellbeing with age where young adults were typically highest on various wellbeing scales, to a consistent pattern where they are now consistently lowest across the Internet-enabled population of every single one of the 34 countries we sampled, suggests a common underlying cause. We considered various potential causal factors: Income Inequality, Political Instability, factors related to the Internet, and Environmental Toxins.

Inequality as measured by the Gini index has increased in much of the developed world in the past decade. However, in other regions such as Latin America it has *decreased* or remained stable. And yet the same age dependent decline exists in every one of these countries. Similarly, while there have been instances of political instability over the last decade, in many of the 34 countries in this report, estimates of *Political Stability and Absence of Violence/Terrorism* (World Bank) have been unchanged over the past decades. Thus, while these factors may play a role in specific countries, neither can explain the presence of such a consistent global trend.

With respect to environmental toxins, air pollution has generally declined worldwide or remained stable over the past decade, ruling this out as a possible cause. On the other hand, chemical contaminants and endocrine disruptors from pharmaceuticals and cosmetics in water have grown significantly since 2010. So too has the presence of microplastics in our food and water, which are known to induce immune and stress response and result in reproductive and developmental toxicity in animals but are not well studied in humans (Blackburn and Green, 2022). Unfortunately, country level data on these parameters are not available. However, this is an area that we believe should be further explored in the context of its impact on mental health status.

Finally, one global change that is consistent across all countries, is the exponential growth of smart phones and ubiquitous Internet access that began around 2009 and stabilized around 2016. The impact of various

aspects of Internet use such as social media and screen time on mental health have been studied with mixed conclusions (Wongkoblap et al., 2017; Kelly et al., 2018; Twenge and Campbell, 2018; Keles et al., 2020). However, we offer another possible perspective. Since the mobile phone became pervasive, global statistics indicate that individuals spend an average of 7 to 10 hours online per day depending on the country. We suggest therefore that it is perhaps not the use of the mobile phone and Internet per se that has been damaging, but rather that it occupies such a large fraction of waking time that it crowds out time that previously would have been spent on the in-person social interactions that are required to build and maintain a strong Social Self, the dimension most significantly lacking in younger adults. While the present data are only suggestive and not conclusive, this is an area that warrants immediate attention and much of our efforts in 2022 will seek to understand these effects.

Potential consequences

While work needs to be done to understand clearly the specific causal factors, the urgency is highlighted by some sobering statistics. Lower MHQ scores are significantly correlated with national rates of suicide and sexual violence, and directionally with rates of violent assault of countries, as reported by United Nations Office on Drugs and Crime (UNODC) (Figure 5.2). The correlations are particularly significant for young men 18-34 and with the dimension of Social Self. Left unmanaged, the present trend suggests that there could be substantial increases in these statistics.

Figure 5.2: **Correlations of country MHQ scores with national statistics**

*** -p<0.001, ** -p<0.01, * -p<0.05
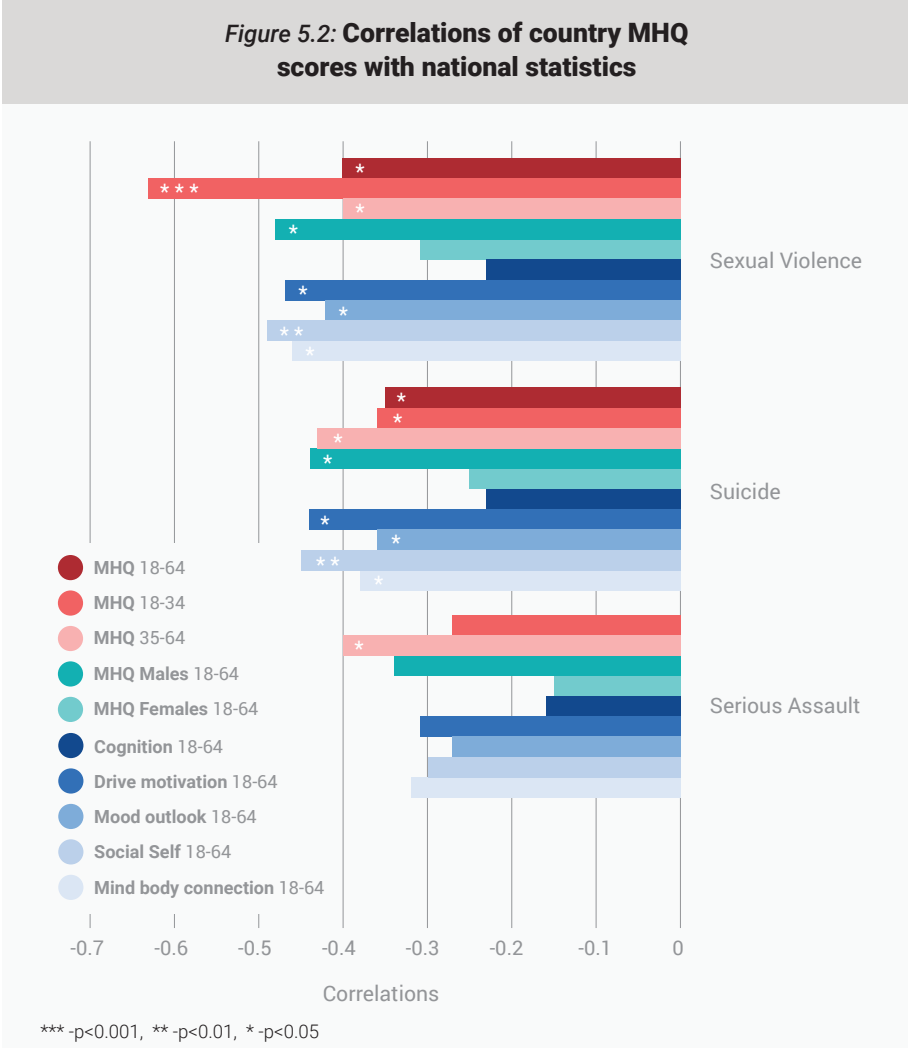
Looking ahead

Global expansion

2021 was the second year of the Mental Health Million project and saw the addition of three languages: Spanish, French and Arabic. This expanded the scope from 8 English-speaking countries and 49,000 responses in 2020 to 34 countries and 223,087 responses in 2021. In 2022, with the addition of translations in Portuguese, Russian, German, Hindi, Tamil and Swahili, we will expand our reach to 72 countries and over half a million responses as we work towards our goal of over 1 million responses each year. With the expansion both in breadth across the globe and depth of reach within each country, we will be able to provide increasingly representative and localized perspectives with the potential for deeper insights into underlying drivers.

Deeper insights

The insights in this report represent only the tip of the iceberg. Triangulating data with other data sources, both environmental and societal, to understand relationships will enable an untangling of the causal factors to determine what must be managed to make the biggest impact on mental wellbeing. Deeper analysis of symptom profiles can also enable understanding of how specific clinical risk profiles differ across geographies and demographics. The possibilities are many. Access to the real time data from the Mental Health Million project is therefore freely available on request to researchers and organizations for not-for-profit research. It is our hope that organizations will use this data effectively for greater impact.

Donations and partnership support

Reaching our goals of a truly global view that helps us actively and effectively manage the mental wellbeing of society requires multifaceted support from around the world. We look to our readers and stakeholders to support our effort to expand across the globe, and also to partner with us to make effective use of the insights this data offers. Donations can be made through our website or by contacting us. We also welcome partnerships to expand reach to specific geographies or demographic groups, and to help bring the insights of this data into policy and interventions that can positively impact the future mental wellbeing of the world.

Appendix 1:
Understanding the MHQ

About the MHQ

Data for the Mental Health Million project is collected using an online assessment tool called the Mental Health Quotient (MHQ) that was developed at Sapien Labs. The MHQ is a unique comprehensive assessment of mental wellbeing comprised of 47 elements of mental function including both problems and assets (Newson and Thiagarajan, 2020). It uses these elements to provide an aggregate score to position individuals on a spectrum from *Distressed* to *Thriving,* as well as sub-scores across 5 broad functional dimensions. The MHQ is freely available online, is anonymous, and takes ~15 minutes to complete. It is currently available in English, Spanish, French and Arabic with additional translations planned for 2022 and beyond. In addition to the 47 scored questions, respondents answer questions relating to their demographics, life experience and lifestyle. To encourage thoughtful and honest responses, respondents receive an MHQ score along with tailored feedback on completion of the MHQ and can opt to receive a more detailed report with recommendations for action via email.

Rationale behind the MHQ

The MHQ was developed to address existing challenges with mental health assessment, and the diversity and comorbid nature of mental illness. First, no tools were available that assessed both the positive and negative dimensions of mental function that would be appropriate to identify the full range of mental wellbeing across a general population. Further, available mental health assessment tools were typically specific to particular 'disorders'. A study by Sapien Labs of 126 commonly used mental health questionnaires and interviews, spanning 10 disorders showed that questionnaires and interviews assessing the same disorder were only 29-58% similar in terms of the symptoms captured, depending on the particular disorder (Newson et al., 2020). Conversely, 60% of symptoms were assessed in at least half of all disorders illustrating the extensive overlap between disorder-specific assessment tools. Furthermore, no cross-disorder tools available assessed the full spectrum of symptoms or considered positive dimensions of mental wellbeing. The MHQ was therefore born out of the need for a global

standard in mental health assessment which spanned the breadth of symptoms of mental health disorders, but was also relevant to the wider population who do not necessarily exhibit symptoms at a clinical level, but nonetheless may experience natural fluctuations in their mental wellbeing.

Development of the MHQ coded questions

The MHQ was developed based on a comprehensive coding of symptoms and mental elements across 126 different mental health questionnaires and interviews spanning depression, anxiety, bipolar disorder, attention-deficit/hyperactivity disorder (ADHD), post-traumatic stress disorder (PTSD), obsessive-compulsive disorder (OCD), addiction, schizophrenia, eating disorder, and autism spectrum disorder (ASD), and cross-disorder tools (Newson et al., 2020). A total of 10,154 questions were coded and consolidated into a set of 43 symptom categories. The resultant items were then reviewed in the context of other transdiagnostic frameworks including the Research Domain Criteria (RDoC) put forward by the National Institute of Mental Health (Insel et al., 2010) and symptoms relevant to dementia, and reorganized into a set of 47 elements of mental wellbeing.

Use of a life impact rating scale

Across the 126 tools studied, the evaluation of symptoms was highly heterogeneous, ranging from presence or frequency to severity and duration of symptoms on various time scales from days to months. Taking instead the position that the ultimate goal of mental health intervention is to mitigate the impact of mental distress on one's life experience and functioning, the MHQ uniquely captures these symptoms and mental attributes using a 9-point life-impact rating scale. The MHQ contains two types of mental elements. Those that could exist on a spectrum from positive to negative and those that are problems of varying degrees of severity.

Demographic, experiential, and momentary questions

The MHQ also includes numerous un-scored questions relating to demographics, lifestyle and life traumas and adversities that can be of value in understanding contextual triggers, drivers and determinants of mental wellbeing.

Validation of the MHQ

The MHQ has now been validated in multiple ways (Newson et al., 2022). First, reliability of the MHQ has been demonstrated by showing that distinct samples collected during the same period had indistinguishable MHQ distributions and average ratings for each of the 47 elements. In addition, MHQ

scores have been shown to be correlated with r=0.84 between retakes within an 8–120-day period. Comparisons of the MHQ life impact rating against frequency and severity ratings for the MHQ element *Feelings of sadness, distress or hopelessness* showed a clear linear relationship with an $R^2>0.99$.
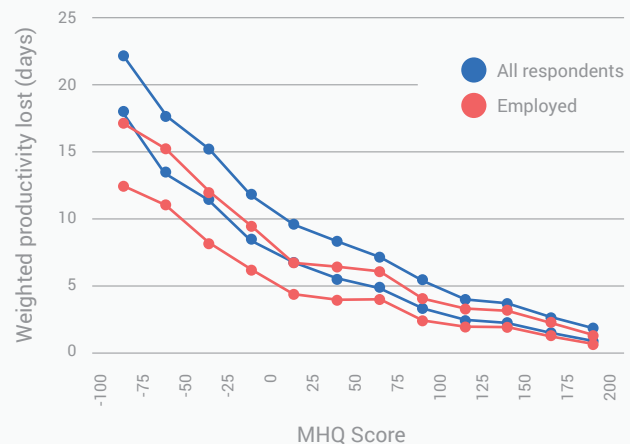
The MHQ scale

The MHQ positions individuals on the spectrum from *Distressed* to *Thriving*, spanning a possible range of scores from −100 to +200 where negative scores indicate a mental wellbeing status that has significant negative impact on the ability to function. Importantly the MHQ score is not based on a simple averaging of question ratings but rather each individual rating is thresholded along the functional scale between positive and negative impact to function and nonlinearly transformed based on a ranked severity of implications. The positive range of the scale is modeled on the IQ scale. Positive scores, which are largely normally distributed, are calibrated to a mean of 100 based on our original 2019 sample and can range from 1 to 200. Negative scores, on the other hand, have a long-tailed distribution. In order to ensure that overall average scores are not inordinately determined by the small number of individuals in the long tail, the negative scale was compressed to a smaller scale of 0 to -100 in order to mitigate the impact of negative scores on the population average. More details of this methodology are provided in (Newson and Thiagarajan, 2020).

Functional implications of the MHQ

The MHQ has been demonstrated to relate systematically to the productive capital of an individual in work and life (Sapien Labs, 2021; Newson et al., 2022). For example, we have shown that the average number of days of work missed in the past month decreases systematically as MHQ scores increase (Newson et al., 2022). Cumulatively, when considering the total loss of life productivity as a function of MHQ score (taking into account both days of work missed and days that were less productive and assuming a range of 20% to 50% loss of productivity on less productive days) those with the lowest MHQ scores (between -75 and -100) had an overall reduction in life productivity of anywhere from 18-23 days per month on average (Figure A1.1). While those with the highest MHQ scores did not often miss a

Figure A1.1: **Relationship of MHQ score to productivity**

Lines show top and bottom of the range

day of work, even this group reported a few unproductive days a month. Thus, MHQ scores are a good representation of behavioral loss of function and supports the use of the MHQ as an assessment of the productive capacity of a population, independent of any disorder classification. It also positions the MHQ as an important tool for companies and universities to be more strategic in their management of mental health and wellbeing.

Relationship of the MHQ scale to clinical disorders

The MHQ elements map to diagnostic criteria for each of 10 major DSM-5 disorders (Newson et al., 2020; Newson et al., 2021b). Mapping individual profiles to these criteria has shown that MHQ scores relate systematically to clinical burden (Newson et al., 2022). The percentage of people with clinical symptom profiles that aligned with any of 10 DSM-5 defined disorder criteria increased as the MHQ score decreased, such that 89% of those with scores in the *Distressed* range had symptom profiles that aligned with at least one of the 10 DSM-5 defined disorder compared to 0% for those with scores in the *Succeeding* or *Thriving* range (Newson et al., 2022). Similarly, the number of disorders per individual decreased systematically as MHQ scores increased with the average number of disorders per person at 3.8 for those in the *Distressed* group and 0.0 for those in the *Succeeding* and *Thriving* groups. Thus, the MHQ score is also reflective of the overall clinical burden of mental health. Note that the MHQ score range labelled as *Distressed* was previously referred to as *Clinical*, while the score range *Struggling* was previously referred to as *At Risk*.

Computation of MHQ dimension scores

MHQ dimension scores are computed for 5 broad dimensions of mental health: Mood & Outlook, Drive & Motivation, Social Self, Mind-Body Connection, and Cognition, that have overlap and parallels with the RDoC principles of domains and constructs (Insel et al., 2010; Note that cognition is a composite of the two historical dimensions of Core Cognition and Complex Cognition). Dimension scores are computed as a weighted average of a subset of relevant items, where those core to the dimension are weighted as 1 and those secondary to the dimension are weighted 0.5. This weighting algorithm was developed based on a review of cognitive and neuroscience models of brain functioning. For example, the item Stability and calmness is coded with a primary 1 weighting in the Mood & Outlook dimension and a secondary 0.5 weighting in the Mind-Body dimension to reflect its dual components of emotion and physiological response, whereas the item Unwanted, strange, or obsessive thoughts is dual coded with a primary weighting in the Cognition dimension and a secondary weighting in the Mood & Outlook dimension to reflect both the cognitive and emotional elements of this item. In this regard, an item could be assigned

to 2 different dimensions and occasionally to 3. Overall, each dimension comprised 10 to 24 items. The dimension scores are reported on the same scale as the overall MHQ as described above. Positive scores are normalized to the range of 0 to 200, whereas negative scores are normalized to the range of −1 to −100 (Note that this represents a change in the dimensional scale which ranged from -50 to +100 previously. As this represents a linear scaling to avoid the use of multiple scales, reports using this earlier scale can be compared to results in this report by simply scaling by 2).

Appendix 2:
Data Collection & Analysis Methods

Recruitment of respondents

223,087 respondents from around the world completed the MHQ assessment between 1st January and December 31st 2021. Participants were recruited through advertising on Google and Facebook by targeting a broad audience within each age-gender demographic across a wide geography within each of 34 countries (See table A2.1 for a list of countries). Recruitment in 2021 initially focused on English-speaking countries, and was then expanded to Spanish, French and Arabic speaking countries with the launch of these translations in June, September and November, respectively.

The Google Ads outreach specifically targeted those individuals who were searching for terms relevant to mental health (e.g. psychological test, cognitive assessment test, mental health assessment) and were applied consistently across all countries. Those recruited through this stream may therefore have had a specific interest or concern relating to their mental health. In contrast, Facebook outreach was much broader, spanning individuals who had shown a previous interest in mental health and wellness topics, as well as all adults in that country with the simple tagline *What is your mental wellbeing score?* Those recruited through this stream were therefore not specifically searching for information relating to a mental health interest or concern.

Data distribution

The number of respondents for each targeted country is shown in Table A2.1.

Table A2.1: **Sample size across countries**

Country	N	Country	N
United States	25074	Peru	3332
India	24924	France	3093
United Kingdom	17318	Iraq	2633
Venezuela	13839	Singapore	2612
Argentina	13043	Yemen	2577
Mexico	12662	Guatemala	2459
South Africa	11887	Cameroon	2139
Canada	10796	Ecuador	2097
Colombia	10385	Chile	2074
Spain	8083	Cote d'Ivoire	2050
Australia	7840	Belgium	1945
Algeria	7631	Saudi Arabia	1505
Nigeria	6468	Democratic Republic	
New Zealand	5098	of the Congo	1285
Egypt	4771	Puerto Rico	1095
Ireland	3899	United Arab Emirates	719
Morocco	3695	Switzerland	406
Tunisia	3653		
TOTAL			**223087**

Figure A2.2: **Percentage of respondents in each age and gender group**

Age profile of respondents
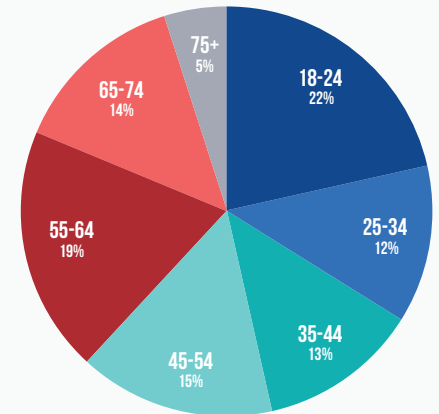
Gender profile of respondents
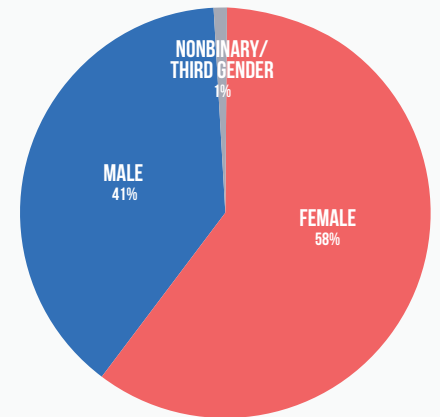
Respondents spanned all age groups roughly equally (Figure A2.2 top) while the gender split was 58% female, 41% male and 1% nonbinary/third gender (Figure A2.2 bottom).

Respondents across countries varied in terms of their education level and employment status.

Education and employment levels are shown in the associated data tables. However, please note that since the MHQ Scores of countries are weighted by age and gender, the average scores do not reflect the raw distribution in the sample. For example, a smaller older population would also mean a smaller retired population while a smaller younger population would mean a smaller population still studying. For details see section on Data analysis.

Data analysis

Exclusion criteria

Only those respondents who stated that they found the MHQ easy to understand were included in the analysis. This exclusion criterion was applied by only selecting respondents who answered "Yes" to the final question in the MHQ which asks them "Did you find this assessment easy to understand?". Those who answered no were excluded from the analysis. In addition, only respondents who were over 18 were included. Those who responded that they were "Under 18" were unable to continue with the assessment and so were automatically excluded. No other inclusion or exclusion criteria were applied to the data.

Computing average MHQ Scores for countries

The spread of respondents across age and gender groups was not an accurate representation of their proportion of the population in each country. Furthermore, the proportion of respondents in each age-gender group were not identical across countries. Thus, to enable a more representative view of a country's population, and more accurate comparisons between countries, scores were first computed for each age-gender group and then a weighted average score was computed based on the relative proportions of each group within individual countries. Analyses comparing age brackets were only weighted by gender, while conversely, analyses comparing genders were only weighted by age. All population estimates and age-gender distributions that are utilized for these weightings were taken from the United Nations population estimates (United Nations, 2019). As there are no reliable statistics for the proportion of nonbinary/third gender individuals across all countries, we used a broad population estimate weighting of 0.5% across all countries, which was decided on after reviewing a number of sources (Flores et al., 2016; Meerwijk and Sevelius, 2017), although we acknowledge, similar to other sources, that this may be an underestimate.

Computing average MHQ Scores for regions

Computation of the regional MHQ and dimension scores were not a simple average across countries but were additionally weighted based on the proportion of Internet users within the country (Data reportal, 2021). Thus, larger countries or countries with larger Internet populations would play a larger role in these regional estimates. Where the Internet population may be larger than the particular language groups in the country in which the MHQ was offered (e.g. Belgium), the proportion of those language groups was used as the weighting factor rather than the proportion of Internet users.

Score Reporting in MHQ points and percentage differences

We typically report differences in terms of MHQ points and the corresponding percentage shift along a 300-point scale i.e. ((Value 1 − Value 2)/300) * 100. For instance, 75 points represents 25% of the

possible length of the scale. Thus a 75-point shift or difference between groups would be a 25% shift along this scale.

Statistical analysis

Statistics were computed by comparing groups using a standard t-test. P-values obtained were then corrected for multiple comparisons using a Bonferroni correction. All statistical tables showing these corrected p-values are provided in a supplementary download along with the report.

Correlations

Correlations between country level MHQ scores and economic, cultural, Covid-19 and other indicators were computed using Pearson's correlation measure. While economic and Covid-19 indicators were available for all 34 countries, the cultural indicators were available only for 18 (Globe Project) or 25 (GH) of the 34 countries. In general indicator numbers used were for the latest year available except for the Gini index where a 4 year average was used.

Limitations of sampling and data interpretation

Although respondents were similarly recruited across all countries, two key caveats must be highlighted. First, these samples may not reflect a true sample of any country's population and will be biased by those with language proficiency, Internet access and the willingness to spend 15 minutes completing an online assessment. Thus, results must be interpreted strictly in this context. Second, cultural differences in language usage and culture itself can significantly influence how people interpret and respond to each individual question. Any individual country's results will therefore reflect these differential effects of culture.

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