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# **Risk and protective factors related to children's symptoms of emotional difficulties and hyperactivity/inattention during the COVID-19-related lockdown in France: results from a community sample**

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1 **Title page**

2  
3 Title: Risk and protective factors related to children's symptoms of emotional difficulties  
4 and hyperactivity/inattention during the COVID-19 related lockdown in France: results from  
5 a community sample

6 Running head: Mental health in children during COVID-19

7  
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Ethics approval: The TEMPO study received approval from France’s national committees for data protection (CCTIRS: Comité Consultatif sur le Traitement des Informations pour la Recherche en Santé; CNIL: Commission Nationale Informatique et Liberté).

Availability of data and material: Upon request.

Code availability: STATA 16.1 (StataCorp, College Station, Texas, USA)

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45 **ABSTRACT**

46 **Objective:** The COVID-19 epidemic has spread worldwide since December 2019.  
47 To contain it, preventive measures including social distancing, economic shutdown, and  
48 school closures were introduced, carrying the risk of mental health burden in adults and  
49 children. Although the knowledge base regarding children's response to trauma and  
50 adverse events in general has broadened, descriptions of their mental health during  
51 epidemics remain scarce. In particular, the role of family socioeconomic characteristics  
52 and parental mental health are poorly understood. **Methods:** We assessed the correlates  
53 of children's emotional difficulties and symptoms of hyperactivity/inattention during the  
54 COVID-19 lockdown in a French community-based sample. Data came from 432  
55 community-based parents (27-46 years, TEMPO cohort) and their children (mean age 6.8  
56 +/- 4.1) interviewed online. Children's symptoms of emotional difficulties and  
57 hyperactivity/inattention were assessed using the parent reported Strengths and  
58 Difficulties Questionnaire during the 5th week of home confinement. Family socioeconomic  
59 characteristics and parental mental health and substance use were assessed weekly  
60 during the first 5 weeks of home confinement. Data were analyzed using logistic  
61 regression models. **Results:** 7.1% of children presented symptoms of emotional difficulties  
62 and 24.7% symptoms of hyperactivity/inattention. Family financial difficulties and parental  
63 symptoms of anxiety and depression, as well as children's sleeping difficulties and screen  
64 time, were associated with the presence of psychological difficulties. **Conclusion:**  
65 Children's emotional and behavioural difficulties are associated with parental mental health  
66 and socioeconomic difficulties. In the unprecedented situation of the COVID-19 epidemic,  
67 parents and professionals involved in caring for children should pay special attention to

68 their mental health needs.

69 **Keywords:** Children's mental health; self-report; epidemiology; community survey:

70 COVID-19

71

## 72 **1. Introduction**

73 As the coronavirus (COVID-19) epidemic progresses worldwide, on March 17<sup>th</sup> 2020 the  
74 French Government ordered a nationwide lockdown, with strict social restrictions and  
75 limitations of individuals' movements. Families were confined to their homes, with the risk  
76 of job loss, salary reduction or closure of regular activities such as schools. According to  
77 UNESCO, as of April 1<sup>st</sup> 2020, the infection has caused 194 countrywide closures around  
78 the world, thus affecting 1 598 099 000 students, knowing that school closures have been  
79 shown to have an impact on children psychological difficulties [1-3], school closure may  
80 also cause disruptions in physical activity, social interactions, and mental health of children  
81 and adolescents.

82 Prior studies on the health impact of a quarantine [1, 4, 5] have shown that when children  
83 are out of school, they are physically less active, have longer screen time and irregular  
84 sleep patterns, resulting in weight gain and loss of cardiorespiratory fitness, which can all  
85 subsequently impact their psychological well-being.

86 There is evidence that in some special populations, such as children of health workers [6],  
87 children with a chronic disease [7] as well as those suffering from ADHD before the  
88 epidemic [8, 9], the COVID-19 outbreak and the accompanying disease containment  
89 measures introduced had an impact on psychological well-being. However, though  
90 research highlights children's mental health risks associated with anxiety, lack of peer  
91 contacts, reduced opportunities for stress regulation or parental mental illness [10-12], and  
92 several reports [1, 13, 14] call for further research, to date there is little epidemiological

93 data on the mental health of children drawn from the community in face of the COVID 19  
94 epidemic.

95 Given the well-known associations between family characteristics such as parental mental  
96 health [15-17], low socioeconomic position [17] [18] and offspring high risk of poor mental  
97 health[15, 16], we chose to specifically examine the role of these factors.

98 The current study

99 The aim of our study was to assess family and individual correlates of children's symptoms  
100 of emotional difficulties and hyperactivity/inattention in a community-based sample in  
101 France.

102 We assumed that children's characteristics such as sleeping difficulties, elevated screen  
103 time use, as well as the family's circumstances including parents' marital situation (single  
104 vs. living together), financial difficulties, low income and unstable work situation during  
105 lockdown, parents' symptoms of anxiety and depression or substance use, and parents'  
106 experience of COVID-19 symptoms were correlated to children's psychological difficulties  
107 and studied these characteristics.

108

109

## 110 **2. Methods**

### 111 *2.1 Setting and study design*

112 Data for this study come from a longitudinal survey of a cohort of parents who took part in  
113 the 2020 online assessment of the TEMPO (Trajectoires EpidéMiologiques en Population)



114 COVID 19 study ([www.tempo.inserm.fr](http://www.tempo.inserm.fr)).

### 115 *2.1.1 Sample characteristics*

116 The TEMPO study was set up in 2009 to examine associations between life circumstances  
117 and substance use and mental health in young adults. All TEMPO participants have a  
118 parent who took part in the GAZEL cohort study [19, 20]. TEMPO study participants were  
119 recruited in 1991 when 2,585 children aged 4-16 were selected to take part in a survey of  
120 their mental health. In 2009, all 1991 study participants (aged 22-35 at the time) were  
121 invited to participate again: 1103 agreed, of whom 752 agreed to a longitudinal follow-up  
122 [21]. In 2011, we conducted a new wave of data collection and the study sample was  
123 expanded to all GAZEL participants' offspring aged 18 to 37 years [22]. (Figure 1). The  
124 TEMPO study received approval from France's national committees for data protection  
125 (CCTIRS: Comité Consultatif sur le Traitement des Informations pour la Recherche en  
126 Santé; CNIL: Commission Nationale Informatique et Liberté).

### 127 *2.2 Sample*

128 On March 17<sup>th</sup> 2020, 7.730 cases of COVID-19 were reported by France's public health  
129 authorities, among them 2759 were hospitalized and 700 were in intensive care [63],  
130 pushing the French government to order a nationwide lockdown. From March 24<sup>th</sup> to April  
131 28<sup>th</sup> 2020, TEMPO participants were invited by email to complete a weekly online  
132 questionnaire. The 4 initial questionnaires focused on socio-demographics, work  
133 characteristics, COVID-19 infection, general and mental health, as well as substance use.  
134 During the 5<sup>th</sup> week of lockdown, the questionnaire assessed participants' children's  
135 mental health and was completed by 432 participants. Participants who had more than one  
136 child were asked to complete the questionnaire in reference to their youngest child.

137 Sample characteristics are described in **Table 1**. In total, 432 participants, including 276  
138 women (65%) and 148 men (34.9%), completed the study questionnaire about their  
139 children: 31 (7.2%) children had signs of emotional difficulties and 107 (24.8%) of  
140 symptoms of hyperactivity/inattention.

## 141 **2.3 Ethical section**

142 The TEMPO study received approval from France's national committees for data  
143 protection (CCTIRS: Comité Consultatif sur le Traitement des Informations pour la  
144 Recherche en Santé; CNIL: Commission Nationale Informatique et Liberté).

## 145 *2.4 Measures*

### 146 *2.4.1 Children*

147 We used the SDQ to ascertain symptoms of emotional difficulties and  
148 hyperactivity/inattention.

#### 149 *2.4.1.1 Emotional and hyperactivity/inattention symptoms*

150 Children's symptoms of emotional difficulties as well as hyperactivity/inattention were  
151 reported by parents using the Strengths and Difficulties Questionnaire (SDQ) during the 5<sup>th</sup>  
152 week (from 20<sup>th</sup> to 26<sup>th</sup> of April 2020) of home confinement. The SDQ is a brief, 25-item,  
153 measure of behavioral and emotional difficulties that can be used in children and young  
154 people aged 4–17 years [23-25]. In this study, we used 2 subscales: "emotional difficulties"  
155 and symptoms of "hyperactivity/inattention", with 5 items each. Each item was scored on a  
156 3 points ordinal Likert scale (0 "not true"; 1 "somewhat true"; 2 "certainly true"). A cut-off of  
157 >3 out of 10 was used to detect high symptom levels on emotional difficulties scale and of  
158 >5 out of 10 to detect high symptoms levels on hyperactivity/inattention scale. The internal

159 consistency of the subscales was acceptable (Cronbach's  $\alpha$  of 0.62 for emotional  
160 difficulties and 0.74 for symptoms of hyperactivity/inattention).

#### 161 *2.4.1.2 Risk factors of children's psychological difficulties*

162 Risk factors studied in this investigation included children's age, sleep and screen time  
163 use, family socio-demographic characteristics, parents' mental health and substance use,  
164 and parents' experience of COVID-19 symptoms.

#### 165 *2.4.1.3 Children's characteristics (sociodemographics, sleeping difficulties, screen time)*

166 The child's sociodemographic characteristics included sex (female vs. male), age (> or =<  
167 6 years old).

168 *Sleeping difficulties* were assessed by the following questions: "During the preceding 7  
169 days, did your child have difficulties sleeping that: appeared or increased or decreased or  
170 disappeared or stayed stable or no difficulties." We created the following categories  
171 "Sleeping difficulties (including "sleeping difficulties that "appeared" or "increased" or  
172 "stayed stable") vs. "No sleeping difficulties" (including "no difficulties", or "difficulties  
173 disappeared" or "difficulties decreased").

174 *Screen time* was assessed by the following questions: "During the preceding 7 days, how  
175 much time has your child spent in front of a screen (TV, tablet, computer, smartphone..)  
176 per day. We created the 2 following categories: "Less than 1 hour", vs. "More than 1 hour",  
177 based on the American Academy of Pediatrics new Recommendations for Children's  
178 Media Use [61]

#### 179 *2.4.2 Parents*

#### 180 2.4.2.1 Family socio-demographic characteristics

181 Socio-demographic characteristics studied include: family situation (single vs. couple),  
182 financial difficulties in the preceding 5 weeks (yes vs. no), household monthly income  
183 (2500 euro or less vs. > 2500 euro)(in reference to the average income in France) [62] and  
184 work situation during lockdown (normal /distance working vs. job loss/ unemployment vs.  
185 sick leave).

#### 186 2.4.2.2 Parents' mental health

187 To assess *parents' symptoms of anxiety and depression* during the first 5 weeks of  
188 lockdown, we used weekly repeated measures of the subscale assessing anxious-  
189 depressed symptoms in the Adult Self Report Scale (ASR) [26], creating a dichotomized T-  
190 score with a cut-off based on +1 standard deviation from the mean. Additionally, using an  
191 assessment of ASR-based anxious-depressed symptoms obtained in the TEMPO study in  
192 2018, we also identified parents' symptoms of anxiety and depression before lockdown,  
193 which were studied in additional analyses.

#### 194 2.4.2.3 Parents' substance use

195 Participants reported levels of substance use and abuse during the first 5 weeks of  
196 lockdown in weekly questionnaires.

197 *Tobacco smoking status* was assessed using the following question in week 1: "Are you a  
198 regular or occasional smoker?" coded yes vs. no.

199 *Alcohol use* was assessed using the French version of the Alcohol Use Disorders  
200 Identification Test (AUDIT-C) [27, 28]. This brief three-item alcohol screening tool  
201 developed by the WHO focuses on the frequency and quantity of alcohol consumption

202 [29], matches DSM IV criteria for alcohol abuse and dependence and is validated against  
203 clinical diagnosis. Audit-C test scores of 3 or more for women and 4 or more for men were  
204 considered to indicate a heightened risk for hazardous drinking/alcohol use disorder [29,  
205 30].

#### 206 *2.4.2.4 COVID-19 symptoms of the parents*

207 Parents' COVID-19 symptoms during the first 5 weeks were ascertained weekly by the  
208 following question: "Did you present symptoms of COVID-19 infection (fever, cough, loss  
209 of taste or smell)"? Based on participants' weekly repeated responses ("yes" vs. "no") we  
210 created a variable indicating the presence of symptoms prior to the measure of children's  
211 psychological difficulties.

#### 212 *2.5 Statistical analyses*

213 First, descriptive statistics including frequencies and percentages were used to  
214 characterize the study population (Table 1). We tested bivariate associations between  
215 potential individuals and family risk factors, and children's symptoms of emotional  
216 difficulties or hyperactivity/inattention using the Chi square test (**Table 2** and **Table 3**).

217 Second, to identify factors associated with children's emotional difficulties and symptoms  
218 of hyperactivity/inattention, we used logistic regression with the alpha value set at  $P < 0.05$ .  
219 We built one model, adjusting for the child's age and sex, and an additional multivariate  
220 model adjusting for all variables that were significantly associated with the study outcomes  
221 in bivariate analyses.

#### 222 *Additional analyses*

223 We tested for statistical interactions between children’s age and sex on the one hand and  
224 parents’ mental health and financial difficulties on the other. None of these statistical  
225 interactions were statistically significant.

226 All statistical analyses were conducted using STATA 16.1 (StataCorp, College Station,  
227 Texas, USA).

### 228 **3. Results**

#### 229 *3.1 Sample characteristics (Table 1)*

230 Sample characteristics are described in **Table 1**. In total, 432 participants, including 276  
231 women (65%) and 148 men (34.9%), completed the study questionnaire about their  
232 children: 31 (7.2%) children had signs of emotional difficulties and 107 (24.8%) of  
233 symptoms of hyperactivity/inattention.

234 **Table 2** and **Table 3** show factors associated with children’s emotional difficulties and  
235 symptoms of hyperactivity/inattention.

#### 236 *3.2 Risk factors of children’s emotional difficulties and symptoms of* 237 *hyperactivity/inattention (Tables 2 & 3)*

##### 238 *Emotional symptoms*

239 Age- and sex-adjusted logistic regression analyses (**Table 2**) showed that the odds of  
240 children’s high levels of emotional difficulties were elevated among those who had  
241 sleeping difficulties (OR 2.6, 95% CI 1.2– 5.7), whose screen time was more than 1 hour  
242 per day (OR 6.8, 95% CI 1.5 – 30.9), whose parents had symptoms of anxiety-depression

243 during lockdown (OR 8.1, 95% CI 2.4– 26.8), or who had financial difficulties (OR 4.2, 95%  
244 CI 1.6– 11.0).

245 Family situation (OR 1.2, 95% 0.6-2.7), the number of children in the family (OR 1.0, 95%  
246 0.3-3.2), income (OR 1.1, 95% 0.5-2.4), job situation (OR 1.6 95% 0.7-3.5), COVID-19  
247 symptoms (OR 1.7, 95% 0.5-5.3), and parents' substance use, such as tobacco  
248 consumption (OR 2.3, 95% 0.8-6.6) and problematic alcohol consumption (OR 0.7, 95%  
249 0.1-3.8) were not associated with children's high levels of emotional difficulties.

250 These associations did not change in a multivariate regression models, except for sleep  
251 difficulties and financial difficulties, which were no longer associated with children's  
252 emotional symptoms.

### 253 *Symptoms of hyperactivity/inattention*

254 Age- and sex-adjusted logistic regression analyses (**Table 3**) showed that the odds of  
255 children's symptoms of hyperactivity/inattention were elevated among children who had  
256 sleeping difficulties (OR 2.0, 95% CI 1.1-3.3), had parents with symptoms of anxiety or  
257 depression (OR 2.6, 95% CI 1.1-1.2), financial difficulties (OR 2.3, 95% CI 1.1-4.6), or who  
258 were unemployed (OR 1.8, 95% CI 1.1-3.3).

259 The child's screen time (OR 1.3, 95% CI 0.9-1.9), the responding parent's sex (OR 0.7,  
260 95% CI 0.4-1.2), the family situation (OR 1.4, 95% CI 0.9-2.3), the number of children in  
261 the family (OR 0.6, 95% CI 0.3-1.5), parents' substance use such as tobacco consumption  
262 (OR 0.8, 95% 0.4-1.6) and problematic alcohol consumption (OR 1.2, 95% 0.7-1.9),  
263 COVID symptoms (OR 0.9, 95% CI 0.4-2.1), or income (OR 1.0, 95% CI 0.6-1.7) were not  
264 associated with children's elevated levels of symptoms of hyperactivity/inattention.

265 These associations did not change in a multivariate regression model, except for sleeping  
266 difficulties and parental work situation, which were no longer associated with children's  
267 symptoms of hyperactivity/inattention.

## 268 **4. Discussion**

### 269 *4.1 Main findings*

270 Ours is one of the first studies to explore children's psychological symptoms and their  
271 correlates during the COVID-19 epidemic and associated lockdown. Overall, when  
272 adjusting on age and sex, children's emotional difficulties and symptoms of  
273 hyperactivity/inattention were significantly associated with their sleeping difficulties and  
274 screen time exposure, their parents' symptoms of anxiety or depression and financial  
275 difficulties. Parental employment situation was associated with children's symptoms of  
276 hyperactivity/inattention only, in an age and sex-adjusted model. Overall, children's  
277 symptoms of frequent psychological difficulties are associated with known risk factors of  
278 youth mental health problems. Children of parents who have psychological difficulties or  
279 who experience socioeconomic difficulties should benefit from special attention from  
280 primary and mental health practitioners.

### 281 *4.2 Interpretation of study findings*

282 We discuss our findings on the role of parents' mental health and socioeconomic  
283 characteristics on the one side, and children's sleep disorders and screen time use on the  
284 other side.

#### 285 *4.2.1 Parents' characteristics*

286 In accordance with previous research [31-33], parents' symptoms of anxiety or depression



287 during lockdown, as well as parents' preexisting mental health difficulties, were associated  
288 with a higher level of children's emotional difficulties and symptoms of  
289 hyperactivity/inattention.

290 In a stressful period such as the COVID-19 epidemic and resulting disruptions of daily life,  
291 parents are the best resource for children to seek help from. Good parenting skills are  
292 hence crucial when children are confined at home [1]. In general, children with a mentally  
293 ill parent more frequently experience negative emotions, including anger, fear, and  
294 sadness. They also show higher levels of disturbed attachment and difficulties in emotional  
295 regulation [34]. Consequently, they are at elevated risk of internalizing problems, such as  
296 depression and anxiety [15, 16].

297 Concerning children's symptoms of hyperactivity/inattention, the study of Zhang [9]  
298 showed that they were related to parent's mood during the COVID-19 outbreak in China.  
299 Additionally, parents of children with ADHD experience high levels of daily child-rearing  
300 stressors [35, 36], therefore this association may also be bidirectional. The special  
301 combination of school closures and children staying at home might bring elevated  
302 difficulties and stress for both children and their parents. Our results have significant  
303 clinical implications concerning the importance of assessing parents' negative mood when  
304 evaluating children's well-being. During periods of lockdown, when assessing a child,  
305 mental health practitioners should pay further attention to the mental health status of the  
306 parents, especially looking for depression or anxiety symptoms.

307 Similarly, independently of home confinement, previous research has reported that  
308 children of parents with substance use disorders, [37-39], have an elevated likelihood of  
309 additional mental disorders. However, we found no relationship between parental  
310 consumption of tobacco or alcohol and offspring psychological difficulties. This may reflect

311 low rates of tobacco and alcohol use among TEMPO cohort participants. [40]

312 In our study, having a parent who presented with symptoms of COVID-19 was not  
313 associated with a higher score of emotional difficulties or hyperactivity/inattention. In a  
314 recent Chinese study [31], having relatives or acquaintances infected with COVID19 was  
315 an independent risk factor of anxiety among college students, probably due to the high  
316 contagiousness of the illness [41]. It is important to note that parental COVID-19  
317 symptoms were self-reported since biological testing was hardly available during the  
318 lockdown. It may also be that individuals who were too ill were not able to respond to  
319 TEMPO study questionnaires.

320 Parental financial difficulties and work situation were associated with children's emotional  
321 difficulties and symptoms of hyperactivity/inattention. Stability of family income has been  
322 found to be significantly associated with youth anxiety during the COVID 19 crisis, due to  
323 links with psychological and economic pressure [31, 42].

324 Our findings indicate an increased risk of psychological difficulties in children whose family  
325 had psychological or financial difficulties during lockdown. This result is consistent with  
326 previous studies, which demonstrated that parents with financial difficulties are at higher  
327 risk of mental health difficulties such as anxiety. Economic decline [43] is associated with  
328 increased mental health problems for youths that may be affected by its consequences on  
329 adult unemployment and mental health, such as depression [14, 44].

#### 330 *4.2.2 Children's characteristics*

331 Children's elevated levels of emotional difficulties and symptoms of  
332 hyperactivity/inattention were associated with sleeping difficulties. Because both were  
333 measured simultaneously, it is possible that these relationships are bidirectional. Children

334 who are anxious or experience symptoms of depression frequently have sleeping  
335 problems, which sometimes appear as a key symptom of distress [18, 45]. Symptoms of  
336 hyperactivity and inattention are core symptoms of ADHD. Similarly, ADHD may disrupt  
337 sleep by increasing the probability of bedtime struggles or resistance, limit-setting sleep  
338 problems, inadequate sleep hygiene, and insufficient sleep disorder or poor sleep quality.  
339 In turn, sleep problems may result in ADHD-like day-time behaviors [46].

340 In the specific context of COVID-19, Zhang et al [9] showed that children who have ADHD  
341 and experience low overall mood are most likely to see their symptoms of ADHD, including  
342 sleep patterns, worsen. Another study [13] found that poor sleep, including nightmares, is  
343 among the most frequently reported children's conditions during the COVID-19 outbreak.

344 In our study, children with emotional difficulties or symptoms of hyperactivity/inattention  
345 spent more time in front of a screen during the COVID19 outbreak than children without  
346 such symptoms, which is line with previous studies showing that increased screen time  
347 may exacerbate risk for depression, anxiety, suicide, and inattention among children and  
348 adolescents [47]. Excessive screen time may also be associated with health risks including  
349 poor sleep and sedentarity, which further exacerbate risk of children's psychological diffi-  
350 culties [48, 49]. It is however important to note that our study being cross-sectional, screen  
351 use may also be a consequence of children's psychological difficulties, both potentially  
352 reinforcing one another. Kiraly et al [50] made some practical guidance to prevent chil-  
353 dren's problematic Internet use and emphasize that monitoring and regulating screen time  
354 is crucial and can be implemented by involving young people in rule-making [51].

355 Paradoxically, during the COVID-19 pandemic, many mental health educational resources  
356 and support services were offered via online platforms, which required screen use. Obvi-  
357 ously, screen time may become over-present during periods of school closure [48], and

358 existing guidelines need to be adequately updated to remain relevant. A recent literature  
359 review emphasized that not all screen time is equal - e.g. doing online lessons for school is  
360 different from social media use, which is different from video games. [52]

361

#### 362 *4.3 Strengths and limitations*

363 Our study's main strengths are that it was conducted in the community and started prior to  
364 the COVID-19 epidemic, making it possible to control for preexisting risk factors. However,  
365 it also has some limitations that need to be highlighted. First, all measures were based on  
366 self-reports, including the children's SDQ scores, which could have been influenced by  
367 parental emotional state [53]. Still, parental evaluations are appropriate given the young  
368 mean age of surveyed children (i.e. 6 years). Importantly, the performance and validity of  
369 the parent-reported SDQ in French [25] suggests that it is a good approximation of a  
370 psychiatric interview, in studies of population representative samples [54-56]. Second, we  
371 did not assess children's emotional difficulties and hyperactivity/inattention before the  
372 COVID-19 epidemic, so we have no information concerning pre-existing vulnerabilities.  
373 Children who experienced psychological difficulties prior to the pandemic or had pre-  
374 existing mental health problems are at high risk of having symptoms of anxiety [57]. Third,  
375 though some variables were assessed longitudinally on a weekly basis during lockdown,  
376 the causal relationship between children's and parents' characteristics and children's  
377 emotional difficulties or symptoms of hyperactivity/inattention cannot be confirmed as  
378 children's symptoms were assessed only once. A recent study [58] outlined the need for  
379 longitudinal mental health research with children during and after lockdown. Fourth, the  
380 relatively small sample of the study limited the statistical power of some analyses. This  
381 suggests that a larger sample may show evidence of other risk factors of children's

382 psychological difficulties. Fifth, participants were more likely to live with a partner, have  
383 higher education and hold a managerial position than middle-aged adults of the same age  
384 in France. Reassuringly, we observed a similar rate of lifetime unemployment compared to  
385 the general population [17, 59]. Overall, associations between parental mental health and  
386 socio-economic characteristics, as well as children's sleep and screen use, may actually  
387 be stronger than we report. Sixth, children's age range was limited, as the study did not  
388 include many very young or adolescent children. However, a focus on pre-teenagers made  
389 it possible for us to study a coherent demographic group. **Seventh, our measure of**  
390 **children's emotional and behavioural difficulties was dichotomized, which may have limited**  
391 **the statistical power of our analyses, however we used a validated cut-off, and were thus**  
392 **able to identify children with potentially clinically relevant psychological difficulties.**

393

#### 394 *4.4 Implications*

395 The aim of our study was to assess family and individual risk factors of children's  
396 symptoms of emotional difficulties and hyperactivity/inattention in a community-based  
397 sample in France.

398 While the COVID19 pandemic is spreading all over the world, attention is mostly focused  
399 on adults, hiding the public mental health burden in children. Our results underline the ne-  
400 cessity to consider long-term mental health effects on this worldwide situation on children,  
401 who account for 42% of the world's population. [60].

402 Risk factors of children's mental health difficulties identified in our study, which have previ-  
403 ously been reported, may require special monitoring during the time of the pandemic. For  
404 instance, paying attention to sleep difficulties and nightmares, and suggesting sleep hy-

405 giene and relaxation methods, could be especially worthwhile during the epidemic [13].

406 Moreover, screen time guidelines need to updated, as many children and adolescents will

407 not attend school.

408 Further longitudinal studies should be conducted in order to test prospective risk factors of

409 children's mental health difficulties. Indeed, even as restrictions are lifted and schools re-

410 open, the psychological impact of the pandemic will last. Increased awareness of the risk

411 factors of mental health difficulties in children in this unprecedented event is needed to

412 prevent them in the short and long terms.

413

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416

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