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Children's Subjective Well-Being During the Coronavirus Pandemic

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Abstract
How did the coronavirus pandemic affect the subjective well-being (SWB) of children? In this paper, we use data from the Children's World Survey, encompassing 9,684 children aged 9 to 15 residing in nine European countries. Our goal is to evaluate the influence of both material —access to digital communication devices— and immaterial factors —information sources about Covid-19, activities conducted during lockdown, and the extent of social support— on children's SWB during the pandemic. We also account for individual characteristics, such as age and gender, as well as country-specific effects. The analysis, employing ordinary least-squares (OLS) and ordered logit (OLogit) methods, reveals that various factors contributed to reduced SWB in children during the pandemic. These factors include loneliness, a lack of active leisure activities, fragmented family environments, and insufficient or no social support from teachers or friends. Additionally, the absence of internet access and reliable sources of information about coronavirus negatively affected children's SWB. However, lacking the material conditions for networking was a less prominent concern for children compared to the absence of support from family and friends or the inability to engage in activities that they deemed valuable for themselves or others.

Keywords Children · Subjective well-being · Coronavirus · Pandemic · Social networks · Europe

1 Introduction

On March 11 2020 the World Health Organization issued a health emergency following the rapid spread of Covid-19 (Cucinotta & Vanelli, 2020). Covid-19 and the subsequent lockdowns and restrictions imposed by governments around the world

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to combat it had a substantial impact on everyday life. In particular, the pandemic is considered to have severely affected the well-being of children (Steinmayr et al., 2022), whose daily routine and habits were turned upside down because of school closures, lengthy stay-at-home periods, and restrictions to normal life. A daily routine is widely accepted as essential for children's development, including their well-being (Fiese et al., 2006). Children require structure, and the closure of schools, the forced transition to digital learning and socialisation, and the restricted freedom of movement during the Covid-19 pandemic represented serious disruptions to their daily lives. Such radical changes in routines are considered to have harmed the subjective well-being (SWB) of children all over the world (e.g. Cusinato et al., 2020).

As highlighted by a spate of research, children have been among the most vulnerable in terms of well-being during the pandemic (Jiao et al., 2020; Patrick et al., 2020; Prime et al., 2020; Venkataramu et al., 2020). The disruption of routines did, however, not have the same impact on all children. Some were far more affected than others. Explanations of why this was the case range from material deprivation to a variety of social, psychological, and personality factors. Material deprivation —and, in particular, lack computers or of access to internet— may have contributed to cut children from peers and to growing feelings of isolation during Covid-19. The sudden transformation of everyday life into one almost entirely dependent on digital technology exacerbated previously existing digital divides, affecting children with less access to communication more (Malta Campos & Vieira, 2021). In addition to material and economic factors, social, psychological, and personality factors may have played an important role on well-being during Covid-19 (e.g., Casali et al., 2021; Engel de Abreu et al., 2021; Stieger et al., 2021; Vázquez et al., 2021).

Furthermore, an expanding body of empirical research that directly investigates the impact of the COVID-19 pandemic provides compelling evidence of the adverse effects on children's well-being. Surveys conducted during the pandemic have revealed significant increases in rates of depression, anxiety, and behavioural problems when compared to pre-pandemic benchmarks (Racine et al., 2021; Theberath et al., 2022). Moreover, research has also reported a decline in children's physical activity and diet quality during lockdowns, resulting in weight gain and an increased consumption of unhealthy food (Al Hourani et al., 2022; Jha & Mehendale, 2022). Longitudinal cohort studies that track children over time have also indicated a rise in mental distress and a decrease in life satisfaction following the onset of the pandemic. These changes correlate with COVID-related stressors such as social isolation, parental unemployment, and home confinement (Duan et al., 2020; Loades et al., 2020). Indeed, school closures and social distancing measures have led to severe isolation and the loss of caregiving support for many young people (Clemens et al., 2020; Orgilés et al., 2020). For example, survey research conducted during the early stages of the pandemic in China found that school-aged children self-reported significantly lower happiness and satisfaction after the introduction of COVID-19 restrictions (Cao et al., 2020). In general, most studies have revealed a complex picture, with some children experiencing strengthened family bonds but most suffering from decreased social cohesion overall (Nahkur & Kutsar, 2022; Ravens-Sieberer et al., 2022). Nonetheless, further research is still necessary to comprehend the nuanced, long-term impacts on children's evaluations of their lives and relationships.

Hence, there is still a shortage of research identifying what affected children's SWB since the beginning of the pandemic. Many of these studies have been limited in terms of geographic coverage and have tended to exclude —because of a tendency to rely on internet-based surveys (e.g., Adıbelli & Sümen, 2020)— those with no or limited access to the internet. The scarce research on children's well-being during the pandemic —especially relative to that of adults— is also related to the need to use strict protocols when conducting surveys on children. This implies that much of the well-being of children during the pandemic has been assessed indirectly, often by interviewing parents and asking about the perception of their children's habits and well-being during lockdowns (Patrick et al., 2020).

In this paper, we address this gap in existing knowledge using data from the Children's Worlds survey. We cover 9,684 children aged between 9 and 15 in schools in nine European countries: Albania, Belgium, Estonia, Finland, Germany, Italy, Romania, Spain, and the UK (Wales). The Children's Worlds survey was perfectly poised to collect data on children SWB during the coronavirus pandemic, as it was an ongoing survey, conducted at schools and with three waves already completed by the outbreak of Covid-19. Protocols for data sampling and collection were already in place, although specific challenges related to the digital component had to be overcome.

Previous research has examined the overall impact of the COVID-19 pandemic on children's well-being using Children's Worlds data (Nahkur & Kutsar, 2022; Savahl et al., 2022). However, a gap remains in understanding which specific factors have had the most positive or negative effects on children's multidimensional subjective well-being (SWB) during this crisis. This study seeks to fill this knowledge gap by analyzing data from the Children's Worlds survey (4th wave—Covid wave). It aims to identify the key factors (such as family, education, daily life, and social networks) that had the most significant influence on children's SWB during the pandemic.

Therefore, by pinpointing the specific factors related to children's multidimensional SWB during the pandemic, this research offers practical insights to guide policies and practices aimed at safeguarding children's overall welfare, development, and resilience in the aftermath of the Covid-19 pandemic, as well as in preparation for future large-scale social disruptions. Consequently, the research aims to address the following central questions:

1. Which specific factors (e.g., family, education, social interactions, daily life) were most predictive of higher or lower subjective well-being (SWB) for children during the Covid-19 pandemic in Europe?
2. What were the most adverse factors affecting children's SWB during the Covid-19 pandemic?
3. Which factors contributed to resilience in children's SWB throughout the Covid-19 pandemic?

The paper is structured in four sections. The first section assesses the link between children's SWB and the influence the pandemic may have had on it from a theoretical and scholarly perspective. In this first section we lay out the

theoretical background guiding the data analysis. The second section introduces the data sample, including its limitations, as well as the empirical models employed in the analysis. The third section contains the results of the analysis followed by the discussion of the results in light of the theory presented earlier. The final section contains the conclusions.

2 Children's Subjective Well-Being and the Influence of the Pandemic

2.1 Dimensions of Well-Being

Well-being research has been traditionally constructed on the shoulders of the eudaimonic and hedonic philosophical paradigms (Ryff, 1989). The eudaimonic paradigm, which underpins psychological well-being, emphasises meaning and self-realization (Ryff, 1989). It argues that well-being should be measured in terms of a person's psychological capacities and resources to fully realise their potential (Fernandes Ferreira Lima & Araujo de Morais, 2018). The hedonic paradigm is focused on subjective well-being (SWB), a concept first introduced by Diener (1984). It centres on the perception of happiness, life satisfaction (LS), and finding a positive balance between pleasant and unpleasant feelings. Individual and subjective judgments of life satisfaction and emotional reactions (positive and negative) to life events define the SWB. According to Proctor (2014), there is no single element that determines SWB. However, several factors, including positive relationships and mental health, relate to high levels of SWB. They, however, do not by themselves ensure happiness. Additionally, a range of personal characteristics, including age (Diener & Suh, 1998), specific personality features (Diener, 1996), good social networks (Diener & Seligman, 2002; Rodríguez-Pose & Maslaukaite, 2012; Rodríguez-Pose & von Berlepsch, 2014), and material circumstances (Diener & Seligman, 2004; Diener et al., 1995, 2002; Lucas et al., 2004) account for a high SWB.

Overall, SWB is a multifaceted concept that is typically regarded as a measure of an individual's self-assessment of personal satisfaction and contentment with both specific components of their life and with their overall life quality (Das et al., 2020; Durand, 2015; Emery, 2020). Thus, it includes self-evaluations of life experiences as well as the individual's judgment of them.

The literature on children's SWB acknowledges that —in a comparable way to SWB on adults— significant aspects of a child's daily life have an impact on it. These include the social support network of family, friends, school, and community (Newland et al., 2014; Schotanus-Dijkstra et al., 2016), the living conditions (Schotanus-Dijkstra et al., 2016), the child's age (Casas & González-Carrasco, 2021) and gender (Kaye-Tzadok et al., 2017), as well as the child's specific cultural environment (Casas et al., 2020).

2.2 Covid-19 Pandemic and Children's Subjective Well-Being

Understanding SWB appears especially important in view of the challenging new circumstances that individuals of all ages have faced around the world because of

the Covid-19 pandemic. In particular, the pandemic had an impact on children both directly and indirectly. Children had to adjust rapidly to changing the daily routines. Schooling and socialising became remote, entailing an almost overnight and unprecedented usage of digital tools for studying and socialising. There were also confronted with an abrupt decline in —when not an outright cessation— leisure and extracurricular activities. Furthermore, they were impacted by their carers' declining well-being (Gierczyk et al., 2022; Mantovani et al., 2021; Martiny et al., 2022).

Under strict lockdowns, online technology became the primary instrument for everyday life, including a vital part in preserving social relationships, as well as ensuring the continuity of learning for millions of children and youngsters worldwide. Concerns about the already existing digital divide were heightened, with governments and supranational entities emphasising the importance of providing immediate solutions for the most disadvantaged and vulnerable in order for them to have access to information and not become disconnected in a situation which made online technologies the primary tool for dealing with the socioeconomic effects of the Covid-19 pandemic (Beaunoyer et al., 2020).

These concerns were echoed in the context of remote learning, with the scholarly literature acknowledging that the shift to online learning had a significant influence on children's well-being, as school closures interrupted their regular routines (Venkataramu et al., 2020). Prolonged exposure to an online environment —which became unavoidable during the pandemic— could also have had a significant negative impact on the SWB of children (Jackson et al., 2021). While the benefits of digital technologies have not been overlooked, their drawbacks have also been recognized in studies on children's well-being during the coronavirus pandemic. On the one hand, scholarly research acknowledges the fact that digital technologies ensured the continuation of social ties with friends, school, and other relatives, as well as provided some variety for extracurricular activities (Tkáčová et al., 2021) in a world where playing outdoors became limited because of the lockdowns. On the other, it has been highlighted that the pandemic paved the way for digital overuse (DAK-Studie, 2020; Montag & Elhai, 2020; Pandya & Lodha, 2021), cyberbullying (Cowie & Myers, 2021; Imran et al., 2020), and the spread of misinformation (Cowie & Myers, 2021).

Digital access and technologies were not the only aspects of children's daily lives which were transformed during the Covid-19 pandemic. Both longitudinal and cross-sectional studies agree that the quality of family and friends relationships may have been disturbed during the pandemic and may have had a knock-on effect on children's SWB (Borualogo & Casas, 2022; Cosma et al., 2021; Gierczyk et al., 2022). In addition, SWB is also determined by structural factors —including living conditions, age, gender (Borualogo & Casas, 2022; Engel de Abreu et al., 2021), or migration status (Pieh et al., 2022; Steinmayr et al., 2022)— as well as specific individual emotional and cognitive states (Engel de Abreu et al., 2021). Whether the child had access to consistent and supervised home-schooling and a diversity in extracurricular activities and in her/his use of time (Cosma et al., 2021; Engel de Abreu et al., 2021) would have also influenced their well-being.

Overall, the limited existing research on children's subjective well-being during the Covid-19 pandemic points to the fact that girls, older children, children

from disadvantaged backgrounds, or those from migrant stock suffered the greatest decline in SWB. The presence of a solid social support network, a good family and living environment, access to digital resources for schoolwork and leisure activities, and the freedom to engage in both outdoor and indoor activities were all connected with an increase in children's SWB. Nevertheless, it should be mentioned that there are differences among researchers regarding the degree to which a certain variable is associated with a decline in children's SWB, especially with regard to the gender, age, and socioeconomic status of the child (Cosma et al., 2021; Steinmayr et al., 2022).

Against this background, this study examines whether the Covid-19 pandemic had a significant impact on the self-reported SWB of 9,684 children aged 9 to 15 years old from nine different European countries. The main goal is to determine which factors are linked to lower levels of children's SWB, while controlling for individual characteristics (age and gender), as well as country effects. The aim is to analyse —given the still-limited pool of information about the impact of the coronavirus pandemic on children's SWB—, using ordinary least-squares (OLS) and ordered logit (OLogit) methods, the extent to which variations in material and immaterial factors were key in changing the SWB of children during the Covid-19 pandemic. Among the material factors, we consider access to digital communication devices. The immaterial factors include the information sources about Covid-19, the activities performed by children during the lockdown, and the degree of support in the social network. We also control for the family environment, material conditions, personal issues, and the social and school circle of each child, as well as for the lockdown and restrictions in the places where each child lives. We go beyond most of existing studies (Borualogo & Casas, 2022 (Indonesia); Cosma et al., 2021; Duan et al., 2020 (China); Engel de Abreu et al., 2021 (Luxembourg, Germany and Brazil); Gierczyk et al., 2022 (Poland); Jackson et al., 2021 (United States of America); Moore et al., 2020 (Canada); Segre et al., 2021 (Italy)) on the topic by covering more dimensions linked to the transformation of the daily lives of children during the pandemic across a broader geographical spectrum of countries.

3 Data and Methodological Approach

3.1 Data

To measure the impact of the Covid-19 pandemic on children's SWB, we use data from the International Survey of Children's Well-being (ISCWeB)[1]—Children's Worlds (Covid wave). The ISCWeB project's main purpose is to gain a better insight into children's lives, including their relationships with family and friends, daily activities, time use, and, most significantly, their own judgements and evaluations of their own well-being. By increasing awareness among children, parents,

[1] https://isciweb.org/

communities, opinion leaders, decision-makers, experts, and the general public, it also tries to contribute to the enhancement of the subjective well-being of children.

Data for the fourth wave —also referred to as the Covid wave— were collected through anonymous, age-appropriate, self-reported questionnaires. The survey was conducted in the language(s) of each country using various methods —including online and paper-based questionnaires— or a hybrid approach. The data collection process received approvals from the relevant institutions to ensure compliance with ethical regulations and principles. Children had the option to opt out of the study at any time or skip specific questions, leading to some questions being unanswered, resulting in missing data and response inconsistencies. To address this, the national datasets underwent centralization and systematic cleaning and preparation by the Children's World data management team before being made available to the participating country teams for further analysis (Savahl et al., 2022).

Data collection occurred between March 2020 and December 2021 in twenty countries, with nine of them situated in Europe: Albania, Belgium, Estonia, Finland, Germany, Italy, Romania, Spain, and the UK (Wales). Our study focuses on these nine European countries. Among them, seven countries obtained samples from specific regions due to feasibility and resource constraints, while the remaining two countries, Estonia and Wales, managed to obtain samples covering their entire territory (Savahl et al., 2022).

The decision to focus just on European countries was made due to comparable cultural and socioeconomic backgrounds, as well as similar lockdown patterns and restrictions. The sample includes responses from 9,684 children aged 9 to 15, of whom 49.9% were girls, 48.5% were boys, 1.6% did not identify as either a girl or a boy or did not answer the gender question.

The key independent variables examined encompass various domains that the literature has identified as having a significant impact on children's subjective well-being (SWB), as detailed above. Demographic factors serve to establish individual baseline differences, while the family, school, and social domains allow the analysis of critical elements in children's immediate environments. Material and personal conditions, as well as digital resources, capture their access to support and opportunities. Furthermore, Covid-19 experiences acknowledge the pandemic's impact, including lockdown activities and social networks, reflecting altered daily routines. Collectively, these variables provide a multidimensional perspective on the sources of stress, risk, and resilience affecting children's SWB during the Covid-19 pandemic disruptions, enabling a holistic analysis of the factors that most influenced their SWB.

The variables encompassed within each of the areas mentioned above include:

a) Demographic characteristics: age, gender;
b) Family environment: living arrangements measured using a multiple-choice single-response categorical scale; parent–child relationship quality, measured on 5-point scales of agreement ranging from 0 —do not agree at all— to 4 —totally agree;
c) Material conditions: satisfaction with the house and area they live in and the things they have, measured on an 11-point satisfaction scale ranging from 0 —do not agree at all— to 10 —totally agree;

d) Personal issues: satisfaction with their health and their appearance, measured on an 11-point satisfaction scale ranging from 0 —do not agree at all— to 10 —totally agree;
e) Social and school circle: perceived friendship quality, measured on 5-point scales of agreement, and social inclusion, measured on a 4-point ordinal frequency scale from never to more than three times, plus a "don't know" option;
f) Lack of material devices for communication: access to communication devices, measured on a binary scale with have/don't have response options; internet access, measured on a 4-point ordinal frequency scale from never to more than three times; and device satisfaction, measured on an 11-point satisfaction scale ranging from 0 —do not agree at all— to 10 —totally agree;
g) Information sources about coronavirus: interpersonal sources and media sources measured on 5-point scales of agreement ranging from 0 —do not agree at all— to 4 —totally agree;
h) Activities performed during lockdown: household activities, learning activities, media/technology activities, recreational activities, solitary activities, measured on a 6-point ordinal frequency scale capturing weekly occurrence, ranging from never to daily frequency;
i) Social network support: support by key people in the child's life, measured on 5-point scales of agreement ranging from 0 —do not agree at all— to 4 —totally agree;
j) Lockdown and restrictions: personal Covid-19 experiences, Covid-19 restrictions, household risk factors, all with yes/no/not sure response options.

The specific variables included in each of these broad categories are elaborated upon in the results section, with the regression tables providing a comprehensive list of predictors considered in relation to children's subjective well-being (SWB).

The dependent variable —children's SWB— is based on the Children's Worlds Subjective Well-Being Scale (CW-SWBS). This scale measures the context-free cognitive aspect of subjective well-being, featuring adapted items and response options tailored to children. It is a variation of Huebner's (1991) Student's Life Satisfaction Scale, a widely used tool in similar studies (Borualogo & Casas, 2019, 2022; Casas & González-Carrasco, 2021; Rees et al., 2010; Strózik et al., 2016). In some cases, a reduced version of the scale is used for children under the age of 9 (Rees et al., 2016; Strózik et al., 2016). The CW-SWBS comprises five statements assessing children's overall life satisfaction, with participants responding on an 11-point scale ranging from 0 (do not agree at all) to 10 (totally agree). The final SWB score is calculated by summing the scores of the five items and dividing them by 5, consistent with prior waves of Children's World data collection (Rees et al., 2016, 2020).

The CW-SWBS specifically measures overall life satisfaction judgments, representing just one aspect of the broader subjective well-being conceptual model. To capture other dimensions such as domain-based satisfaction, positive and negative effects, and psychological well-being, additional customised scales were utilized. This comprehensive approach enabled a nuanced measurement of distinct facets of children's subjective well-being across various global contexts. By employing

multiple instruments, the Children's Worlds questionnaire adopts a multidimensional approach to assess childhood subjective well-being in diverse global settings. This highlights the significance of resorting to culturally valid instruments to capture the intricate nature of children's subjective quality of life worldwide.

3.2 Model and Method

The proposed empirical model includes generic key factors reported in the literature as having an impact on children's SWB, while accounting for a wide set of Covid-19 relevant factors also derived from scholarly research. The model is aimed at understanding and differentiating among the influence of proposed regressors on SWB. A set of national fixed-effects (FE) are included to control for variations in conditions and schooling systems across countries (see below).

Model (1) is the base model, which simply controls for the characteristics of the child, the family environment, the material conditions, the personal issues, and the social and school circle of the child. These characteristics should, in principle, be independent from developments during the Covid-19 pandemic and are engulfed under the moniker of 'characteristics of the child'. The base model adopts the following simple form:

$$SWB_i = \alpha_i + \beta_1 ChildCharact_i + \mu_c + \varepsilon_i \quad (1)$$

Model (2) focuses on the material dimension, and controls for the access to digital communications devices by the child:

$$SWB_i = \alpha_i + \beta_1 ChildCharact_i + \beta_2 DigitalDevices_i + \mu_c + \varepsilon_i \quad (2)$$

Models (3), (4), (5), and (6) focus on different immaterial aspects that may have affected the SWB of a child during the pandemic, including the sources used to get information about coronavirus, the activities of the child during the lockdown, the social networks at the child's disposal, and the Covid-19 restrictions implemented in the places where the child goes to school, respectively:

$$SWB_i = \alpha_i + \beta_1 ChildCharact_i + \beta_3 InfoSourcesCoronavirus_i + \mu_c + \varepsilon_i \quad (3)$$

$$SWB_i = \alpha_i + \beta_1 ChildCharact_i + \beta_4 ActivitiesLockdown_1 + \mu_c + \varepsilon_i \quad (4)$$

$$SWB_i = \alpha_i + \beta_1 ChildCharact_i + \beta_5 SocialNetworkSupport_i + \mu_c + \varepsilon_i \quad (5)$$

$$SWB_i = \alpha_i + \beta_1 ChildCharact_i + \beta_6 CoronavirusRestricts_i + \mu_c + \varepsilon_i \quad (6)$$

where,

SWB_i is the Subjective well-being of child i at the moment the survey was conducted;

$ChildCharact_i$	represents the individual characteristics of each child;
$DigitalDevices_i$	denotes the access the child had to digital communication devices during the pandemic;
$InfoSourcesCoronavirus_i$	indicates the information sources about the coronavirus pandemic at the disposal of the child;
$ActivitiesLockdown_i$	denotes the activities performed by each child during the pandemic;
$SocialNetworkSupport_i$	represents the social network support of the child;
$CoronavirusRestricts_i$	measures the coronavirus restrictions and lockdown implemented in the place of schooling of each child;
μ_c	are a set of country fixed effect;
α_i	denotes the constant;
$\beta_1, \beta_2, \beta_3, \beta_4$ and β_5	are coefficients;
ε_i	is the error term.

The independent variables were categorically divided into two groups to assess their impact on children's subjective well-being (SWB). The first group comprised well-established factors — as indicated by existing scholarly literature— known to influence children's SWB. These included gender, age, family environment, living conditions, individual personal matters, and the social and school network. The second group encompassed specific variables related to the coronavirus, as previously outlined.

The selection of variables in the latter group was influenced by data availability, specifically the questions included in the survey. In cases where survey items were not asked in a particular country, listwise deletion was employed. Consequently, the analysis was restricted to countries with complete data for the variables of interest, resulting in varying total observations (N) per analysis, as indicated in each table.

The methods used include OLS and ordered logistic regressions (also known as ordered logit). OLS has frequently been the traditional method used in analysis aiming to assess the determinants of well-being (e.g., Blanchflower & Oswald, 2008; Helliwell, 2003). The authors using this approach prefer it to alternatives, such as ordered probit or ordered logit estimations, because of the ease to analyse the coefficients (Helliwell & Putnam, 2004). Researchers using alternatives argue that, as the SWB of any individual is recorded on an ordinal scale, ordered probit or logit approaches are more appropriate. OLS, by contrast, assumes that the dependent variable is continuous. Hence, the use of both methods together has become common in recent times (e.g., Blanchflower & Oswald, 2004; Pontarollo et al., 2020;

Table 1 Children's SWB during coronavirus pandemic—country level (mean, gender & age)

Country	Children's swb during the coronavirus pandemic					*N*
	Mean	Girls[a]	Boys	10-Years old[b]	12-Years old	
Albania	9.1	9.1	9.0	9.1	8.4	1,005
Belgium	8.0	8.2	7.8	8.0	7.9	2,290
Estonia	7.9	7.7	8.2	8.1	7.7	1,181
Finland	8.5	8.3	8.7	8.5	8.4	928
Germany	7.5	7.5	7.6	7.9	6.8	490
Italy	8.8	8.7	8.8	8.9	8.5	841
Romania	9.1	9.0	9.2	9.1	9.0	1,742
Spain	8.2	8.1	8.5	8.4	7.9	619
Wales	7.8	7.5	8.2	8.4	7.5	588
Average	8.4	8.4	8.5	8.5	7.9	

[a]We only examined the difference between boys and girls due to low numbers in the case of the third option: "I do not identify as either a girl or a boy."

[b]Children were grouped into two age categories following the approach used by Children's World surveys to ensure an adequate sample size for reporting. The "10-years old group" comprises children aged 9 to 11 years, while the "12-years old group" includes children aged 12 to 15 years

Rodríguez-Pose & Von Berlepsch, 2014). We use this approach, with the ordered logit regressions included in the appendix. We report the ordered logit rather than the ordered probit results for computational efficiency reasons and the fact that the results can be also provided as odd ratios (Agresti, 2012). For ease of interpretation, we report the ordered logit coefficients as proportional odds ratios.

4 Results and Discussion

4.1 Children's Subjective Well-Being Profile During Covid-19

This section provides an overall snapshot of children's SWB during the coronavirus pandemic before delving into the regression outcomes. When presenting the regression results, a distinction will be made between coronavirus pandemic-related factors and widely agreed-upon SWB factors, as the aim is to evaluate the influence, if any, that coronavirus had on children's SWB.

Some caveats should be considered. First, each country conducted their surveys according to their own timeline, and while all surveys were completed during the height of the coronavirus pandemic (2020–2021), there are differences in the actual months the surveys took place. Second, the survey was only conducted in a limited number of European countries. Table 1 reports the basic descriptive statistics of the SWB of children in different countries.

The average children's SWB according to the data from the survey was 8.4 out of 10, with Albania and Romania having the highest values and Germany the lowest. The difference between them was 2.6 points. When gender is considered, boys had

a higher SWB than girls in most countries during the pandemic. The only exceptions were Albania and Belgium. The biggest variations between the two categories were found in Estonia and Wales. Albania had the highest SWB in the case of boys, whereas Germany and Wales had the lowest. In the case of girls, Romania experienced the highest SWB value, while Germany came last among the countries considered. Finally, younger children reported higher levels of SWB than their older peers, with Romania and Albania displaying the highest values of SWB in the case of 10-year-olds. Germany had the lowest value for this age group. For 12-year-old children, surveyed Romanian children were happier, while German children, once again, reported the lowest scores, with a 2.2-point difference between children in both countries. Overall, these results are consistent with what the literature has found in terms of variations between young and older children, as well as between girls and boys.

4.2 Key Factors Influencing Children's SWB During the Covid-19 Pandemic: Regression Outcomes

In this section we report the results of estimating the different empirical models presented in the methodological section. We start with the baseline regression (Table 2), covering how the characteristics of the child, its family environment, material conditions, personal issues, and social and school circle affect her or his SWB. The aim is to test whether these results conform with what has been highlighted by previous research on this topic.

Table 2 shows that, as expected, the factors related to the characteristics of the child commonly accepted in the literature as impacting children's SWB are highly significant in all regressions. Age and gender are particularly important in this respect (Borualogo & Casas, 2022; Casas & González-Carrasco, 2021; Engel de Abreu et al., 2021; Kaye-Tzadok et al., 2017). Boys and younger children have higher levels of SWB with respect to girls and children who do not ascribe to any gender, on the one hand, and older children, on the other (Table 2, Regressions 1 and 2). The ordered logit odds ratio coefficient indicates that the odds of boys being happier are around 1.10 times higher than for girls, while a one-year increase in age leads to odds of a decrease in SWB of roughly 10% (Table 8 in Appendix). The family environment and material conditions are also significant, with children who do not reside in their regular home or who have parents who live in different homes having lower SWB. The decline in satisfaction can be important for children who live outside their regular home or with a family different from their own. The odds of having a lower SWB for children in these circumstances —depending on the controls included in the analysis— are between 0.59 and 0.81 times lower than for children living with their families in the family home (Table 8 in Appendix). Having parents who listen to the child is also a powerful source of SWB (Tables 2 and 8 in Appendix). Satisfaction with their home, neighbourhood, and possessions also results in a higher level of SWB. According to the ordered logit odds ratio estimations, a one unit increase in the child's material conditions and the environment where s/he lives, increases his/her SWB odds by between 1.11 and 1.56 times (Table 8 in Appendix). Finally, being

Table 2 Baseline regression

	Variables	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
	Gender—Boy	0.1195***	0.0857**	0.1005***	0.0666**	0.0756**
		(0.040)	(0.037)	(0.032)	(0.030)	(0.030)
	Gender—I do not think of myself as a boy or a girl	-2.0721***	-1.4634***	-1.0614***	-0.7687***	-0.7421***
		(0.331)	(0.285)	(0.252)	(0.230)	(0.229)
	Age	-0.1872***	-0.1548***	-0.1020***	-0.0475***	-0.0582***
		(0.023)	(0.021)	(0.018)	(0.017)	(0.017)
Family Environment *Base category: living with family*	Living with family, but at a different place (not at our regular home)		-0.4805**	-0.1817	-0.0351	-0.0196
			(0.204)	(0.137)	(0.138)	(0.140)
	Living with family, but in more than one home, because my parents live in different homes		-0.3889***	-0.2875***	-0.1572***	-0.1637***
			(0.071)	(0.059)	(0.055)	(0.056)
	Living with family, but in more than one house, because my family has more than one house		-0.3065**	-0.2732**	-0.1441	-0.1544
			(0.136)	(0.118)	(0.097)	(0.099)
	Living in residential care		-0.1813	0.3108	0.0697	0.0439
			(0.477)	(0.352)	(0.338)	(0.360)
	Living in a family different than mine		-0.6139	0.8696***	0.6826**	0.7564***
			(0.441)	(0.316)	(0.283)	(0.283)
	Question not asked		-0.7542***	-0.7670***	-0.0971	-0.0765
			(0.100)	(0.090)	(0.083)	(0.084)
	My parent(s) listen to me and take what I say into account		0.9360***	0.4945***	0.3815***	0.3651***
			(0.032)	(0.030)	(0.028)	(0.029)
Material conditions	Satisfaction with the house you live in			0.1726***	0.1337***	0.1325***
				(0.021)	(0.019)	(0.020)

Table 2 (continued)

	Variables	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
	Satisfaction with the area where you live			0.1368***	0.0689***	0.0674***
				(0.014)	(0.013)	(0.014)
	Satisfaction with the things you have			0.3541***	0.1835***	0.1769***
				(0.020)	(0.020)	(0.020)
Personal issues	Satisfaction with the way you look				0.1972***	0.1845***
					(0.011)	(0.011)
	Satisfaction with your health				0.2526***	0.2542***
					(0.017)	(0.018)
Social and school circle	I have enough friends					0.0932***
						(0.027)
	Left out by other children from your class					-0.1134***
						(0.027)
	Observations	9,611	8,919	8,638	8,545	8,283
	R^2	0.0872	0.2402	0.4448	0.5387	0.5379
	State FE	YES	YES	YES	YES	YES
	Adjusted R^2	0.0862	0.239	0.443	0.537	0.537
	F test	86.82	99.90	178.2	229.8	207.4

Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

content with one's appearance and health, as well as having a solid social and school circle, are equally relevant for a child's SWB, with increases in SWB that range between 18%, in the case of having enough friends, to almost 35%, for levels of satisfaction with health (Tables 2 and 8 in Appendix). Overall, these results are in line with expectations and with the extant literature on the topic.

When it comes to coronavirus related issues (Table 3), having access to material devices to connect to the outside world seemed less important for the children surveyed than indicated by some prior literature. At the beginning of the pandemic it was highlighted that having the opportunity to connect to the outside world at a time when lockdown and restrictions limited the freedom of movement meant that internet technology would become the critical element for everyday living (Beaunoyer et al., 2020). However, while the children surveyed did value having a connection to the internet, they were far less concerned with having the material devices to make use of internet. Owning a computer, smartphone, laptop, tablet, or another device to connect to the internet did not increase the SWB of children significantly (Table 3). Accessing the web mattered for children's SWB (Regression 3), but having their own personal device, regardless of type, did not. Indeed, the increases in well-being for children of having any of these devices are negligible: in none of the cases possessing an additional device increased the subjective well-being by more than 1% (Table 9, Regressions 4–8). It may be that children did not value having more devices, provided they already had one that allowed them to connect to the outside world. During the pandemic both governments and non-governmental organisations made it a priority to provide children with the means needed to access remote learning and maintain their social connections, but they could not always account for the provision of internet access as it was dependant on the existing communication infrastructure. In these circumstances, adding an extra device would bring limited benefits, explaining the bigger relevance of internet access.

When interpreting these results, it must be borne in mind, however, that several low-income or rural households in some or all countries analysed may not have had internet access and hence were unable to participate in the survey. This may have resulted in an underestimation of the actual impact the digital divide on the SWB, as several studies have highlighted (e.g., Cheshmehzangi et al., 2022; Iivari et al., 2020).

Receiving information on coronavirus from reliable sources is another factor that may have affected children's SWB during the pandemic. When considering various sources of information relating to Covid-19, children received more comfort when the information came from family members or caregivers, teachers, and the news. These sources of information were connected with higher levels of SWB (Table 4). For children gathering information about the pandemic from family members or caregivers the odds of them improving their SWB by one unit increased by 6.4%; 3.5% in the case of receiving that information from teachers; and 5.3% if the source of information was the news (Table 10 in Appendix). By contrast, receiving information from other children or through social media was not a source of comfort (Table 4). This is consistent with what scholarly research (e.g., Dalton et al., 2020) says about the importance of children gathering information from reliable and trustworthy sources and being able to sort through the various fake news stories that circulate in social media, as it would have negatively impacted their SWB. In a context where the amount of information

Table 3 Access to the internet and to material devices for remote communication

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
At present, how happy are you with the devices that you have to get in touch with other people?	0.0142							
	(0.083)							
Have access to computer or a tablet when needed		-0.0862						
		(0.067)						
During the Coronavirus, how often did you have access to the Internet?			0.0478*					
			(0.027)					
Have your own device: Computer				-0.0001				
				(0.001)				
Have your own device: Handy/Smartphone					0.0005			
					(0.001)			
Have your own device: Laptop						0.0006		
						(0.001)		
Have your own device: Tablet							0.0005	
							(0.001)	
Have your own device: Others								0.0016
								(0.002)
Observations	8,271	8,243	8,227	5,770	7,028	6,099	6,620	7,009
R^2	0.5372	0.5388	0.5379	0.5498	0.5482	0.5420	0.5516	0.5475
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.536	0.537	0.537	0.548	0.547	0.540	0.550	0.546
F test	197.9	199.5	199.9	145.3	179.3	149.7	171.7	183.6

Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4 Sources of information

	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	OLS	OLS
I received a lot of information about the Coronavirus from my family members or caregivers	0.0358***				
	(0.013)				
I received a lot of information about the Coronavirus from other children		0.0172			
		(0.012)			
I received a lot of information about Coronavirus from teachers			0.0313**		
			(0.014)		
I received a lot of information about Coronavirus through social media (Instagram, WhatsApp, Facebook, etc.)				-0.0003	
				(0.011)	
I received a lot of information about the Coronavirus through the news					0.0437***
					(0.014)
Observations	8,151	8,124	8,133	8,106	8,134
R^2	0.5415	0.5388	0.5403	0.5394	0.5375
Controls for children's characteristics	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES
Adjusted R^2	0.540	0.537	0.539	0.538	0.536
F test	197.7	196.3	198.2	194.8	193.7

Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

about the coronavirus pandemic was overwhelming —with many adults struggling to navigate the multiple sources and often contradictory information about Covid-19— relying on what children perceived as more authoritative sources of information contributed to avoid feeling overwhelmed by what was going on around them. As Maftei et al. (2021) have observed, the overuse of social media during Covid-19 pandemic exposed children to a massive amount of information, including fake news, making it critical for them to have what they considered to be trustworthy sources of information. Otherwise they may not been able to distinguish what was valid and what not. Taking this into consideration, the findings also emphasise the importance of adults in children's lives taking the time to ensure that they had more accurate information about Covid-19, while also assisting them in determining what was false information.

Well-being throughout the pandemic was also related the activities carried out by children during the lockdown. Performing helpful tasks to benefit the family and oneself (e.g., helping out in the house, caring for siblings, doing homework, reading, playing sports or doing exercise, or doing new things or things that they had not done in a long time) and activities that directly involved engaging with others (e.g., speaking on the phone, meeting friends online) resulted in a considerably greater SWB than more passive activities with limited benefits to others (e.g., watching films and series or using social media) (Table 5). Playing and hanging out outside the house also brought higher benefits to children's well-being than doing the same activity inside. Most of these social activities increased children's well-being by rates of between 3.6% (taking care of siblings or other family members) and 9.3% (playing sports or doing exercise) (Table 11 in Appendix).

Overall, these results are consistent with recent research (e.g., Cosma et al., 2021; Moore et al., 2020) highlighting the negative impact of passive leisure activities on children's well-being during the lockdown. Children needed to feel that they were actively interacting with their family members and doing something productive rather than spending their unprecedented amount of free time alone. Spending time alone may have induced feelings of lack of productivity, given that they were deprived of their daily routines and activities as well as their social network (friends and schoolmates) (Cosma et al., 2021). Bartlett et al. (2020) have stressed the importance of self-efficacy in times of uncertainty and fear caused by Covid-19 for children's well-being.

Spending time on their own was the only activity that reduced rather than increased well-being. It was a strong negative predictor factor of SWB. Playing sports or exercising, as well as playing inside the house or outside were among the strongest SWB positive predictors among the activities performed during the lockdown. Again, this corroborates several studies (e.g., Cosma et al., 2021; Jackson et al., 2021; Mitra et al., 2021), all of which emphasise the relevance of healthy movement behaviours for children's SWB. This was also the case for learning and doing homework (Engel de Abreu et al., 2021). These authors account for a sense of productivity in a new situation with ample free time but also restrictions regarding going outside and interacting with their friends. But it contrasts with prior findings by Cosma et al. (2021), who observed no association between schoolwork and children's SWB in Czechia. Our results also diverge from previous work highlighting that doing new things not done before the Coronavirus pandemic had no effect on children's SWB. This was part of research underlining the importance of maintaining the routines implemented before the pandemic during the

coronavirus outbreak (Bartlett et al., 2020; Segre et al., 2021). Of course, one must consider that the variety of new activities available during the lockdown with strict restrictions was extremely limited, and thus may not have stimulated the interest of children.

When analysing a child's SWB, one of the central features is the necessity of having a strong social network (Konu et al., 2002). Venkataramu et al. (2020) have emphasised the importance of social connectedness, particularly with peers, in children coping with the coronavirus pandemic, whereas other studies (Cosma et al., 2021; Gierczyk et al., 2022; Magson et al., 2021) have stressed the importance of social connections, regardless of whether they involved friends or family, in supporting higher levels of well-being.

The results in Table 6 fall in line with such findings. Feeling supported by friends, teachers, and people they live with were robust positive predictors of children SWB during the pandemic (Table 6). The odds of social network support increasing the well-being of children were considerably higher than those of linked to activities and chores, access to information, or material devices. Being supported by the people they lived with increased the odds of improving a child's SWB during the pandemic by 22%; the increase was 19% in case of support by teachers; and almost 17% in the case of being supported by friends (Table 12 in Appendix). When confronted with a shock like the coronavirus pandemic,

Table 5 Activities and chores during the lockdown

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(During the Coronavirus pandemic) How often did you spend time:	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Helping out in the house (household chores)	0.0206*						
	(0.011)						
Taking care of siblings (brothers/sisters) or other family members		0.0136*					
		(0.008)					
Learning and doing homework			0.0303*				
			(0.017)				
Watching movies or series on the TV, computer or another device				0.0035			
				(0.012)			
Using social media (Facebook, Instagram, TikTok, etc.) on the computer, mobile phone or other devices					0.0097		
					(0.009)		
Speaking with people on the phone or any other way (such as using WhatsApp						0.0180*	
						(0.011)	
Meeting with your friends online (e.g., on the computer, zoom or any other way)							0.0231***
							(0.009)
Observations	8,042	7,930	8,002	7,998	8,032	8,051	8,013
R^2	0.5405	0.5383	0.5398	0.5392	0.5375	0.5404	0.5389
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.539	0.537	0.538	0.538	0.536	0.539	0.538
F test	191.8	187.2	191.8	189.1	188.4	192	191.4

Table 5 (Continued)

	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Doing things I did not do for a long time (such as hobbies, games etc.)	0.0187*							
	(0.011)							
Playing games on the computer, mobile phone or devices (such as PlayStation, Xbox, Nintendo, etc.)		0.0216**						
		(0.010)						
Spending time on my own			–0.0567***					
			(0.010)					
Playing or hanging out inside the house				0.0303***				
				(0.011)				
Playing or hanging out outside					0.0559***			
					(0.012)			
Reading						0.0267***		
						(0.010)		
Playing sports or doing exercise							0.0384***	
							(0.011)	
Doing new things I did not do before the Coronavirus (such as new hobbies, games etc.)								0.0172
								(0.011)
Observations	7,984	8,041	7,998	7,955	7,941	7,992	7,984	8,041
R^2	0.5382	0.5392	0.5405	0.5405	0.5368	0.5406	0.5387	0.5392
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.537	0.538	0.539	0.539	0.535	0.539	0.537	0.538
F test	190.5	193.2	191.3	190.6	187.7	191.1	191	193

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

children's SWB levels relied to a large extent on support from those they felt close to, as they required reassurance and assistance to understand what was going on around them during very difficult times, when even adults struggled to adjust.

Finally, when coronavirus restrictions and lockdown-related factors are included as regressors in the analysis, only not being able to attend school for many days was significant. Surprisingly, not being able to attend school appears to have a positive connection with SWB (Table 7) —with an increase in the child's well-being of 10% (Table 13 in Appendix). This could be explained by, first, the fact that not going to school for periods of time is often welcomed by children and frequently regarded as a holiday regardless of the circumstances that trigger the school closure. Second, it could also be a factor that, as indicated in Table 1, exclusion by classmates is an important source of anxiety and distress for children. Thus, school closures due to covid-19, while having a negative effect on children's direct interaction with peers, may have also reduced the strong negative effect that bullying and exclusion by their classmates had on children that suffer these forms of harassment. This may at least partially explain the increase in children's well-being at least in the initial stages of the pandemic when long-term lack of social connectedness was not yet an issue.

Table 6 Social network support

	(1) OLS	(2) OLS	(3) OLS
During the Coronavirus, I felt well-supported by some of my friends	0.0967***		
	(0.014)		
During the Coronavirus, I felt well-supported by some of my teachers		0.1302***	
		(0.015)	
During the Coronavirus, I felt well-supported by some people I live with			0.1745***
			(0.022)
Observations	8,136	8,158	8,203
R2	0.5435	0.5451	0.5461
Controls for children's characteristics	YES	YES	YES
State FE	YES	YES	YES
Adjusted R2	0.542	0.544	0.545
F test	206.3	205.9	211.6

Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5 Discussion

The purpose of this study has been to look at how the coronavirus pandemic affected self-reported levels of SWB in children, with a particular emphasis on identifying positive, but also negative predictors associated to coronavirus pandemic. Loneliness, a lack of active leisure indoor activities, a fragmented family environment, as well as limited or no social network support from teachers or friends, a lack of internet access, and an absence of reliable sources of information about coronavirus all contributed to lower levels of SWB in children. This is not surprising given the overwhelming situation they were living in. In these circumstances, having little or no adult support and reassurance meant being completely isolated within an already closed and restricted world outside their home. Furthermore, not having internet access meant being cut off from opportunities for learning and socialisation, as the Covid-19 pandemic meant, as previously noted, a forced and sudden transition to digitally connected platforms.

However, not having many of the material conditions to network was a lower source of disquiet for children than not being supported by family and friends within a social network or not conducting a series of activities the children considered as useful for themselves or others. Being listened to and supported by family or caregivers, having productive leisure activities both indoors and outdoors, a strong social network support, and good living conditions, including access to the digital environment, provided an environment in which children reported higher levels of SWB. This was far more important for the children than having an additional laptop or a phone to connect with others. The association between active leisure activities and SWB could have somewhat compensated for the limited opportunities school closures left for extra-curricular activities. Conducting a raft of other activities counterweighed, to

Table 7 Lockdown and restrictions

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS
Everybody in my city/town/village was in lockdown for many days	-0.0046						
	(0.024)						
Me or somebody in my home got infected with Coronavirus		0.0255					
		(0.036)					
Somebody in my family (not living with me) got infected with Coronavirus			-0.0130				
			(0.027)				
Somebody I know got infected with Coronavirus (e.g.: from my neighbourhood or in a friend's family)				0.0090			
				(0.022)			
At home we had to be very careful because somebody was considered at high risk of getting very ill if they got infected with the Coronavirus					-0.0432		
					(0.026)		
I had to stay at home for many days						0.0406	
						(0.031)	
I could not attend school for many days							0.0702**
							(0.033)
Observations	7,502	8,030	7,828	7,908	7,890	8,036	8,079
R2	0.5370	0.5398	0.5355	0.5407	0.5409	0.5374	0.5351
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES
Adjusted R2	0.535	0.538	0.534	0.539	0.539	0.536	0.534
F test	171.7	197.6	182.3	193.1	189.7	195.1	194.6

Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

a large extent, the negative impact restrictions on sports and organised outdoor activities, as well as on socialisation opportunities, had on children's SWB.

Overall, the analysis aligns with prior findings, strengthening their conclusions. It also adds additional evidence about the influence of the coronavirus on children's SWB. By covering nine different European countries, the data from the Children's Worlds survey provides an important opportunity to assess the impact of coronavirus on children's SWB at a cross-national level, while overcoming the limitations of single-country or two-country analyses. We uncover that children's SWB during the pandemic was associated with (1) some material conditions (e.g., satisfaction with their house/area they live in, internet access, etc.); but mostly with (2) healthy movement activities (e.g., playing outside, doing sport, etc.); and (3) family, school, and friends network support. By contrast, SWB in children decreased with (4) age, (5) loneliness; (6) a fragmented family environment; and (7) exclusion by peers.

6 Conclusions

The coronavirus pandemic, coupled with the lockdowns and restrictions imposed by national governments to contain the spread of the virus, had a significant impact on children's subjective well-being (SWB). Our study involved the direct surveying of 9,684 children, aged 9 to 15, attending schools across nine European countries. It offers valuable insights into the factors that affected the SWB of European children one year into the pandemic.

Our findings indicate that higher levels of self-reported SWB were associated with a sense of security and support within the family and their broader social circle. Conversely, children who reported feelings of isolation and engaged in individual, less productive daily tasks tended to have lower SWB. This underscores the critical need for outreach and the promotion of social connections, especially for children who lack adequate support systems and those who are most isolated or vulnerable. Initiatives that facilitate peer interaction through small-group activities or mentoring programmes can have a positive impact in these cases.

Moreover, we discovered that good internet access, rather than the type of device used, played a crucial role in higher SWB. The pandemic highlighted the necessity of closing existing digital divides, as connectivity became a lifeline for education, information, and social contact during lockdowns. Investment in broadband development and the provision of subsidised access in underserved areas can help bridge these gaps. Equally important are digital literacy programmes and technical assistance to ensure that families can fully utilise their improved connectivity.

Finally, maintaining a varied set of activities, both indoors and outdoors, such as playing sports or engaging in new tasks and games, was another essential source of SWB during the pandemic, especially given the severe restrictions on freedom of movement imposed by successive lockdowns. Surprisingly, children demonstrated remarkable resilience and adaptability to the disruptions caused by the pandemic, often more so than adults. Despite extensive changes to their routines, such as prolonged lockdowns, school closures, or living in households with infections, their SWB was less impacted than expected.

However, despite the study's considerable strengths in shedding light on the most significant pandemic-related factors influencing variations in children's subjective well-being (SWB), several limitations remain. The cross-sectional nature of the Children's Worlds data constrains the ability to conduct longitudinal analyses of changes in SWB within the same sample from before to during the Covid-19 pandemic. Nahkur and Kutsar (2022) have used retrospective questions to explore specific aspects of subjective well-being before and during the pandemic. This is a useful approach as retrospective questions can provide valuable insights into changes in well-being. However, this approach cannot completely replace the absence of genuine pre-pandemic baseline data for a robust assessment of within-person SWB changes over time. Since the Children's Worlds data lacks baseline observations collected before the Covid-19 pandemic, it limits the depth and detail of conclusions regarding individual-level SWB shifts from pre-Covid-19 to during Covid-19, relying more on immediate context rather than true baseline data.

The absence of longitudinal data poses a challenge when evaluating changes in children's SWB levels before and during the coronavirus pandemic. This limitation is nevertheless a shared challenge in virtually all surveys, as the pandemic introduced transformations that were not foreseen in pre-outbreak surveys. Additionally, despite having data from a significantly larger number of countries compared to most studies on the same topic, the sample remains influenced by the distinct cultural and socioeconomic characteristics of each country and of Europe as a whole. The use of country fixed-effects in the analysis partially addresses this issue, but further research is necessary to account for cross-country differences and nuances, especially if the results are to be applied to countries and continents not covered in the analysis. Furthermore, the majority of country samples were regionally rather than nationally representative, with substantial variations in the number of surveys conducted between nations. Sample sizes ranged from as low as 590 children in Germany to as high as 2,422 in Belgium.

Overall and considering the significance of subjective well-being (SWB) for mental health, this study contributes meaningfully to the evolving understanding of how massive disruptions impact children's lives and provides a foundational resource for practitioners and policymakers. It offers fresh insights into the factors that influenced children's SWB during the coronavirus pandemic and should serve as a starting point for addressing and mitigating elements that have affected and may continue to affect children's well-being in the future.

Moreover, these results can aid family members and caregivers in better understanding how to support children during sudden crises and challenging times. While it is not possible to directly assess individual-level changes in SWB, identifying the key influences on children's SWB offers actionable evidence to inform supportive practices and policies that promote child welfare, both presently and in future crises.

In a broader context, delineating the most influential factors allows for tailored, evidence-based responses. This approach focuses resources where they are needed most, rather than relying on one-size-fits-all strategies. It underscores the importance of a holistic approach that encompasses school, social networks, family, and socio-economic domains when designing policies and practices to safeguard children's subjective well-being in times of crisis.

Appendix

Table 8 Odds ratio of ordered logit analysis of children's satisfaction. Baseline regression

	Odds ratio of ordered logit analysis of children's satisfaction	(1)	(2)	(3)	(4)	(5)
	VARIABLES	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit
	Gender—Boy	1.1071***	1.0942**	1.1159***	1.0825**	1.0969**
		(0.040)	(0.041)	(0.042)	(0.041)	(0.042)
	Gender—I do not think of myself as a boy or a girl	0.2114***	0.3189***	0.3591***	0.4816***	0.4986***
		(0.049)	(0.070)	(0.095)	(0.116)	(0.117)
	Age	0.8464***	0.8540***	0.8911***	0.9389***	0.9258***
		(0.016)	(0.017)	(0.018)	(0.019)	(0.019)
Family Environment	Living with family, but at a different place (not at our regular home)		0.5855**	0.7626	0.8789	0.9044
			(0.125)	(0.138)	(0.170)	(0.175)
	Living with family, but in more than one home, because my parents live in different homes		0.6751***	0.7117***	0.7877***	0.7889***
			(0.044)	(0.046)	(0.052)	(0.053)
	Living with family, but in more than one house, because my family has more than one house		0.8070*	0.8276	0.8606	0.8542
			(0.095)	(0.101)	(0.109)	(0.111)
	Living in residential care		1.1886	1.7197	1.4447	1.4075
			(0.468)	(0.623)	(0.602)	(0.628)
	Living in a family different than mine		0.6862	3.0604**	2.7748**	3.1832***
			(0.336)	(1.336)	(1.146)	(1.345)
	Question not asked		0.4480***	0.3773***	0.8129*	0.8435
			(0.047)	(0.040)	(0.088)	(0.094)

Table 8 (continued)

	Odds ratio of ordered logit analysis of children's satisfaction	(1)	(2)	(3)	(4)	(5)
	VARIABLES	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit
	My parent(s) listen to me and take what I say into account		2.3984***	1.6537***	1.5304***	1.4944***
			(0.068)	(0.049)	(0.044)	(0.045)
Material conditions	Satisfaction with the house you live in			1.2106***	1.1732***	1.1718***
				(0.024)	(0.023)	(0.024)
	Satisfaction with the area where you live			1.1903***	1.1114***	1.1086***
				(0.017)	(0.016)	(0.016)
	Satisfaction with the things you have			1.5618***	1.3121***	1.3025***
				(0.033)	(0.028)	(0.029)
Personal issues	Satisfaction with the way you look				1.2960***	1.2758***
					(0.015)	(0.016)
	Satisfaction with your health				1.3467***	1.3483***
					(0.024)	(0.025)
Social and school circle	I have enough friends					1.1790***
						(0.037)
	Left out by other children from your class					0.8870***
						(0.028)
	Observations	9,611	8,919	8,638	8,545	8,283
	State FE	YES	YES	YES	YES	YES
	Log Likelihood	-28464	-25641	-23471	-22524	-21692
	LR chi^2	907.4	1778	3090	3633	3519
	Prob. > chi^2	0	0	0	0	0
	Pseudo R^2	0.0158	0.0405	0.0898	0.116	0.116

Odds ratios reported. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 9 Odds ratio of ordered logit analysis. Access to the internet and to material devices for remote communication

	(1) Ordered Logit	(2) Ordered Logit	(3) Ordered Logit	(4) Ordered Logit	(5) Ordered Logit	(6) Ordered Logit	(7) Ordered Logit	(8) Ordered Logit
At present, how happy are you with the devices that you have to get in touch with other people?	0.9897							
	(0.090)							
Have access to computer or a tablet when needed		0.7973***						
		(0.068)						
During the Coronavirus, how often did you have access to the Internet?			1.1290***					
			(0.036)					
Have your own device: Computer				1.0030**				
				(0.002)				
Have your own device: Handy/Smartphone					1.0042***			
					(0.001)			
Have your own device: Laptop						1.0042***		
						(0.001)		
Have your own device: Tablet							1.0039***	
							(0.001)	
Have your own device: Others								1.0050**
								(0.002)

Table 9 (continued)

	(1) Ordered Logit	(2) Ordered Logit	(3) Ordered Logit	(4) Ordered Logit	(5) Ordered Logit	(6) Ordered Logit	(7) Ordered Logit	(8) Ordered Logit
Observations	8,271	8,243	8,227	5,770	7,028	6,099	6,620	7,009
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES	YES
Log Likelihood	-21663	-21587	-21543	-14460	-17,955	-15,309	-16735	-18034
LR chi^2	3507	3532	3532	2305	2883	2422	2697	2828
Prob. > chi^2	0	0	0	0	0	0	0	0
Pseudo R^2	0.116	0.116	0.116	0.119	0.119	0.118	0.119	0.118

Odds ratios reported. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 10 Odds ratio of ordered logit analysis. Sources of information

	(1) Ordered Logit	(2) Ordered Logit	(3) Ordered Logit	(4) Ordered Logit	(5) Ordered Logit
I received a lot of information about the Coronavirus from my family members or caregivers	1.0641***				
	(0.017)				
I received a lot of information about the Coronavirus from other children		1.0340**			
		(0.017)			
I received a lot of information about Coronavirus from teachers			1.0347*		
			(0.019)		
I received a lot of information about Coronavirus through social media (Instagram, WhatsApp, Facebook, etc.)				1.0086	
				(0.014)	
I received a lot of information about the Coronavirus through the news					1.0528***
					(0.018)
Observations	8,151	8,124	8,133	8,106	8,134
Controls for children's characteristics	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES
Log Likelihood	-21,314	-21,286	-21,301	-21,194	-21,277
LR chi^2	3485	3482	3490	3440	3458
Prob. > chi^2	0	0	0	0	0
Pseudo R^2	0.117	0.116	0.116	0.116	0.116

Odds ratios reported. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11 Odds ratio of ordered logit analysis. Activities and chores

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(During the Coronavirus pandemic) How often did you spend time:	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit	Ordered Logit
Doing things I did not do for a long time (such as hobbies, games etc.)	1.0495***						
	(0.015)						
Taking care of siblings (brothers/sisters) or other family members		1.0363***					
		(0.011)					
Learning and doing homework			1.0567***				
			(0.022)				
Watching movies or series on the TV, computer or another device				1.0235			
				(0.015)			
Using social media (Facebook, Instagram, TikTok, etc .) on the computer, mobile phone or other devices					1.0054		
					(0.011)		
Speaking with people on the phone or any other way (such as using WhatsApp						1.0470***	
						(0.014)	
Meeting with your friends online (e.g. on the computer, zoom or any other way)							1.0428***
							(0.012)
Observations	8,042	7,930	8,002	7,998	8,032	8,051	8,013
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES
Log Likelihood	–20961	–20702	–20862	–20840	–20936	–20990	–20899
LR chi^2	3429	3343	3414	3373	3364	3411	3386
Prob.> chi^2	0	0	0	0	0	0	0
	0.117	0.116	0.117	0.117	0.116	0.117	0.116

Table 11 (Continued)

	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Doing things I did not do for a long time (such as hobbies, games etc.)	1.0744***							
	(0.015)							
Playing games on the computer, mobile phone or devices (such as PlayStation, Xbox, Nintendo, etc.)		1.0439***						
		(0.013)						
Spending time on my own			0.9255***					
			(0.012)					
Playing or hanging out inside the house				1.0564***				
				(0.015)				
Playing or hanging out outside					1.1074***			
					(0.016)			
Reading						1.0613***		
						(0.013)		
Playing sports or doing exercise							1.0931***	
							(0.015)	
Doing new things I did not do before the Coronavirus (such as new hobbies, games etc.)								1.0703***
								(0.017)
Observations	7,984	8,041	7,998	7,955	7,941	7,992	7,984	8,041
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES	YES
Log Likelihood	–20829	–20960	–20863	–20725	–20689	–20821	–20821	–20962
LR chi^2	3395	3392	3416	3352	3400	3419	3433	3416
Prob.> chi^2	0	0	0	0	0	0	0	0
	0.117	0.117	0.117	0.117	0.117	0.117	0.117	0.117

Odds ratios reported. Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 12 Odds ratio of ordered logit analysis. Social network support

	(1) Ordered Logit	(2) Ordered Logit	(3) Ordered Logit
During the Coronavirus, I felt well-supported by some of my friends	1.1693***		
	(0.021)		
During the Coronavirus, I felt well-supported by some of my teachers		1.1914***	
		(0.022)	
During the Coronavirus, I felt well-supported by some people I live with			1.2231***
			(0.030)
Observations	8,136	8,158	8,203
Controls for children's characteristics	YES	YES	YES
State FE	YES	YES	YES
Log Likelihood	-21,295	-21,338	-21,451
LR chi^2	3595	3626	3679
Prob. > chi^2	0	0	0
Pseudo R^2	0.118	0.118	0.118

Odds ratios reported. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 13 Odds ratio of ordered logit analysis. Lockdown and restrictions

	(1) Ordered Logit	(2) Ordered Logit	(3) Ordered Logit	(4) Ordered Logit	(5) Ordered Logit	(6) Ordered Logit	(7) Ordered Logit
Everybody in my city/town/village was in lockdown for many days	0.9534						
	(0.029)						
Me or somebody in my home got infected with Coronavirus		0.9876					
		(0.045)					
Somebody in my family (not living with me) got infected with Coronavirus			0.9762				
			(0.034)				
Somebody I know got infected with Coronavirus (e.g.: from my neighbourhood or in a friend's family)				1.0277			
				(0.030)			
At home we had to be very careful because somebody was considered at high risk of getting very ill if they got infected with the Coronavirus					0.9705		
					(0.032)		
I had to stay at home for many days						1.0583	
						(0.042)	
I could not attend school for many days							1.1001**
							(0.047)
Observations	7,502	8,030	7,828	7,908	7,890	8,036	8,079
Controls for children's characteristics	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES
Log Likelihood	-19,454	-21,020	-20,452	-20,665	-20,610	-21,069	-21,193

Table 13 (continued)

	(1) Ordered Logit	(2) Ordered Logit	(3) Ordered Logit	(4) Ordered Logit	(5) Ordered Logit	(6) Ordered Logit	(7) Ordered Logit
LR chi^2	3104	3438	3287	3381	3343	3437	3410
Prob. > chi^2	0	0	0	0	0	0	0
Pseudo R^2	0.117	0.116	0.115	0.116	0.117	0.116	0.115

Odds ratios reported. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Data Availability The Children's Worlds 4th Wave (Covid-19) dataset is available by request from the Jacobs Foundation here: https://isciweb.org/the-data/access-our-dataset/.

Declarations

The data used in this paper comes from Children's Worlds: An international survey of children's lives and well-being (http://www.isciweb.org) and has been collected using all the ethical guidelines for research involving humans. The Children's Worlds 4th Wave (Covid-19) dataset is available by request from the Jacobs Foundation here: https://isciweb.org/the-data/access-our-dataset/. The views expressed here are those of the authors. They are not necessarily those of ISCWeB.

Informed Consent Statement All participants in the survey received structured and age-appropriate information about the purposes and procedures of the research.

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