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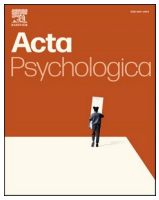

Tracking the Irish adult population during the first year of the COVID-19 pandemic: A methodological report of the COVID-19 psychological research consortium (C19PRC) study in Ireland

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ABSTRACT

The COVID-19 Psychological Research Consortium (C19PRC) study was established to determine the impact of the COVID-19 pandemic on the population of multiple countries. Here, we provide a methodological overview, cohort profile, data access, and summary of key findings from the Republic of Ireland arm of the C19PRC study. A longitudinal internet panel survey was designed to collect data from a nationally representative sample of Irish adults ($N = 1041$) who were tracked from March/April 2020 to March/April 2021. Quota sampling methods were used to produce a sample that was representative of the population with respect to sex, age, and regional distribution. Data were collected in five waves, and new participants were recruited at follow-up waves to cover sample attrition and produce nationally representative samples at various points during the first year of the pandemic. A comprehensive battery of measures was used throughout the project to assess an array of socio-demographic, political, social, psychological, physical health, COVID-19, and mental health variables. Analyses were conducted to compare sample characteristic to known population parameters from available census data. These analyses showed that the sample was representative of the general adult population of Ireland on the three quota variables and was reasonable representative of the population across a diverse range of sociodemographic variables. These data representative the first and only nationally representative, longitudinal survey of the mental health of the Irish population. These data are made freely available to interested users (https://osf.io/2huzd/files/) and the findings of this study provide a methodological basis for the future use of these data.

1. Introduction

The emergence of the novel severe acute respiratory coronavirus (SARS-CoV-2) in 2019 and the resultant COVID-19 disease pandemic in 2020 posed a threat to the global population as initial attempts to contain the spread of the virus were unsuccessful. In response to the emergence of the COVID-19 pandemic, researchers in the Universities of Sheffield and Ulster in the United Kingdom (UK) launched a multinational project in March 2020 called the COVID-19 Psychological Research Consortium (C19PRC) study (McBride et al., 2021). Researchers in Spain, Italy, Saudi Arabia, the United Arab Emirates, and the Republic of Ireland joined the C19PRC. The primary goal of the C19PRC was to conduct a longitudinal assessment of the social, political, economic, and health impact of the COVID-19 pandemic on the adult population of each nation. A 'core' battery of psychological and mental health measures was included in all national surveys however each international branch could tailor their survey to meet specific national needs. The Irish branch of the C19PRC, which is the focus of this paper, received partial funding from the Health Research Board and the Irish Research Council under the COVID-19 Pandemic Rapid Response Funding Call [COV19-2020-025; see protocol by Hyland & Vallières, 2020] to monitor changes in the mental health of the population over the first year of the pandemic (see https://www.mentalhealthasap.com/). The Irish branch of the C19PRC collected longitudinal data from a nationally representative sample of adults in fives waves between March/April 2020 and March/April 2021. The collection of data on an extensive array of sociodemographic, individual, COVID-19 specific, socio-political, and physical and mental health variables has produced a

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dataset that will allow researchers to comprehensively examine the pandemic's effects on the adult population of Ireland. This paper is intended to provide a methodological overview of these data, to demonstrate the nationally representative nature of the sample data, to make these data freely available to the scientific community, and to summarise the key findings that have already emerged from these data. It is our hope that this paper will serve as a useful reference point for all parties interested in making use of these data.

On the 27th of January 2020, the Republic of Ireland formed the National Public Health Emergency Team (NPHET; Government of Ireland, 2020) to oversee the pandemic response in the country. Ireland confirmed its first COVID-19 case on the 29th of February 2020 (Pollak, 2020), and by the 22nd of March 2020, coronavirus presence had been confirmed in all counties of Ireland (Cullen, 2020). Public event cancelations and business closures were announced ahead of the St. Patrick's Day celebrations on the 17th of March (McGowran, 2020; The Journal, 2020) and a national lockdown was implemented on the 27th of March (Raidió Teilifís Éireann, 2020). A series of regional and national lockdowns continued into 2021 as several viable vaccines became available for administration. Ultimately, Ireland would see >245,000 infections and >4000 deaths, with >141 m infections and >3m deaths globally by the conclusion of this study in April 2021 (Dong, Du, & Gardner, 2020; Johns Hopkins University, 2021).

At the outset of the pandemic, there were fears it would have a detrimental effect on the mental health and psychological well-being of the general population due to (i) individual concern over becoming seriously ill/dying, (ii) concerns for friends/family, (iii) perpetuation of concerns by media and social media coverage, (iv) economic damage with loss of income, and (v) community spread prevention measures including reduction in social contact and mandatory lockdowns (Hyland & Vallières, 2020). It was claimed that a "tsunami of mental health need" (O'Connor, Wrigley, Jennings, Hill, & Niazi, 2020) would follow, adding to the already historically high rates of mental illness in Ireland (OECD, 2018), and the authors called for an action plan to prepare the health service for this eventuality. It was understood that the pandemic would not have a universal effect on all individuals and identifying factors which influenced differing responses to the pandemic was vital. During the first global wave of infection, writer Damien Barr (2020) noted, "*We are not all in the same boat. We are all in the same storm. Some are on super-yachts. Some have just the one oar.*", summarising the differing social and personal circumstances affecting individuals during this shared crisis.

While the adverse physical effects of COVID-19 including serious illness and death were evident (World Health Organization, 2020), very little data was available at the outset of the COVID-19 pandemic (and thus at the launch of this project) to aid in predicting what the potential mental health effects in the population might be, and what factors might predict differing responses to the crisis. In planning the C19PRC study, we looked to the mental health effects of recent large-scale health crises such as the 2002-2003 severe acute respiratory syndrome (SARS) and the Middle Eastern respiratory syndrome (MERS) outbreaks. However, these literatures typically focused on health workers (Lee, Kang, Cho, Kim, & Park, 2018; Tam, Pang, Lam, & Chiu, 2004; Wu et al., 2009), patients/survivors (Mak, Chu, Pan, Yiu, & Chan, 2009; Park et al., 2020; Wu, Chan, & Ma, 2005), or population sub-groups (Lau et al., 2008; Lee et al., 2006). Furthermore, while studies had investigated psychological effects of quarantine (Hawryluck et al., 2004; Reynolds et al., 2007) these were typically short-term, and therefore not representative of the sustained lockdown and social distancing measures associated with the COVID-19 pandemic. We therefore included an extensive a set of measures in the first assessment of the population to obtain as broad an assessment as possible, and as time progressed and as our understanding of the effects of the pandemic on population health improved, the content of the survey was adapted and refined.

This report is intended as a methodological overview of the Irish branch of the C19RPC study, a cohort profile of participants, and a guide for the use of these data which are made freely available to interested researchers. The five waves of data collection, run over 12 months from March/April 2020 to March/April 2021, encapsulate the pandemic experience in Ireland from the first weeks of the initial lockdown to the early stage of the population vaccination programme.

2. Methods

2.1. Study design and sampling procedure

This study was designed to measure the mental health and wellbeing of the adult population (≥18 years) of the Republic of Ireland via a longitudinal design comprised of five waves of data collection, following the C19PRC study design (McBride, Butter, et al., 2021). Quota sampling methods were used to construct a nationally representative sample based on distributions of sex, age, and geographical location, as per the 2016 Irish census (Central Statistics Office, 2016). Inclusion/exclusion criteria were simple in that participants were required to be at least 18 years of age, a resident of the Republic of Ireland at the time of the survey, and able to complete the survey in English. Recruitment was managed by the survey company Qualtrics. Qualtrics partners with over 20 online sample providers to supply a network of diverse, quality respondents to their worldwide client base and, to date, has completed more than 15,000 projects across 2500 universities worldwide. Qualtrics deliver high-quality survey data from online survey panels and conduct multiple validation checks on the C19PRC survey data. First, the survey is piloted ('soft launch'; $n = 50$) prior to the fieldwork going live ('full launch') to rectify sequencing/coding errors and omissions prior to the full launch. The soft launch also calculates the median survey completion time, providing an opportunity to tailor the content to ensure the median survey time does not exceed the agreed timeframe; this is important to minimise respondent burden and maximise participation over time. Qualtrics also screens responses and removes any responses that are deemed to have been completed in too short of a time.

Participants were recruited from traditional, actively managed, double-opt-out research panels. Participants were contacted by Qualtrics via email, SMS, or in-app notification. To avoid selection bias, participants were not provided with specific details about the survey at the first contact. If a participant followed the link to the survey in their initial contact, they were then provided with full information about the nature of the study. Participants were informed about the purpose of the C19PRC Study, that their anonymised data would be shared with the scientific community, and of their right to terminate participation at any time. Participants were also informed that some topics might be sensitive or distressing. Information about how their data would be stored and analysed by the research team was also provided. Participants were informed that they would be re-contacted several times in the future to invite them to participate in subsequent survey waves. Participants provided informed electronic consent prior to completing each survey and were directed to contact the government websites upon completion if they had any concerns about COVID-19, and emotional support services if they had been negatively impacted by any of the questions asked during the survey. Participants were also informed that C19PRC data would be stored confidentially in line with GDPR. Ethical approval was obtained by multiple university ethics committees including the University of Sheffield, Ulster University, and the Social Research Ethics Committee at Maynooth University [Ref SRESC-2020-2402202] where the project in Ireland was being directed from.

Power analyses were conducted to determine the optimal sample size for identifying common mental health disorders including major depressive disorder (MDD), generalized anxiety disorder (GAD), and posttraumatic stress disorder (PTSD) in the general population. As the sample was nationally representative, calculations were based on existing prevalence estimates for these disorders in the Irish population. At approximately 5%, PTSD has a lower estimated prevalence than MDD or GAD (Hyland et al., 2020) and was used as the benchmark for power

analyses. A sample size of 1842 was necessary to detect a disorder with a 5% prevalence with a precision of 1% and 95% confidence, however Qualtrics was only able to guarantee 1000 participants. The target sample size was then set at 1000 which, holding all other parameters in the sample size calculation equal, resulted in a precision of 1.35%.

2.2. Sample

Recruitment across the five waves is illustrated in Fig. 1. Data collection from Wave 1 (W1; $N = 1041$) took place between March 31st and April 5th, 2020, during the first weeks of Ireland's national lockdown and was considered a nationally representative sample in terms of age, sex, and geographic distribution. Table 1 provides an overview of the national representativeness of the sample at W1 by comparing the sample statistics to the known parameters of the adult population from the 2016 Census (Central Statistics Office, 2016). These are shown as the percentage difference between the W1 sample and superordinate national population. Gender and geographic dispersion by province fell within 1% difference, and age fell within 1-2% difference across all age bands.

Data collection at Wave 2 (W2; $N = 1032$) took place between April 30th and May 19th, 2020, during the end of the initial lockdown and consisted of 506 participants from W1 (recontact rate = 48.6%) and 526 newly recruited participants. The new participants were recruited using the above quota sampling protocols to ensure W2 was also a nationally representative sample.

Data collection at Wave 3 (W3; $N = 534$) took place between July 16th and August 8th, 2020 and consisted entirely of recontacts from W1 (recontact rate = 51.3%). Due to limited financial resources at the time, we were unable to recruit new participants at Wave 3. As described in Section 2.4 below, Wave 3 data were weighted to produce nationally representative cross-sectional estimates.

Data collection at Wave 4 (W4; $N = 1098$) took place between December 2nd and December 22nd, 2020 and consisted of W1 recontacts ($N = 443$, recontact rate = 42.5%), W2 recontacts ($N = 63$, recontact rate = 6.1%), and 592 fresh participants recruited using quota sampling, resulting in a nationally representative sample.

Data collection at Wave 5 (W5; $N = 1110$) took place between March

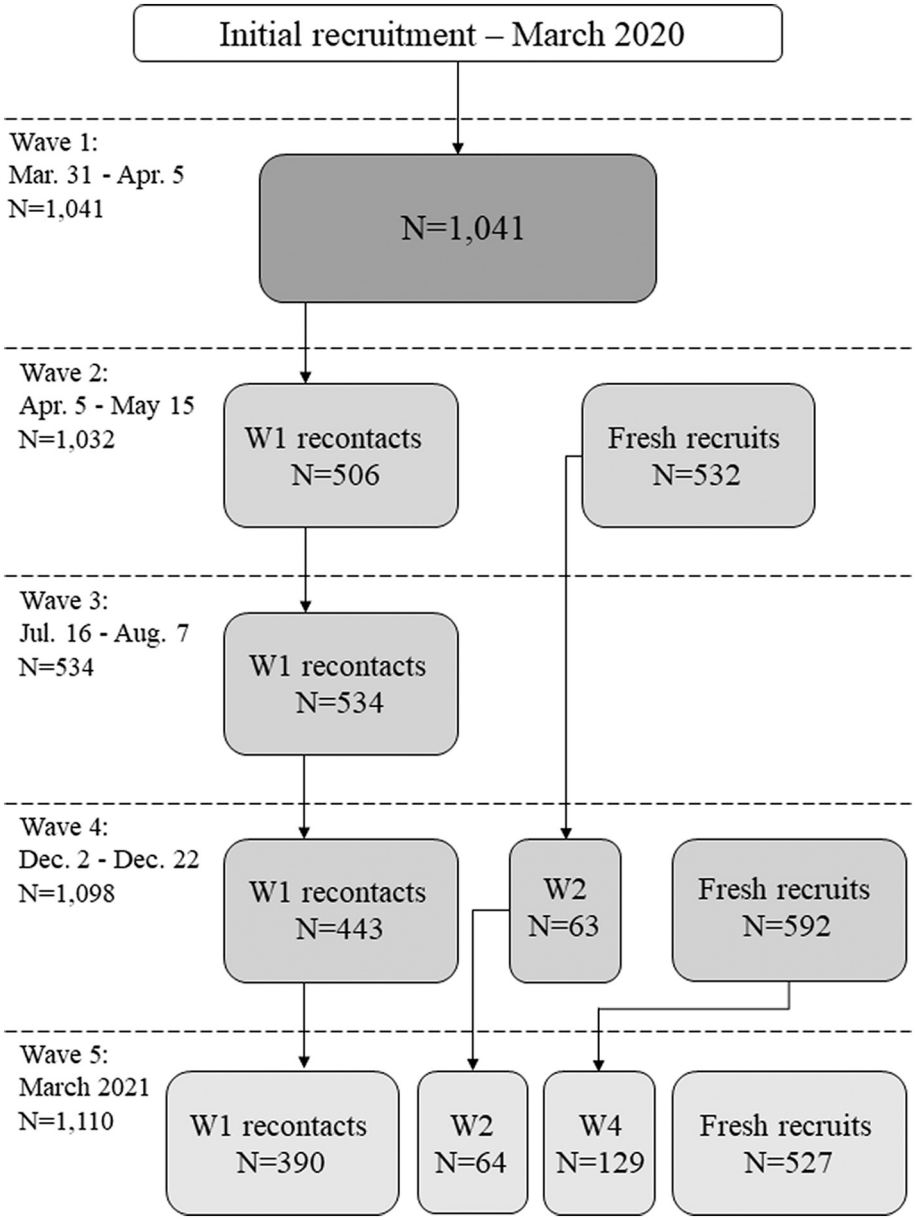

Fig. 1. Sample sizes by recruitment wave for Waves 1-5.

Table 1
Representativeness of wave 1 sample population compared against the Irish adult population by sampling quota demographics.

		Wave 1 sample	Irish adult population[a] (+/- % difference)
		N = 1041	*N* = 3,571,363[b]
Gender	Male	48.2%	48.9% (−0.7%)
	Female	51.5%	51.1% (+0.4%)
	Prefer not to say	<0.1%	–
	Other	<0.1%	–
Age	18-24	11.1%	11.0% (+0.1%)
	25-34	19.2%	18.5% (+0.7%)
	35-44	20.6%	21.0% (−0.4%)
	45-54	15.9%	17.5% (−1.6%)
	55+	33.2%	32.0% (+1.2%)
Province in Ireland	Leinster	55.3%	55.5% (−0.2%)
	Munster	27.3%	26.7% (+0.6%)
	Connaught	12.0%	12.0% (0.0%)
	Ulster (part of)	5.4%	5.8% (−0.4%)

[a] Per Census 2016.
[b] Irish population <18 = 1,190,502.

19th and April 9th, 2021 and consisted of W1 recontacts (N = 390, recontact rate = 37.4%), W2 recontacts, (N = 64, recontact rate = 6.2%), W4 recontacts (N = 129, recontact rate = 11.7%) and 527 fresh participants, also recruited by quota sampling to produce a nationally representative sample. The total unique population for all waves was N = 2686 and N = 271 (26.0%) individuals participated in all 5 waves of data collection. Those who responded at all waves were compared to those that did not on all sociodemographic variables and differed significantly on just two: they were more likely to be older (t (1039) = 2.61, p = .009, d = 0.19) and less likely to living alone (χ^2 (1) = 5.20, p = .023, ϕ = 0.07). Moreover, there were no significant differences between those who completed all waves and those that did not in terms of meeting diagnostic criteria for MDD (χ^2 (1) = 0.00, p = .969, ϕ = 0.00), GAD (χ^2 (1) = 0.29, p = .590, ϕ = 0.02), and PTSD (χ^2 (1) = 1.46, p = .227, ϕ = 0.04).

2.3. Measures

The socio-demographic and socio-political variables used were specific to the Republic of Ireland, and this study utilised a variety of measures to collect data on participants' homelife characteristics, financial concerns, health information, beliefs, and behaviours specific to COVID-19, and mental health (see Table 2). Several self-report measures were used to assess specific mental disorders during each wave.

MDD: Symptoms of MDD were measured using the nine-item *Patient Health Questionnaire-9* (PHQ-9) (Kroenke, Spitzer, & Williams, 2001). Participants indicate how often they have been bothered by these symptoms over the last two weeks on a four-point Likert scale that ranges from 0 (*Not at all*) to 3 (*Nearly every day*). Scores range from 0 to 27 with higher scores reflecting greater symptomatology and scores ≥10 are used to identify possible caseness. The psychometric properties of the PHQ-9 scores have been evidenced in previous population studies (Manea, Gilbody, & McMillan, 2012).

GAD: Symptoms of GAD were measured using the *Generalized Anxiety Disorder 7-item Scale* (GAD-7) (Spitzer, Kroenke, Williams, & Löwe, 2006). Participants indicate how often they have been bothered by these symptoms over the last two weeks on a four-point Likert scale that ranges from 0 (*Not at all*) to 3 (*Nearly every day*). Scores range from 0 to 21 with higher scores reflecting greater symptomatology and scores ≥10 are used to identify possible caseness. The GAD-7 scale scores have been shown to produce reliable and valid scores in community studies (Hinz et al., 2017).

PTSD: The International Trauma Questionnaire (ITQ: Cloitre et al., 2018) measures PTSD in accordance with the ICD-11 diagnostic

Table 2
All variables queried in all waves of the Irish C19PRC study.

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
Sociodemographic					
Province in Ireland	X	X	X	X	X
Age	X	X	X	X	X
Gender	X	X	X	X	X
Employment status	X	X	X	X	X
Nationality	X	X		X	X
Grew up in Ireland	X	X			
Area of residence	X	X		X	X
Ethnicity	X	X		X	X
Education level	X	X		X	X
Religion	X	X		X	X
Working face-to-face with public	X				X
Healthcare worker	X				
Key/essential worker status			X	X	
Relationship status		X	X	X	X
Homelife characteristics					
Childcare during pandemic	X	X	X		
Housework during pandemic		X			
Caring for others during pandemic		X			
Felt unsafe at home during pandemic		X			
Intimate partner violence			X	X	
IPV during pandemic		X	X		
Sought help for IPV during pandemic			X		
Neighbourhood belongingness	X				
Neighbourhood comfort	X	X			
Number adults living in the home	X	X	X		
Number children living in the home	X	X	X		
Living alone	X	X	X	X	X
Have children			X	X	X
Ages of children in the home			X		
Housing tenure	X	X			
Type of property			X		
Number of bedrooms		X	X		
Length of time at property			X		
Access to open/green space		X			
Privacy in residence		X			
Broadband availability		X			
Degree current home makes it difficult/easy to be confined		X			
Financial Information					
2019 Income level	X	X		X	X
Change in monthly household income during pandemic		X	X	X	
Use of saving/increasing debt during pandemic			X	X	
Lost income due to pandemic	X				
Made saving due to pandemic	X		X	X	
Worried about finances due to pandemic	X	X		X	
Perceived future financial security			X	X	
Increased buying of specific items during pandemic	X				
Number hours worked weekly pre/post lockdown (self)			X	X	
Health information					
Diagnosed with major illness before COVID-19 outbreak	X				
Major underlying health conditions - self	X	X		X	X
Major underlying health conditions - immediate family mbr.	X	X		X	
	X	X	X	X	X

(continued on next page)

Table 2 (*continued*)

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
Currently pregnant - self/ partner					
Number of weeks pregnant (if applicable)	X				
Currently pregnant - immediate family member	X				
Any chronic health problem				X	
Chronic health problem limits you				X	
Caring for others				X	
Time spent caring				X	
COVID-19					
Source of information (newspapers, TV, social media, etc.)	X	X			
Level of trust in information sources	X	X			
Knowledge of common COVID-19 symptoms	X				
Knowledge of mode of transmission of COVID-19	X				
Common beliefs about COVID-19 risk reducing methods	X				
Behaviours to reduce risk of contracting COVID-19	X		X		
Perceived risk of serious illness/death from COVID-19: vulnerable groups	X				
Engaging in behaviour to reduce risk of contracting COVID-19 (e.g. wearing face mask)	X				
Anxiety level relating to COVID-19	X	X		X	X
Perceived individual risk of contracting COVID-19 over 1, 3, 6 months	X	X	X	X	X
Experiences of being infected with COVID-19 (self and family member or friend)	X	X	X	X	X
Knowing someone close (family member/friend) who has tested positive for COVID-19			X	X	X
Knowing someone close (family member/friend) who has died due to COVID-19		X	X	X	
Competency, opportunity, and motivation to engage in social distancing	X				
Competency, opportunity, and motivation to maintain hygiene practices	X				
Knowledge of what to do if sick with COVID-19 symptoms	X				
Comfort in attending various places during COVID-19 Pandemic		X	X		
COVID-19 vaccine: have you been vaccinated					X
COVID-19 vaccine acceptability: self	X	X	X	X	X
COVID-19 vaccine acceptability: child	X	X	X	X	X
COVID-19 vaccine acceptability: elderly relative	X				
Reasons for accepting COVID-19 vaccine: self		X			
		X			

Table 2 (*continued*)

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
Reasons for refusing COVID-19 vaccine: self					
Information required to accept COVID-19 vaccine		X			
Willingness to participate in COVID-19 vaccine trial		X			
General attitudes/beliefs towards vaccines		X		X	
Conspiracy theories about COVID-19		X			
Preference for pace of easing lockdown restrictions			X		
Predicted course of the pandemic			X		
Concern about second wave			X		
Support/opposition for restrictions in case of second wave			X		
Support/opposition for air bridges and quarantine			X		
Perceptions of others' engagement in social distancing and health and safety guidance			X		
Going on holiday/travel abroad			X		
Mental health					
Depression (PHQ-9)	X	X	X	X	X
Anxiety (GAD-7)	X	X	X	X	X
Traumatic stress (ITQ)	X	X	X	X	X
Lifetime traumatic stress					X
Complex PTSD					X
Somatic symptoms (PHQ-15)	X	X	X	X	X
Paranoia (Persecution and Deservedness Scale)	X			X	
Treatment for mental health difficulties	X	X		X	X
Access to MH treatment/ satisfaction with treatment during pandemic		X			
Attitudes to MH services		X			
Self-harm, suicidal thoughts and attempts		X	X	X	X
Sleep/Insomnia		X	X	X	X
Social anxiety			X		
Alcohol use			X		X
Obsessive compulsive disorder					X
Psychosis					X
Borderline personality disorder					X
Avoidant personality disorder					X
Schizoid personality disorder					X
Histrionic personality disorder					X
Psychological factors					
Loneliness	X	X	X	X	X
Existential loneliness				X	
Personality	X	X			
Empathy (Identification with humanity)	X	X		X	
Religiosity	X	X		X	
Conspiracy mentality	X			X	
Locus of control	X	X			
Self-esteem	X	X			
Resilience	X	X			
Death anxiety	X	X			
Intolerance of uncertainty	X	X			
Catastrophizing	X				
Analytic reasoning	X				
Happiness			X	X	X
Life satisfaction - Current			X	X	X
			X	X	

(*continued on next page*)

Table 2 (*continued*)

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
Areas of life that are better or worse now					
Social support			X	X	X
Social Contact			X	X	
Optimism				X	
Social jetlag				X	X
Socio-political views/related behaviours					
Voting behaviour at last General Election	X	X			
Political party voted for in General Election	X	X	X		X
Satisfaction with how PREVIOUS government/ institutions handling pandemic			X		
Confidence in how CURRENT government will handle pandemic moving forward			X		
Satisfaction with government handling different domains			X		
'Left wing' or 'right-wing' on social and economic issues	X				
Patriotism/nationalism	X				
Authoritarianism	X				
Social dominance	X				
Attitudes towards migrants	X				
Trust in state institutions	X	X	X	X	X
Future voting behaviour			X		
Trust in other people (general)	X	X			
Facial detection of trust	X				
Conspiracy beliefs about COVID-19 vaccine					X
Conspiracy beliefs about healthcare professionals/ scientists					X

guidelines. The ITQ includes six items measuring symptoms across the three clusters of re-experiencing in the here and now, avoidance of traumatic reminders, and sense of current threat. Participants were instructed to indicate how bothered they have been over the last month in relation to their experiences of the COVID-19 pandemic. Three items measure functional impairment associated with these symptoms, and all items are answered using a five-point Likert scale ranging from 'Not at all' (0) to 'Extremely' (4). Total symptom scores range from 0 to 24 with higher scores indicating higher levels of PTSD. A symptom was deemed to be present based on a score of ≥2 ('Moderately') on the Likert scale (Cloitre et al., 2018), and diagnosis requires one symptom to be present from each cluster plus endorsement of at least one indicator of impairment. The ITQ has been shown to produce reliable and valid scale scores in multiple samples (Cloitre et al., 2018; Vallières et al., 2018).

Somatic problems: Somatic symptoms were measured using the Patient Health Questionnaire (PHQ-15: Kroenke, Spitzer, & Williams, 2002). The PHQ-15 is a 15-item self- measure that asks participants, "Over the last 2 weeks, how often have you been bothered by any of the following problems?" and lists commonly reported physical complaints. The response options are "Not bothered at all" (0), "Bothered a little" (1), and "Bothered a lot" (2). The 'menstrual problems' item was excluded due to its gender-specific nature that would preclude analysis of the entire sample. Scores therefore range from 0 to 14.

Loneliness: The three-Item Loneliness Scale; (Hughes, Waite, Hawkley, & Cacioppo, 2004) was designed for use in large-scale population surveys and asks respondents to indicate how often they feel that they lack companionship, feel left out, and feel isolated from others. Responses are scored on a three-point scale including 'hardly ever' (1), 'sometimes' (2), and 'often' (3), and higher scores reflect higher levels of loneliness.

Wave 5 incorporated additional mental health measures designed to screen for a variety of psychopathologies not previously investigated in W1-4, specifically: several personality disorders (borderline, histrionic, schizoid, and avoidant; adapted from the Structured Clinical Interview for DSM-5© Personality Disorders (SCID-5-PD; First, Williams, Benjamin, & Spitzer, 2015), psychosis (Psychosis Screening Questionnaire (PSQ; Bebbington & Nayani, 1995), obsessive-compulsive disorder (Obsessive Compulsive Inventory – Revised (OCI-R; Foa et al., 2002), lifetime traumatic exposure (International Trauma Exposure Measure; Hyland et al., 2021), and Complex PTSD (ITQ; Cloitre et al., 2018). These were included to capture prevalence rate of psychopathology in the widest sense possible within a representative Irish adult sample, and to be able to describe the experiences of potentially vulnerable subgroups during the pandemic.

2.4. Data use specifics

W1, W2, W4, and W5 do not require weighting if used for cross-sectional research. A weight variable was constructed for use with W3 using an inverse probability weight process. Sex, age, and province were used to predict responder status at W3 (0 = non-responder, 1 = responder) using a binary logistic regression analysis. These variables were used as predictors of responder status as they are the three quota sampling variables used to construct the nationally representative sample of W1. Predicted probabilities of being a W3 responder were saved, and the weight variable was produced by calculating the inverse of this value (i.e., 1 divided by the predicted probability value of being a W3 responder).

3. Results

Table 3 describes the sample representativeness of socio-demographic variables at W1 when compared against the total Irish population as of the 2016 Census. The total population was used due to Census 2016 designation of 'adult' being 15 years or older, differing from the ≥18 years designation used in our study. Many items were phrased differently, or included additional/fewer responses, than used in Census 2016 and these have been noted (Table 3). Divergence exceeding +/- 5% between the two groups was seen in ethnicity (-6.2% Irish, +7.9% 'white other'), religion (+5.7% atheist, +7.4 agnostic, -14.2% Christian), and highest qualification (-14.7% junior cert, +7.1% leaving cert, +7.4% undergraduate degree, +9.4% diploma, +11.5% postgraduate degree, +5% technical qualification). Employment was categorised in Census 2016 as employed, unemployed, retired, and student, resulting in a larger divergence (+16.9% all employment).

Table 4 shows frequency percentages and mean scores across the five waves for a selection of socio-demographic, health, COVID-19, mental health, and socio-political variables. Location, age, and gender were controlled by sampling procedures and most variables did not fluctuate to a significant degree across the waves of data collection. This multi-wave sample was predominantly born and raised in Ireland with a majority identifying as 'Irish' or 'Other White', and a majority living in rural areas or towns compared to cities and suburbs.

Unemployment (both due to COVID-19 and not) was higher in the first several months of the pandemic but stabilised at rates close to Census 2016 totals, with rates of self-employment rising. All waves showed higher percentages of secondary qualifications, potentially due to demographics shifting in the years since the census or pre-disposition of higher educated individuals to volunteer for survey availability through Qualtrics. Religious/non-believer diversity was evident in all waves, and W5 introduced categorisation for Christianity (Catholic and Protestant) and Islam (Sunni and Shia), as well as the inclusion of Hinduism. Nearly half of respondents in W1-W3 lived in homes with two adults, a majority did not live with children, and a small percentage lived alone. Most of the sample earned <€40,000 in 2019, with changes to income/debt not as severe as predicted early in the first lockdown.

Table 3
A socio-demographic comparison of wave 1 sample population with the Irish population.

		Wave 1 sample	Irish population (+/- % difference)
		N = 1041	N = 4,761,865
Ethnicity	Irish	74.8%	81.0% (−6.2%)
	Irish Traveller	0.3%	0.6% (−0.3%)
	White other	17.3%	9.4% (+7.9%)
	African	2.1%	1.2% (+0.9%)
	Black other	0.3%	0.1% (+0.2%)
	Chinese	0.4%	0.4% (0.0%)
	Asian other	3.3%	1.7% (+1.6%)
	Other (incl. mixed)	1.5%	1.5% (0.0%)
	Not stated	–	2.6%
	Missing	–	1.5%
Religion	Atheist	15.3%	9.6% (+5.7%)
	Agnostic	7.5%	0.1% (+7.4%)
	Christian	69.8%	84.0% (−14.2%)
	Muslim	1.6%	1.3% (+0.3%)
	Jewish	0.2%	- (+0.2%)
	Buddhist	0.6%	0.2% (+0.4%)
	Sikh	0.1%	- (+0.1%)
	Other	4.9%	0.8% (+4.1%)
	Not stated	–	2.5% (−2.5%)
	Missing	–	1.5% (−1.5%)
Highest Qualification	No qualifications	1.2%	1.4% (−0.2%)
	Junior/Inter cert	6.2%	20.9% (−14.7%)
	Leaving cert	22.4%	15.3% (+7.1%)
	Undergraduate degree	22.5%	15.1% (+7.4%)
	Diploma	13.5%	4.1% (+9.4%)
	Postgraduate degree	19.8%	8.3% (+11.5%)
	Other qualifications	2.2%	4.9% (−2.7%)
	Technical qualification	12.2%	7.2% (+5.0%)
	Not stated	–	5.3% (−5.3%)
	Missing	–	17.5% (−17.5%)
Employment	Employed full time	41.0%	42.1%[1]
	Self-employed (FT)	2.3%	–
	Employed part time	12.3%	–
	Self-employed (PT)	3.4%	–
	Recently unemployed	5.7%	–
	Unemployed (non-COVID)	8.5%	12.9%
	Retired	15.0%	11.4%
	Student	6.3%	9.0%
	Cannot work	5.6%	–

Most respondents did not have a serious underlying health condition but were slightly more likely to have a family member with health issues, and a small percentage of respondents and/or their partners were pregnant. The mean perceived risk of becoming infected with COVID-19 in the next month declined over the study period, with a 'spike' during W4, which took place during December 2020. Notably this coincided with a time of reopening of all non-essential business and freedom of movement nationally and internationally. Due to the high numbers of asymptomatic carriers of COVID-19, varying degrees of track-and-trace programs, and early inconsistencies in testing procedure, it was difficult to determine COVID-19 experience prevalence in this study population, however, a majority here did not experience symptoms or test positive for COVID-19. Most respondents had no experience of losing someone close to them due to COVID-19 or suspected COVID-19. Personal vaccine acceptability fluctuated from higher numbers at W1, to lower numbers during vaccine research and clinical trials, and back to approximately two-thirds expressing acceptability once vaccine efficacy was apparent by W5. Vaccine acceptability for children declined over the waves, however this may reflect that the available vaccines had not yet been clinically trialled in children nor recommended for those under the age

Table 4
Demographic comparisons of waves 1 - 5.

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
	N = 1041	N = 1032	N = 534	N = 1098	N = 1110
Province in Ireland					
Leinster	576 (55.3%)	570 (55.2%)	285 (53.4%)	609 (55.4%)	618 (55.7%)
Munster	284 (27.3%)	284 (27.5%)	145 (27.2%)	302 (27.5%)	299 (26.9%)
Connaught	125 (12.0%)	125 (12.1%)	73 (13.7%)	133 (12.1%)	135 (12.2%)
Ulster	56 (5.4%)	53 (5.1%)	31 (5.8%)	56 (5.1%)	58 (5.2%)
Age					
18-24	116 (11.1%)	116 (11.2%)	22 (4.1%)	121 (11.0%)	124 (11.2%)
25-34	200 (19.2%)	200 (19.4%)	81 (15.2%)	209 (19.0%)	214 (19.3%)
35-44	214 (20.6%)	214 (20.7%)	110 (20.6%)	231 (21.0%)	236 (21.3%)
45-54	165 (15.9%)	165 (16.0%)	93 (17.4%)	176 (16.0%)	180 (16.2%)
55+	346 (33.2%)	337 (32.7%)	228 (42.7%)	363 (33.0%)	356 (32.1%)
Gender					
Male	502 (48.2%)	493 (47.8%)	243 (45.5%)	533 (48.5%)	533 (48.0%)
Female	536 (51.5%)	536 (51.9%)	291 (54.5%)	561 (51.0%)	574 (51.7%)
Prefer not to say	1 (0.1%)	1 (0.1%)	–	2 (0.2%)	1 (0.1%)
Other	2 (0.2%)	–	–	–	1 (0.1%)
Transgender	–	2 (0.2%)	–	4 (0.4%)	1 (0.1%)
Employment status					
Employed (FT)	427 (41.0%)	443 (42.9%)	220 (41.2%)	415 (37.7%)	439 (39.5%)
Self-employed (FT)	24 (2.3%)	–	20 (3.7%)	30 (2.7%)	66 (5.9%)
Employed (PT)	128 (12.3%)	139 (13.5%)	65 (12.2%)	120 (10.9%)	108 (9.7%)
Self-employed (PT)	35 (3.4%)	–	112 (21.0%)	182 (16.5%)	56 (5.0%)
Unemployed (due to COVID-19)	59 (5.7%)	96 (9.3%)	10 (1.9%)	12 (1.1%)	42 (3.8%)
Unemployed	88 (8.5%)	135 (13.1%)	61 (11.4%)	126 (11.5%)	122 (11.0%)
Retired	156 (15.0%)	171 (16.6%)	11 (2.1%)	76 (6.9%)	172 (15.5%)
Student	66 (6.3%)	–	12 (2.2%)	61 (5.5%)	58 (5.2%)
Not able to work	58 (5.6%)	–	–	–	–
Zero hours contract	–	15 (1.5%)	13 (2.4%)	60 (5.5%)	11 (1.0%)
Other flexible work practice	–	33 (3.2%)	5 (0.9%)	6 (0.5%)	12 (1.1%)
On COVID-19 wage scheme	–	–	5 (0.9%)	12 (1.1%)	24 (2.2%)
Born in Ireland					
Yes	736 (70.7%)	739 (71.6%)	394 (73.8%)[a]	780 (70.9%)	847 (76.3%)
No	305 (29.3%)	293 (28.4%)	140 (26.2%)[a]	320 (29.1%)	263 (23.7%)
Grew up in Ireland					
Yes	824 (79.2%)	816 (79.1%)	430 (80.5%)[a]	–	–
No	217 (20.8%)	216 (20.9%)	104 (19.5%)[a]	–	–
Area of residence					
City	255 (24.5%)	209 (20.3%)	118 (22.1%)[a]	314 (28.5%)	276 (24.9%)
Suburb	188 (18.1%)	221 (21.4%)	100 (18.7%)[a]	213 (19.4%)	236 (21.3%)

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Table 4 (*continued*)

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
	N = 1041	N = 1032	N = 534	N = 1098	N = 1110
Town	298 (28.6%)	294 (28.5%)	151 (28.3%)[a]	282 (25.6%)	311 (28.0%)
Rural	300 (28.8%)	308 (29.8%)	165 (30.9%)[a]	291 (26.5%)	287 (25.9%)
Ethnicity					
Irish	779 (74.8%)	774 (75.0%)	417 (78.1%)[a]	832 (75.6%)	902 (81.3%)
Irish traveller	3 (0.3%)	6 (0.6%)	1 (0.2%)[a]	–	–
Other white	180 (17.3%)	108 (10.5%)	84 (15.7%)[a]	–	–
African	22 (2.1%)	11 (1.1%)	7 (1.3%)[a]	–	–
Other black	3 (0.3%)	2 (0.2%)	–	–	–
Chinese	4 (0.4%)	2 (0.2%)	1 (0.2%)[a]	–	–
Other Asian	34 (3.3%)	22 (2.1%)	15 (2.8%)[a]	–	–
Other (including mixed background)	16 (1.5%)	107 (10.4%)	9 (1.7%)[a]	–	–
Non-Irish ethnicity	–	–	–	268 (24.4%)	208 (18.7%)
Education level					
No qualifications	12 (1.2%)	15 (1.5%)	6 (1.1%)[a]	10 (0.9%)	9 (0.8%)
Junior/inter cert	65 (6.2%)	63 (6.1%)	34 (6.4%)[a]	60 (5.5%)	58 (2.5%)
Leaving cert	233 (22.4%)	221 (21.4%)	124 (23.2%)[a]	241 (21.9%)	249 (22.4%)
Undergraduate degree	234 (22.5%)	229 (22.2%)	120 (22.5%)[a]	305 (27.7%)	300 (27.0%)
Diploma	141 (13.5%)	157 (15.2%)	70 (13.1%)[a]	163 (14.8%)	159 (14.3%)
Postgraduate degree	206 (19.8%)	204 (19.8%)	105 (19.7%)[a]	189 (17.2%)	213 (19.2%)
Other qualifications	23 (2.2%)	21 (2.0%)	9 (1.7%)[a]	10 (0.9%)	10 (0.9%)
Technical qualification	127 (12.2%)	122 (11.8%)	66 (12.4%)[a]	122 (11.1%)	112 (10.1%)
Religion					
Atheist	159 (15.3%)	150 (14.5%)	78 (14.6%)[a]	169 (15.4%)	135 (12.2%)
Agnostic	78 (7.5%)	66 (6.4%)	31 (5.8%)[a]	69 (6.3%)	64 (5.8%)
Christian	727 (69.8%)	748 (72.5%)	389 (72.8%)[a]	731 (66.5%)	–
Catholic	–	–	–	–	715 (64.4%)
Protestant	–	–	–	–	63 (5.7%)
Muslim	17 (1.6%)	17 (1.6%)	6 (1.1%)[a]	27 (2.5%)	–
Sunni	–	–	–	–	13 (1.2%)
Shia	–	–	–	–	4 (0.4%)
Jewish	2 (0.2%)	1 (0.1%)	1 (0.2%)[a]	7 (0.6%)	4 (0.4%)
Buddhist	6 (0.6%)	6 (0.6%)	3 (0.6%)[a]	5 (0.5%)	6 (0.5%)
Sikh	1 (0.1%)	1 (0.1%)	–	2 (0.2%)	2 (0.2%)
Hindu	–	–	–	–	13 (1.2%)
Other	51 (4.9%)	43 (4.2%)	26 (4.9%)[a]	90 (8.2%)	91 (8.2%)
Adults living in home					
1	192 (18.4%)	126 (12.2%)	28 (5.2%)	–	–
2	508 (48.8%)	516 (50.0%)	280 (52.4%)	–	–
3	197 (18.9%)	179 (17.3%)	87 (16.3%)	–	–
4	109 (10.5%)	105 (10.2%)	46 (8.6%)	–	–
5	28 (2.7%)	38 (3.7%)	19 (3.6%)	–	–
6	6 (0.6%)	8 (0.8%)	2 (0.4%)	–	–
7	–	1 (0.1%)	–	–	–
8	1 (0.1%)	–	–	–	–
10 or more	–	2 (0.2%)	–	–	–
Missing	–	57 (5.5%)	72 (13.5%)	–	–
Children living in home					
0	628 (60.3%)	578 (56.0%)	276 (51.7%)	–	–
1	194 (18.6%)	186 (18.0%)	86 (16.1%)	–	–
2	16 (15.9%)	157 (15.2%)	78 (14.6%)	–	–
3	39 (3.7%)	41 (4.0%)	18 (3.4%)	–	–
4	12 (1.2%)	8 (0.8%)	4 (0.7%)	–	–
5	2 (0.2%)	3 (0.3%)	–	–	–
10 or more	1 (0.1%)	1 (0.1%)	–	–	–
Missing	–	58 (5.6%)	72 (13.5%)	–	–
Living alone					
No	892 (85.7%)	899 (87.1%)	462 (86.5%)	928 (84.4%)	947 (85.3%)
Yes	149 (14.3%)	132 (12.8%)	72 (13.5%)	72 (15.6%)	163 (14.7%)
Missing	–	1 (0.1%)	–	–	–
2019 income level					
€0–19,999	256 (24.6%)	227 (22.0%)	113 (21.2%)[a]	372 (33.8%)	337 (30.4%)
€20,000–29,999	222 (21.3%)	208 (20.2%)	117 (21.9%)[a]	213 (19.4%)	240 (21.6%)
€30,000–39,999	203 (19.5%)	205 (19.9%)	108 (20.2%)[a]	216 (19.6%)	207 (18.6%)
€40,000–49,999	132 (12.7%)	134 (13.0%)	64 (12.0%)[a]	133 (12.1%)	150 (13.5%)
€50,000 or more	–	–	–	166 (15.1%)	176 (15.9%)
€50,000–59,999	67 (6.4%)	90 (8.7%)	4 (7.5%)[a]	–	–
€60,000–69,999	62 (6.0%)	68 (6.6%)	34 (6.4%)[a]	–	–
€70,000–79,999	44 (4.2%)	45 (4.4%)	27 (5.1%)[a]	–	–
€80,000–89,999	18 (1.7%)	18 (1.7%)	9 (1.7%)[a]	–	–
€90,000–99,999	15 (1.4%)	12 (1.2%)	11 (2.1%)[a]	–	–
€100,000 or more	22 (2.1%)	25 (2.4%)	11 (2.1%)[a]	–	–
Income/debt change due to pandemic					
Income decrease (-1% – -100%)	–	491 (47.6%)	205 (38.4%)	–	–
No change in income (0)	–	282 (27.3%)	91 (17.0%)	–	–
Income increase (+1% – +100%)	–	259 (25.1%)	238 (44.6%)	–	–

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Table 4 (*continued*)

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
	N = 1041	N = 1032	N = 534	N = 1098	N = 1110
Debt increased	–	–	–	215 (19.5%)	–
No change in debt	–	–	–	536 (48.7%)	–
Debt decreased	–	–	–	110 (10.0%)	–
No debt	–	–	–	239 (21.7%)	–
Underlying health condition (self)					
No	876 (84.1%)	783 (75.9%)	449 (84.1%)[a]	785 (71.4%)	828 (74.6%)
Yes	165 (15.9%)	249 (24.1%)	85 (15.9%)[a]	315 (28.6%)	282 (25.4%)
Underlying health condition (family)					
No	741 (71.2%)	681 (66.0%)	380 (71.2%)[a]	668 (60.7%)	–
Yes	300 (28.8%)	351 (34.0%)	154 (28.8%)[a]	432 (39.3%)	–
Currently pregnant (self)					
No	999 (96.0%)	1004 (97.3%)	432 (80.9%)	1046 (95.1%)	1060 (95.5%)
Yes	42 (4.0%)	17 (1.6%)	6 (1.1%)	29 (2.6%)	32 (2.9%)
Yes (partner)	–	11 (1.1%)	5 (0.9%)	25 (2.3%)	18 (1.6%)
Missing	–	–	91 (17.0%)	–	–
Perceived risk of catching COVID-19 (1 month, percentage risk)	M = 44.63 (SD = 26.07)	M = 37.62 (SD = 24.41)	M = 36.52 (SD = 24.05)	M = 38.83 (SD = 23.55)	M = 35.75 (SD = 23.77)
Perceived risk of catching COVID-19 (3 months, percentage risk)	M = 43.57 (SD = 24.59)	M = 36.53 (SD = 23.71)	–	–	–
Perceived risk of catching COVID-19 (6 months, percentage risk)	M = 39.98 (SD = 27.22)	M = 34.65 (SD = 26.07)	–	–	–
Infected with COVID-19 (self)					
Tested negative	45 (4.3%)	40 (3.9%)	–	–	–
No symptoms	856 (82.2%)	820 (79.5%)	491 (91.9%)	1013 (92.1%)	1005 (90.5%)
Symptoms but COVID not suspected	96 (9.2%)	63 (6.1%)	–	–	–
Symptoms and COVID suspected	16 (1.5%)	11 (1.1%)	–	–	–
Tested positive	4 (0.4%)	–	11 (2.1%)	28 (2.5%)	45 (4.1%)
Previous symptoms but no test	20 (1.9%)	38 (3.7%)	32 (6.0%)	59 (5.4%)	60 (5.4%)
Previously infected (test confirmed)	4 (0.4%)	1 (0.1%)	–	–	–
Missing	–	59 (5.7%)	–	–	–
Someone close died of COVID-19					
No	–	969 (93.9%)	506 (94.8%)	1010 (91.8%)	–
Yes	–	43 (4.2%)	22 (4.1%)	70 (6.4%)	–
Unsure	–	20 (1.9%)	6 (1.1%)	20 (1.8%)	–

Table 4 (*continued*)

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
	N = 1041	N = 1032	N = 534	N = 1098	N = 1110
COVID-19 vaccine acceptability: self					
Yes	665 (63.9%)	671 (65.0%)	299 (56.0%)	614 (55.8%)	710 (64.0%)
Maybe	262 (25.2%)	240 (23.3%)	143 (26.8%)	292 (26.5%)	183 (16.5%)
No	97 (9.3%)	121 (11.7%)	92 (17.2%)	194 (17.6%)	82 (7.4%)
Missing	17 (1.6%)	–	–	–	135 (12.2%)
COVID-19 vaccine acceptability: child					
Yes	527 (50.6%)	340 (32.9%)	164 (30.7%)	199 (18.1%)	242 (21.8%)
Maybe	216 (20.7%)	174 (16.9%)	112 (21.0%)	133 (12.1%)	145 (13.1%)
No	84 (8.1%)	96 (9.3%)	63 (11.8%)	143 (13.0%)	86 (7.7%)
Not applicable	214 (20.6%)	–	195 (36.5%)	–	628 (56.6%)
Missing	–	422 (40.9%)	–	625 (56.8%)	9 (0.8%)
Depression (PHQ-9)					
Absent	804 (77.2%)	765 (74.1%)	407 (76.2%)	779 (70.8%)	855 (77.0%)
Present	237 (22.8%)	267 (25.9%)	127 (23.8%)	321 (29.2%)	255 (23.0%)
Anxiety (GAD-7)					
Absent	833 (80.0%)	836 (81.0%)	440 (82.4%)	853 (77.5%)	910 (82.0%)
Present	208 (20.0%)	196 (19.0%)	94 (17.6%)	247 (22.5%)	200 (18.0%)
Traumatic stress (ITQ)					
Absent	857 (82.3%)	806 (78.1%)	466 (87.3%)	914 (83.1%)	862 (77.7%)
Present	184 (17.7%)	226 (21.9%)	68 (12.7%)	186 (16.9%)	248 (22.3%)
Treatment for mental health issues					
Never received treatment	697 (67.0%)	729 (70.6%)	–	757 (68.8%)	803 (72.3%)
Received treatment in the past	201 (19.3%)	231 (22.4%)	–	214 (19.5%)	194 (17.5%)
Currently receiving treatment	98 (9.4%)	72 (7.0%)	–	128 (11.6%)	112 (10.1%)
Prefer not to answer	45 (4.3%)	–	–	–	–
Missing	–	–	–	1 (0.1%)	1 (0.1%)
Loneliness					
Absent	619 (59.5%)	581 (56.3%)	340 (63.7%)	557 (50.6%)	670 (60.4%)
Present	422 (40.5%)	451 (43.7%)	194 (36.3%)	543 (49.4%)	440 (39.6%)
Political party vote (Gen. Election)					
Fine Gael or Fianna Fáil	283 (27.2%)	294 (28.5%)	195 (36.5%)	–	373 (33.6%)
Sinn Fein or Aontú	233 (22.4%)	212 (20.6%)	112 (21.0%)	–	288 (26.0%)
Left wing parties	135 (13.0%)	137 (13.2%)	76 (14.2%)	–	206 (18.5%)
Independent	78 (7.5%)	72 (7.0%)	46 (8.6%)	–	106 (9.5%)
Eligible but did not vote	236 (22.7%)	105 (10.2%)	55 (10.3%)	–	–
Ineligible to vote	–	–		–	–

(*continued on next page*)

Table 4 (*continued*)

	Wave 1 Apr 2020	Wave 2 May 2020	Wave 3 Jul 2020	Wave 4 Dec 2020	Wave 5 Mar 2021
	N = 1041	N = 1032	N = 534	N = 1098	N = 1110
			50 (9.4%)		
Other	–	–	–	–	137 (12.3%)
Missing	76 (7.3%)	212 (20.5%)	–	–	–
Trust in state institution (0-40)	M = 21.22 (SD = 5.48)	M = 23.81 (SD = 6.04)	M = 23.67 (SD = 6.26)	M = 24.36 (SD = 6.28)	M = 23.29 (SD = 6.11)

[a] Demographic percentages taken from Wave 1.

of 16.

Threshold scores for the possible presence of MDD, GAD, COVID-19 related PTSD, and loneliness were established using scoring guidelines for each measure. Over two-thirds of the sample in each wave experienced no MDD and over three-quarters experienced no GAD or COVID-19 related PTSD. MDD rates were highest during the initial lockdown (W2) and in the weeks preceding Christmas 2020 (W4), with GAD consistent, and peaking at W4. PTSD rates fluctuated and peaked at W5. While a majority had never experienced mental health treatment, the rates of those currently in treatment did remain relatively consistent across the year. Loneliness was described at a higher rate than formal psychopathology, peaking during the first lockdown (W2) and again before Christmas (W4), with nearly half the sample at/exceeding threshold scores.

Socio-politically, party vote at the previous General Election and party voting intent ("If a General Election was held now, how would you vote?") shifted slightly over the year, with fewer declaring they would not vote and an increase in support for all parties. Trust in the state increased slightly during the first lockdown and remained static over the year.

4. Discussion

While the wave samples differed from national statistics on some socio-demographic variables (ethnicity, religion, highest qualification attained, and employment), representativeness in age, gender, and location was maintained throughout. Results described here were population frequencies and mean scores where indicated, as an introduction to the data collected and a demographic profile of the wave populations. W4, which ran in the three weeks prior to Christmas 2020, does appear to have surface-level peaks in adverse outcomes when compared against W3 and W5: higher perceived risk of becoming infected with COVID-19 in the next month and higher prevalence of depression, anxiety, and loneliness. Restrictions had eased on 1st December with the announcement that another Level 5 lockdown would follow, implemented on 27th December (Brennan, 2021). It is not possible to determine the direct effect of a pandemic Christmas/holiday season, but there does seem to be an association between W4 and symptomology.

4.1. Research results

Studies utilising Irish C19PRC study data have begun to illuminate underlying mechanisms of mental health and reactivity to life during the pandemic. Analysis of W1 data found that meeting 'caseness' criteria for depression, GAD, and depression or GAD was associated with younger age, being female, income loss due to the pandemic, COVID-19 infection, and higher perceived risk of COVID-19 infection, with individuals over 65 experiencing greater COVID-19 related anxiety than those aged 18-34 (Hyland et al., 2020). COVID-19 related PTSD was assessed after W1 at 17.7% (pre-COVID-19 PTSD/CPTSD prevalence was 5%/7.7%, Hyland, Vallières, et al., 2020) and found to be associated with lower age, being male, urbanicity, cohabiting with children, moderate/high perceived risk of COVID-19 infection, and presence of anxiety or depression (Karatzias et al., 2020). When compared against a nationally representative pre-COVID-19 cohort, W1 showed lower rates of depression (29.8% to 22.8%, respectively) with no significant change in anxiety and depression over 6 weeks of lockdown, and anxiety/depression associated with lower age, being female, and multiple psychological risk factors (Hyland et al., 2021). Examined longitudinally, W1-W4 saw 4 distinct profiles emerge describing individual mental health reaction to the pandemic: 'Resilience' (66.7%), 'Improving' (17.9%), 'Worsening' (11.3%), and 'Sustained' (4.1%), with membership in the 'Worsening' profile associated with lower age, urbanicity, current/history of mental health treatment, increased empathy, and increased loneliness (Hyland, 2021).

Irish data were examined alongside UK data regarding vaccine hesitancy/resistance after W1 and again after W3. Vaccine hesitancy was found to be 26% with resistance at 9.5% (25% and 6.2% respectively in the UK sample) after W1 and associated with decreased likelihood of relying on traditional/expert sources for information on COVID-19 and increased distrust of these sources (Murphy et al., 2021). Vaccine resistance after W3 increased from 9.5% in March 2020 to 18.1% in August 2020 (6.2% to 10% in the UK sample) and was associated with a drop in vaccine acceptance (Hyland et al., 2021). Wave 5 included an item on vaccination status, with $N = 135$ (12.2%) having had at least one vaccine shot. With the alarming rise of vaccine resistance in the two decades prior to COVID-19 (Blume, 2006; Hussain, Ali, Ahmed, & Hussain, 2018) and the incorporation of this mentality into broader conspiratorial ideation (Cook, 2020; Dickinson, 2021) which has actively disrupted COVID-19 measures in the US (Gerber & Khan, 2021) and Ireland (McGreevy, 2021), understanding the underlying mechanisms of vaccine hesitancy/resistance benefits national public health.

Studies using Irish C19PRC study data from W1 have examined the effect of the pandemic on right-wing authoritarianism, finding associations between it and both nationalism and anti-immigrant sentiments as a function of perceived threat (Hartman et al., 2021). As the global prominence of such beliefs has been rising for several years (Peters, 2017; Staerklé & Green, 2018), associated with both vaccine resistance and political violence (Giroux, 2017; Kennedy, 2019), research into influences on such beliefs in Ireland should remain a priority. W1 data was also used alongside UK data in investigating predictors of over-purchasing or 'panic buying' behaviour (Bentall et al., 2021). In the Irish sample, about 75% of individuals engaged in at least minimal over-purchasing, more over-purchasing was noted in the Republic compared to the UK (though it was noted that Ireland's government intervened first and to a greater extent, potentially perpetuating purchasing behaviour) and in urban over rural areas, with no specific category of goods favoured. Additionally, Bentall et al. (2021) found that over-purchasing was positively influenced by income, a household with children, adverse mental health, being sensitive to threat, and experiencing paranoia, but was negatively influenced by analytic reasoning ability.

The C19PRC study measured anxiety, depression, PTSD, and other psychopathologies using scales designed to screen for the presence of these disorders at a diagnostic threshold. This methodology allowed for comparison within the sample population, against pre-COVID population prevalence rates, between branches within the C19PRC study, against and studies using the same measures. Articles published based on early waves of the study indicated an initial increase in anxiety, depression, and somatic symptoms with variation by sub-group (see Hyland, Shevlin, et al., 2020; Karatzias et al., 2020 for ROI, see Murphy et al., 2020, Shevlin et al., 2020; Shevlin et al., 2020 for UK) but eventual normalisation of rates with further indication that 85% of the Irish adult population showed resilience to adverse mental health outcomes (Hyland, Shevlin, et al., 2021). This finding was closely mirrored

in a similarly sized, representative sample of Australian adults (Batterham et al., 2021). Increases in anxiety and depression at the onset of the pandemic were found in multiple studies from a variety of countries (Ettman et al., 2020; Li et al., 2020; Bueno-Notivol et al., 2020; Webb, McManus, & O'Connor, 2021), reflecting media reports of mental health impacts on individuals, including 57.1% of Irish adults reporting the pandemic has had a negative effect on their mental health (Central Statistics Office, 2021). This divergence in findings indicates that population mental health effects are heterogeneous (Shevlin et al., 2021) and while both sub-clinical distress and clinical symptomology trended higher in populations during the pandemic, prevalence of clinical disorders returned to pre-pandemic levels after a brief increase.

4.2. Data functionality and use

As the samples were controlled for national representativeness (with weighting as described for W3), these data can be exploited for a multitude of studies within the Irish population, though it remains to be seen if data collected during the COVID-19 pandemic will be proven to be of use outside a pandemic/disaster context. Data collection and analysis was made possible by a grant from the Health Research Board and fully anonymised data is available for public use. Waves 1-5 and an aggregate dataset of all waves are stored in repository with the Open Science Framework and can be downloaded from (https://osf.io/2huzd/files/).

4.3. Limitations

This study should be understood in light of several limitations. As this was not a random probability sample, it was not possible to determine the participation rate at W1, however, the sample (and W2, W4, and W5) was representative of the Irish adult population, allowing for superordinate generalisation of findings using the data. Data collected were self-reports and vulnerable to social desirability bias, with public health regulations precluding face-to-face interviews to cross-check respondent bias. Due to the emergent and rapidly changing nature of the pandemic in March 2020, launching the survey quickly was prioritised, meaning detailed advanced planning was not possible. During the initial Irish lockdown, the severity and ultimate length of the pandemic could not be estimated due to the novel nature of both SARS-CoV-2 and COVID-19. However, the methodology of the C19PRC study was rigorous in fulfilling the stated goal of assessing the impact of COVID-19 on the adult population, and for the Irish branch in assessing the mental health of the nation across the first year of the pandemic. The Irish sample was comparatively small, though representative, and met power requirements for assessing common mental health disorders within the population.

As the pandemic progressed, the survey items changed to better reflect the on-going crisis with additional items and measures (see Table 2). As a result, not all items are present in each wave. In addition, while a percentage of new recruits from each wave and from W1 returned to participate in the next wave, many did not (W1: $N = 535$, W2: $N = 463$, W4: $N = 463$). It is not possible to determine if these individuals chose not to participate or were unable to participate due to any number of personal factors. Attrition in this study was comparable to attrition rates in pre-established longitudinal cohorts which ran data collection during the pandemic (McBride et al., 2021) but no national comparison is available, as there currently exists no longitudinal, nationally representative sample assessing the mental health of the Irish adult population.

Comparisons to establish national representativeness were based on Census 2016, however national demographics may have shifted in the intervening years. The planned Census 2021 was postponed due to the pandemic and re-scheduled for April 2022, at which time these data might be re-evaluated. As participants were recruited based on quota sampling and this methodology was used in all branches of the C19PRC study, cross-comparisons within the study are possible but results cannot be generalized to the greater international population.

4.4. Impact and implications

This study has far-reaching implications for Ireland, with the most important being that the COVID-19 pandemic has not be as detrimental to mental health and well-being as initially feared. Recent meta-analytic studies comparing mental health from before and during the pandemic across the world indicates that there was a very small increase in symptoms of anxiety and depression in the first weeks of the pandemic, followed by a rapid return to pre-pandemic levels and stability thereafter (see Prati & Mancini, 2021; Robinson, Sutin, Daly, & Jones, 2021). Our findings are in line with this, and we also showed that 85% of the Irish adult sample could be described as resilient/adaptive to the unique stressors of the COVID-19 pandemic (Hyland, Shevlin, et al., 2021), with a smaller sub-population at increased risk of deterioration. While the 'tsunami' of mental health need has not yet broken on Ireland's shores, and early indications are it may be far less severe than initially feared, awareness and vigilance remain important. PTSD and CPTSD are not always immediately apparent following traumatic events (Andrews, Brewin, Philpott, & Stewart, 2007) and the increased exposure to both risk and trauma in essential services and healthcare workers may lead to higher prevalence of PTSD in these groups as time passes.

Socio-demographic factors are known to contribute to mental illness risk, including socioeconomic status, housing/resource inequality, and poverty. Policies addressing these circumstances could reduce risk of mental health problems during a disaster and would also benefit the entire population. Lastly, the data collected as part of this study can be used to typify the effects of the COVID-19 pandemic on the Irish adult population for comparison with future public health threats. The next pandemic agent may be more serious in terms of mass casualty and suffering, so understanding the reactions of the public in terms of health regulation compliance, perceived risk, vaccine resistance/hesitancy, and psychological effects, could be invaluable for emergency policy/protocol planning. Armed with such an understanding, physical and mental healthcare providers can fine-tune emergency policies to both maintain care to service users and protect their workers (Fearon, 2020).

4.5. Conclusions

In the aftermath of previous respiratory coronavirus outbreaks in the 2000s, researchers investigating the mental health effects of these epidemics stressed the value of preparation for the next epidemiological event (Mak et al., 2009; Smith, 2006) and this report follows suit. Research conducted on a nationally representative sample of the Irish adult population over the first year of the COVID-19 pandemic has laid the foundation for continuing research into the effects of this rapidly changing public health situation. Humanity is vulnerable to disease and COVID-19 is another in the series of pandemics which have, and which will continue to threaten life. The socio-political, economic, cultural, health, and mental health outcomes of the COVID-19 pandemic will likely persist for decades in a variety of forms. Understanding immediate, intermediate, and long-term effects of a pandemic on individuals will assist in preparing for the next global disease event. It is sincerely hoped that such an event will remain in the far future.

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Availability of data and material

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Consent to participate

All participants provided consent to participate.

Consent for publication

All authors consent for publication.

Declaration of competing interest

All authors declare no conflicts of interest.

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