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Chapter

A New Look at Psychological Health and Life Satisfaction: A Quadripartite Model

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Abstract

COVID-19 pandemic had a negative impact on adolescents' psychological health. Two national studies were conducted. The DGEEC study included 9 to 18-year-old pupils. The HBSC study (2 waves) included pupils from the 6th, 8th, 10th, 12th grades. For each study, two groups were established based on life satisfaction scores and on psychological symptoms scores, producing four groups. In both studies, the group with high life satisfaction and reduced psychological symptoms had more boys and younger pupils. The group with low life satisfaction and pronounced psychological symptoms comprised more girls and older pupils. In the DGEEC Study, pupils with low life satisfaction and pronounced psychological symptoms were more likely to exhibit other unwellness signs. In the HBSC study, from 2018 to 2022 (with the COVID-19 in between), psychological symptoms increased significantly and life satisfaction decreased, exacerbating inequities. This model allowed to examine the results of DGEEC and HBSC studies under a new perspective comprising four scenarios, offering an innovative viewpoint on adolescents' psychological health. Results also suggest a potential buffering effect of being physically active, adequate sleep, and adequate screen time. This is a powerful message for health and education professionals and policymakers regarding the relevance of health education and promotion.

Keywords: pupils, gender, life satisfaction, psychological symptoms, lifestyles, school, quality of life perception, COVID-19

1. Introduction

The vulnerabilities associated with the pandemic of COVID-19 have motivated studies reflecting on adolescents, including their physical and psychological health, either through their research or systematic analysis of documents produced by educational and health institutions and researchers [1–6].

There is an agreement in the research about the psychosocial effects of the COVID-19 pandemic on school-aged children and adolescents [7]. Young people reported feeling more lonely and having more depression and anxiety symptoms [8]. Quantitative studies done all over Europe [9–12] confirm this link and show an increase in symptoms of depression, anxiety, and stress.

Tomé and colleagues [13] argue that given the contingencies grounded in the pandemic by COVID-19 (more specifically, social distancing and general confinement/lockdown of the population), young people's psychosocial contexts are considered to have undergone changes that, in turn, generated risks to their psychological health and life satisfaction [3, 10, 12, 14, 15].

The Dual Factor Model [16–18], was used, with some adaptations for its use in population studies, to understand the psychological health of children and adolescents and the associations with their lives and well-being. This model is here referred as “the quadripartite model”, as we retained from this model that life satisfaction and psychological symptoms are not opposed in a continuum of two dimensions, but rather four psychological states: Complete Psychological Health (reduced psychological symptoms and high life satisfaction), Incomplete Psychological Health (reduced psychological symptoms and low life satisfaction), Incomplete Psychological Distress (marked psychological symptoms and increased life satisfaction), and Complete Psychological Distress (marked psychological symptoms and low life satisfaction). Complete Psychological Health implies both conditions: high life satisfaction and reduced psychological symptoms, as suggested in the Dual Factor Model [16–18].

To test this model, data from two national studies, the Directorate-General of Education and Science Statistics of the Ministry of Education and the Ministry of Science (DGEEC), and the Health Behaviour in School-aged Children (HBSC) studies, were used for specific analyses. Gender and grade differences (a proxy for age differences) were confirmed in the four groups (complete and incomplete, health and distress). The DGEEC study also analysed how the situation changes with the perception of quality of life and three health behaviours/lifestyles. Considering HBSC, the differences between the 2018 wave (pre-COVID-19 pandemic) and the 2022 wave (post-COVID-19 pandemic) were analysed.

2. STUDY 1: the DGEEC study

2.1 Methods

2.1.1 Procedures

The *Psychological Health and Well-Being | School study* (also called the DGEEC study) was done by the Directorate General of Education and Science Statistics, the Directorate General of Education, the National Programme for the Promotion of School Success, Aventura Social Team/ISAMB, the University of Lisbon, the Order of Portuguese Psychologists, and the Calouste Gulbenkian Foundation, with the approval of the Ministry of Education.

Schools and classes were chosen randomly from a national list, and all the ethical procedures, authorisations, and anonymous and voluntary participation were guaranteed. Questionnaires were administered online. Full details are in the final national report of the DGEEC study [4].

2.1.2 Participants

This study included 4444 pupils ($M = 13.39 \pm 2.414$; Min = 9 e Max = 18), of whom 52.2% are girls. 27.2% of the participants attended the 2nd cycle of schooling, and 72.8% attended lower and upper secondary education.

2.2 Instruments

The measures and variables under study are described in **Table 1**.

2.3 Statistical analysis and main results

Two groups were created from the measurement of life satisfaction (low—50.3%; high—49.7%) and two groups were created from the evaluation of psychological symptoms (reduced—53.4%; and pronounced—46.6%). In both variables, the median was used as a cut-off point). The combination of four situations resulted in four groups: (1) *Complete Psychological Health*—high life satisfaction and low psychological symptoms (35.6%); (2) *Incomplete Psychological Health*—low life satisfaction and low psychological symptoms (17.7%); (3) *Incomplete Psychological Distress*—high life satisfaction and pronounced psychological symptoms (14.1%); (4) *Complete Psychological Distress*—low life satisfaction and pronounced psychological symptoms (32.6%).

Age and gender differences and differences related to lifestyles and perceptions of quality of life were analysed through Chi-squares or ANOVAS. A significant level was set at $p < .05$.

2.3.1 Gender and age differences

It was found that boys are significantly more frequent in the group with high life satisfaction and low psychological symptoms (*Complete Psychological Health*). Girls are significantly more frequent in the group with low life satisfaction and strong psychological symptoms (*Complete Psychological Distress*).

It was also found that younger pupils were significantly more frequent in the group *Complete Psychological Health* and older pupils in the group *Complete Psychological Distress*. A gradient was observed with the increase in school grades.

Overall, the percentage of girls reporting psychological symptoms is significantly higher than that of boys, even when they report high life satisfaction. Conversely, the percentage of boys reporting no psychological symptoms is significantly higher than that of girls, even when they report low life satisfaction.

Younger participants are more satisfied with life, whether or not they have pronounced psychological symptoms, and older participants are less satisfied with life, whether or not they have pronounced psychological symptoms.

2.3.2 Lifestyles/health behaviours and quality-of-life perception differences

Considering other indicators of psychological well-being (perceived quality of life) and health behaviours (sleep time adequacy, physical activity time, and screen time), the pattern described favours pupils in a state of *Complete Psychological Health* (higher quality of life perception, adequate sleep, physical activity, and screen time) and made more vulnerable pupils in a state of *Complete Psychological Distress*, regarding the same behaviours/situations (**Table 2**). Indeed, the gradient highlights the two “extreme” groups, and the “incomplete” situations tend to place themselves in the middle.

Variables	Category/Items	Min & Max
Gender	Boy	
	Girl	
Age	—	Min = 9 & Max = 18
Grade	From 5th to 12th	Min = 5 & Max = 12
Cycle of studies	2.º cycle	Min = 1 & Max = 2
	Lower and upper secondary education	
Cantril—Life satisfaction (HBSC) [19]	11-step ladder: “The top of the ladder is “10” and represents the best possible life for you, the bottom of the ladder is “0” and represents the worst possible life for you. Right now, where do you think you are on the ladder?”	0 = worst possible to 10 = best possible
HBSC_WHO-5 Total [20] HBSC Psychological symptoms (HBSC) [21, 22]	Sadness	5 lower to 15 higher
	Irritability	1 to 5—Seldom or Never to every day
	Nervousness	
	Difficulty falling asleep Extreme sadness	
Physical Activity (HBSC) [21, 22]	In the past 7 days, how many days did you engage in physical activity for at least 60 minutes?	0 to 7 days
Sleep (HBSC) [21, 22]	In general, how many hours do you sleep each night?	0 to 10 or more hours
Screen time (HBSC) [21, 22]	In general, how many hours do you spend each day in front of a screen (TV, mobile phone, computer, tablet)?	0 to 10 or more hours

Table 1.
Measures and variables under study.

		N	M	SD	F
Days with 60 min of adequate physical activity	Incomplete Psychological Health	741	3.34	1.90	39.89***
	Complete Psychological Distress	1364	2.93	1.80	
	Complete Psychological Health	1478	3.69	1.89	
	Incomplete Psychological Distress	593	3.34	1.83	
Sleep (hours of sleep)	Incomplete Psychological Health	738	7.79	1.12	210.64***
	Complete Psychological Distress	1356	7.12	1.31	
	Complete Psychological Health	1457	8.24	1.07	
	Incomplete Psychological Distress	590	7.83	1.24	
Screen time (hours of screen time)	Incomplete Psychological Health	737	4.62	2.39	78.16***
	Complete Psychological Distress	1364	5.41	2.55	
	Complete Psychological Health	1471	4.00	2.35	
	Incomplete Psychological Distress	591	4.76	2.57	

		N	M	SD	F
HBSC_WHO-5 Total Score (out of 5 to 15)	Incomplete Psychological Health	778	15.28	4.28	885.87***
	Complete Psychological Distress	1430	10.79	4.53	
	Complete Psychological Health	1561	18.81	3.99	
	Incomplete Psychological Distress	617	15.42	4.23	

Note: *** $p < 0.001$.

Table 2.

Psychological symptoms and life satisfaction, by days of physical activity, hours of sleep, screen time, quality of life—Analysis of variance between groups.

3. STUDY 2—the HBSC study

3.1 Methods

3.1.1 Procedures

The HBSC study network integrated multiple countries in 2018 and 2022. In 2018, 44 countries participated; in 2022, 51 countries participated [22–24]. Participants constitute a representative sample for the school grades under study. Schools and classes were picked at random from a national list. All ethical procedures and permissions were in place, and participation was both anonymous and voluntary. Questionnaires were administered online. Full details with the final national report of the HBSC study in 2018 [22] and 2022 [23].

3.1.2 Participants

In 2018, 8215 pupils from the 6th (30.7%), 8th (33.7%), 10th (20.8%), and 12th (14.8%) grades participated, with 52.7% being female and a mean age of 14.36 (SD = 2.28). In 2022, 7649 pupils from the 6th (22.4%), 8th (25.4%), 10th (28.1%), and 12th (24.1%) grades responded, with 51.8% being female and a mean age of 15.05 (SD = 2.36). Therefore, considering the 2018 and 2022 HBSC studies, 15,750 pupils were included, 51.8% from the 2018 HBSC study wave and 48.2% from the HBSC 2022 wave, and 53.2% were female.

3.2 Instruments

The measures and variables under study are described in **Table 3**.

3.3 Statistical analysis and main results

Two groups were created from the measurement of life satisfaction (low—45.4%; high—54.6%), and two groups were created from the evaluation of psychological symptoms (reduced—47.5%; and pronounced—52.5%). In both variables, the median was used as a cut-off point). Four groups were obtained from the combination of the four situations: (1) *Complete Psychological Health*—high life satisfaction and low psychological symptoms (33.4%); (2) *Incomplete Psychological Health*—low life satisfaction and low psychological symptoms (14.1%); (3) *Incomplete Psychological Distress*—high life satisfaction and pronounced psychological symptoms (21.2%); (4) *Complete Psychological Distress*—low life satisfaction and pronounced psychological symptoms (31.3%).

Variables	Category/Items	Min & Max
Gender	Boy	
	Girl	
Age	—	Min = 10 & Max = 18
Grade	6th, 8th, 10th; 12th	Min = 1 & Max = 4
Cantril—Life satisfaction (HBSC) [19]	11-step ladder: “The top of the ladder is “10” and represents the best possible life for you, the bottom of the ladder is “0” and represents the worst possible life for you. Right now, where do you think you are on the ladder?”	0 = worst possible to 10 = best possible
HBSC Psychological symptoms (HBSC) [21, 22]	Sadness	1 to 5—Seldom or Never to every day
	Irritability	
	Nervousness	
	Fear	

Adapted from [19, 20].

Table 3.
Measures and variables under study.

It was confirmed, as in the previous DGEEC 2022 study, that in the HBSC study (either in 2018 or in 2022), younger pupils and boys were significantly more frequent in the group of complete psychological health and older pupils and girls were significantly more frequent in the group of complete psychological distress. There was also an age/grade gradient, with the situation deteriorating as schooling progresses.

4. Discussion

In this application of the Dual Factor Model [16–18], to a population study, it was found that the model helped to explain the distribution of pupils by each of the situations defined by the four conditions.

As observed in previous research, we discovered that, globally, girls present a more disadvantageous situation in terms of their psychological distress [1, 2, 19, 20, 22, 23, 25, 26]. Additionally, we discovered that, globally, older pupils present a more disadvantageous situation concerning their psychological distress [22]. In a study by Yoon et al. [27], it is reaffirmed that adolescents exhibit clear signs of psychological distress as they age, with this trend becoming more prevalent among girls.

The results indicate that, globally, girls are more likely to report symptoms, even when report high life satisfaction. Boys are more likely to report the absence of symptoms, even when they report low life satisfaction. Also, the youngest are the most likely to express life satisfaction, regardless of the presence or absence of pronounced psychological symptoms. The oldest report the lowest levels of life satisfaction, regardless of the presence or absence of pronounced psychological symptoms. This fact demonstrates the need, already mentioned by the original authors [16–18], to take into account not only the extreme situations of “complete health” and “complete distress” but also the situations in which only one of the situations occurs (reduced psychological symptoms and high life satisfaction or pronounced psychological symptoms with low life satisfaction) (Table 4).

<p><i>Complete psychological health</i></p> <ul style="list-style-type: none"> • Younger pupils • Boys • Before COVID-19 • More physically active • More sleep • More adequate screen time • Better perception of quality of life 	<p><i>Incomplete psychological health</i></p> <ul style="list-style-type: none"> • Older pupils • Boys
<p><i>Incomplete psychological distress</i></p> <ul style="list-style-type: none"> • Younger pupils • Girls 	<p><i>Complete psychological distress</i></p> <ul style="list-style-type: none"> • Older pupils • Girls • After COVID-19 • Less physically active • Less sleep • Less adequate screen time • Worst perception of quality of life

Table 4.
 The quadripartite model—the dual factor model [16, 17] adapted [28]—gender and age/grade differences.

Finally, when considering other indicators of psychological well-being (perceived quality of life) and certain health behaviours (adequacy of sleep time, physical activity time, and screen time), we found that this pattern is repeated, favouring pupils in a state of *Complete Psychological Health* and making pupils in a state of *Complete Psychological Distress* more vulnerable.

As suggested by other authors, this study confirms that for a state of complete psychological well-being, both the dimensions of life satisfaction and absence of psychological distress symptoms are essential [16–18]. These same authors suggest that there is a need to consider situations in which only one of the situations occurs (low psychological symptoms and high life satisfaction or pronounced psychological symptoms with low life satisfaction) is present, as results suggest they may be alert to the differential position of gender across educational levels. The data suggest that, throughout schooling, psychological symptoms are most pronounced in girls even when they refer to high life satisfaction, while in boys, there is a decrease in life satisfaction, even without pronounced psychological symptoms. That is, among girls, it is suggested that girls' negative trend with age is from a status of *Incomplete Psychological Distress* to a Status of *Complete Psychological Distress*. In contrast, among boys, it is suggested that boys' negative trend with age is from a status of *Complete Psychological Health* to a Status of *Incomplete Psychological Health*.

The significance of being physically active, sleeping an adequate number of hours, and using screens in a balanced and moderated manner are three promising ways to increase the odds for boys and girls to grow older in a state of *Complete Psychological Health*. Consistently, longitudinal studies have demonstrated that screen time and sleep duration are associated with less psychological health [29, 30].

In the HBSC study from 2018 to 2022, not only did psychological symptoms increase significantly and life satisfaction decrease, but the gap between girls and

boys and between the oldest and the younger seems to have worsened, increasing the health and well-being gap between gender and age groups/grades [22, 23].

Both DGEEC and HBSC studies have some limitations that should be considered. These are self-report studies with a cross-sectional design, which does not allow making inferences of causality. Despite these limitations, the selection of participants was randomised and stratified by administrative region and level of education, with a high number of participants.

5. Conclusions

This quadripartite model allows us to delve deeper into the evolution of life satisfaction and perception of psychological symptoms of distress and look at gender and educational level (age) differences from a different perspective.

This four-scenario perspective provides relevant insight into the worsening of the psychological health of adolescents after the COVID-19 pandemic, accentuates the gender differences already identified, alerts in a more refined way to the gender and grade/age differences, and has already had an impact on the recommendations defined and on the ongoing prevention and promotion measures [4].

Several previous studies [1, 2], specifically the recent HBSC 2022 study [20] and the DGEEC 2022 study [4], emphasise the significance of the prevention of psychological distress and the promotion of psychological health and well-being among adolescents in the school contexts integrates the following.

Conflict of interest

The authors declare no conflict of interest.

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