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# ADOLESCENTS' MENTAL HEALTH LITERACY: POSITIVE MENTAL HEALTH LITERACY QUESTIONNAIRE, GENDER, AND MENTAL HEALTH

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In this study, the validity of a new measure of positive mental health literacy (MHL) is explored in a sample of adolescents: the Positive Mental Health Literacy questionnaire (PosMHLit). The instrument development combined three stages: literature review; conceptual validation by a panel of experts (focus-group and single analysis); a psychometric study. A sample of 539 adolescents was collected and exploratory factor analysis (EFA) with parallel analysis (PA) were conducted. A unidimensional solution with 23 items emerged from EFA. A confirmatory factor analysis corroborated the 1-factor solution, with 19 items. PosMHLit has good internal consistency and construct validity, because it was correlated in the expected directions with MHL, mental well-being, and psychopathology. Girls reported higher PosMHLit than boys. Flourishers and nonflourishers did not differ in terms of PosMHLit. The PosMHLit appears valid and reliable and can be used with adolescents to measure positive MHL.

Keywords: Mental health literacy; Positive mental health; Well-being; Psychometric analysis, Prevention.

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Adolescence is a critical period of mental and physical changes, in which developmental challenges (e.g., biological maturation, emotional regulation learning, and identity formation) occur. Such profound changes can be associated with mental health impairment if adolescents face risk factors like academic and peer pressure, romantic relationship losses, interpersonal violence from peers or adults, and alcohol or drug consumption (cf. American College of Obstetricians and Gynecologists, 2017). Studies estimate that 50% of mental health problems start before the age of 14 years, with short- and long-term effects throughout the lifespan (World Health Organization, 2021).

Nonetheless, adolescence is a particularly fruitful period for building cognitive/behavioral resources and implementing healthy lifestyles as the foundation for balanced mental health growth. Neuroplasticity is heightened, access to health education is normally made available at school and adolescents share several worries with their peers revealing the need for mental health support (Fuhrmann et al., 2015). For this reason, empowering adolescents to help themselves and their peers manage mental health challenges can play a significant role in the risk-protection interplay that influences their long-term mental health development (Hart et al., 2018).

Mental health literacy (MHL) is the set of knowledge and skills that facilitate mental health management, by identifying risk factors for mental illness, knowledge of mental illness itself, available treatments, and help-giving (Jorm, 2000). It is a protective factor for mental health given its association with more well-being (BjØrnsen et al., 2017, 2019; Chao et al., 2020), less psychopathology, improved help-seeking, better adherence to medication, and less mental health stigma (Bonabi et al., 2016; Brijnath et al., 2016; Lam, 2014; Kutcher, Wei, & Coniglio, 2016; Rüsch et al., 2014; Wei et al., 2015).

Important progress in mental health reforms at a public level was possible because MHL inspired the development of MHL surveys at international levels, especially in Western countries such as Australia, Canada, and the United States (Jorm, 2019; Wei et al., 2016). These surveys helped understand the misinformation and lack of knowledge of the public on mental health (e.g., mental disorders, normative and pathological mental states, help treatment preferences, and kinds of self-help strategies used). Additionally, MHL appeared to correlate with mental health outcomes such as psychopathology and mental well-being (Chao et al., 2020). Data regarding help-seeking options later informed programs on the importance of peers as mental health resources not only during adolescence, but also in adulthood (Hart et al., 2018, 2022). Differences in MHL according to gender, more than differences in socioeconomic status, also opened the debate regarding MHL disadvantages (Campos et al., 2016), with women presenting significantly more MHL than men (e.g., Hadjimina & Furnham, 2017). Lack of MHL was associated with delayed help-seeking, suspicion toward treatments, and worse medication uptake (Bonabi et al., 2016; Rüsch et al., 2014). Also, the capacity to help others and social distance from those who have a mental illness is present when MHL is low (Bonabi et al., 2016), affecting help-giving (Kirchener & Jorm, 2002). Lack of information about mental health is associated with more stigmatized beliefs and attitudes, and stigma about mental health is connected to worse mental health outcomes such as help-seeking and mental health itself (Eisenberg et al., 2009; Lally et al., 2013; Gulliver et al., 2010; Velasco et al., 2020).

Recent reconceptualizations of MHL (Kutcher, Wei, Costa, et al., 2016) added the importance of good mental health development and maintenance. This reflects the World Health Organization's (2005) definition of mental health as a state of well-being empirically sustained by research from the dual continuum model of mental illness and mental health (Iasiello et al., 2020). Nevertheless, previous research has focused more on mental illness prevention, and the components of MHL that target mental disorders such as the recognition of mental disorders, help-seeking efficacy, and help-seeking strategies or mental stigma (Wei et al., 2013; Nobre et al., 2021). Recent systematic reviews recognize the lack of instruments to measure good mental health (as well as how to develop and maintain it; Mansfield et al., 2020; Wei et al., 2016), and an absence of interventions targeting this salutogenic component (Nobre et al., 2021) recently recommended by a World Health Organization (2021) report on adolescents' mental health intervention.

The existing MHL instruments present several limitations, such as lack of clear conceptual foundation, lack of validation, and excessive focus on psychopathology. Additionally, many measures rely on vignette methods, constraining variance analysis (Mansfield et al., 2020; Spiker & Hammer, 2019; Wei et al., 2015, 2016). To our knowledge, only one instrument measures literacy about positive mental health in adolescents, the Mental Health Promoting Knowledge (MHPK-10; BjØrnsen et al., 2017). This is a unidimensional scale comprising 10 items, rated on a 6-point Likert-type scale, ranging from 0 = *don't know* to 5 = *completely correct*. This scale gravitates toward knowledge on how to promote good mental health, but it leaves the definition of good mental health unclarified and does not focus on the difference between mental well-being and mental illness, nor the importance of mental well-being to complete mental health.

Additionally, the Attitudes and Knowledge Survey is composed of 36 items evaluating MHL, divided into two sections, and measures the efficacy of the guide intervention (Mcluckie et al., 2014). This

measure has two items reflecting a dual vision of mental health and mental illness, which the MHPK-10 lacks. On the other hand, it does not capture the factors that promote and protect mental well-being and positive mental health.

The Mental Health Literacy Scale for Healthcare Students (Chao et al., 2020) is a more recent measure of MHL and comprises 26 items rated on a 5-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*, and has a structure of five factors. The authors developed this measure by revising several existing MHL measures, such as the MHPK-10 (BjØrnsen et al., 2017). Therefore, one of the subscales of the Mental Health Literacy Scale for Healthcare Students (Chao et al., 2020) is the Maintenance of Positive Mental Health, which focuses on illness and health aspects such as the protection and promotion of well-being. However, this tool is not only limited to healthcare students and professionals but was also exclusively developed for adults.

Recognizing the limitations of existing measures, we have developed a new measure of literacy about positive mental health and mental well-being, the Positive Mental Health Literacy questionnaire (PosMHLit). This instrument was adapted and validated in a sample of 418 Portuguese adults. The final version for the adult population comprises 20 items divided into two subscales: characteristics and promoters of positive mental health (17 items) and vulnerability factors of positive mental health (three items), although the final rank of PosMHLit is calculated using only the items from the first subscale. Items can be summed to calculate the total. Items 3 and 12 are reversed. The PosMHLit presents an adequate factor structure and suitable psychometric properties such as reliability and validity (Maia de Carvalho et al., 2022). This instrument is the first to clearly assess the difference between mental illness and positive mental health, how positive mental health can be promoted, and mental well-being as a protective factor against mental illness. In the present study, we explored the factor structure and psychometric properties of the PosMHLit questionnaire in a sample of adolescents.

## METHOD

### Measurement Development

An in-depth description of the instrument development process is provided in the PosMHLit psychometric study in adults (see Maia de Carvalho et al., 2022). Its development process was based on three steps: measure development through an extensive literature review, content validation with a panel of experts (clinicians and academics), and a psychometric study. In the first step, six factors were hypothesized to underlie the items generated. Items generation was conducted using a positive mental health framework: 1) definition of good mental health and mental well-being; 2) beliefs about good mental health and mental well-being; 3) four promoters and protectors of mental health: gratitude; positive interrelationships; emotion regulation; valued action. In the second step, clinicians and researchers were asked to match items with the hypothesized factors. The psychometric study explored the factorial structure of the instrument and its reliability. Figure 1 outlines the three stages of questionnaire development: 1) extensive literature review and measure development; 2) content validity testing with a panel of experts; 3) psychometric study. The current study focuses on replicating the third step (psychometric study) of the original study in a sample of adolescents, therefore exploratory factor analysis (EFA) considered the initial 6-factor formulation followed by the study conducted in a sample of adults to begin the factor structure examination.

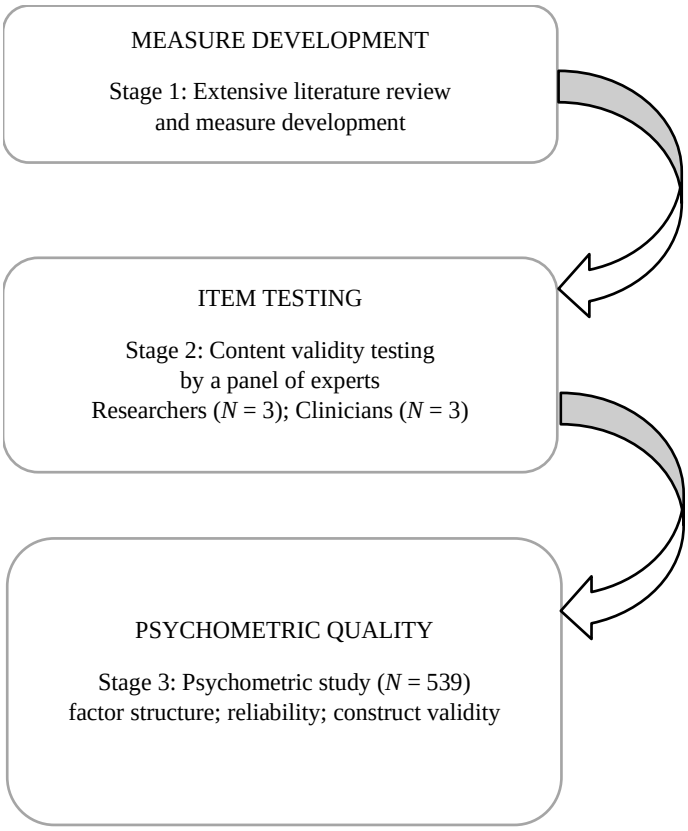


FIGURE 1
Flowchart of the stages of the development of PosMHLit

## Participants

A community sample of 539 adolescents was collected online and through pencil-and-paper collection. All participants were Portuguese. Inclusion criteria: being older than 14 and younger than 20.

The total sample comprised 57.2% women and 42.8% men. The mean age was 16.61 (*SD* = 1.29), ranging from 15 to 19 years of age. Regarding relationship status, 30.8% reported being in a relationship, 40.1% reported not being in a relationship, 1.9% chose the option "other," and 27.3% did not respond to this question. In terms of socioeconomic status, 29.4% of participants had a low socioeconomic status, 53.7% had a medium socioeconomic status, and 16.9 had a high socioeconomic status. Additionally, 42.1% had counseling/psychotherapy by a psychologist, while 55.9% had not, and 2% reported "I do not know." Finally, 16.5% had support from a psychiatrist, whereas 78.5% had not, and 5% reported "I do not know."

## Procedure

The present study integrates a larger research project approved by the Scientific Committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra, Portugal. Data collection was preceded by informed consent from all participants and their legal tutors (generally their parents). The study

presentation explained that all data was confidential and anonymous, participation was voluntary, and participants had the right to withdraw from the study at any moment.

The data collection had two waves because of the COVID-19 lockdowns. From March 2019 to July 2019 (pre-COVID) (paper-and-pencil collection) and from March 2021 to July 2021 (post-COVID) (online collection), 644 participants were recruited. One hundred and five participants were eliminated because of incomplete answers and age above 19. Only questionnaires with full responses to PosMHLit items were considered. The final sample comprised 205 adolescents collected through the paper-and-pencil form, and a sample of 334 participants was collected online using the LimeSurvey platform. Four independent graduate Psychology students (not part of the research team) collected the data. Participants were recruited from high schools in Portugal after the study was authorized by the Ministry of Education and Science — General Directory of Education (RN: 0668400001).

## Measures

*Demographics*. Demographic information included age, gender (girl/boy/other), nationality (open-ended question), education level (in years completed), socioeconomic status (years of education and parents' occupation), relationship status (single, married, or dating), having mental illness in the family, having consulted a mental health professional.

*Mental Health Literacy questionnaire* (MHLq; Campos et al., 2016). This measure assesses literacy about mental illness (negative mental health literacy) and comprises 33 items rated on a 5-point Likert-type scale (from 1 = *strongly disagree* to 5 = *strongly agree*). Items are distributed into three factors: first aid skills and help-seeking (e.g., "If I had a mental disorder I would seek professional help — a psychologist and/or psychiatrist"); knowledge and stereotypes (e.g., "Mental disorders affect peoples' thoughts"); self-help strategies (e.g., "Physical exercise helps to improve mental health"). All subscales are calculated by the sum of all items composing each subscale. All subscales present good internal consistency in the original study, ranging from .72 to .79. A final score is calculated using the referred items. At the end of the questionnaire, seven mental disorders are stated (mental disorders, neurodevelopmental, and physical) that participants must identify as such.

*Positive Mental Health Literacy questionnaire* (PosMHLq; Maia de Carvalho et al., 2022). This self-rated questionnaire assesses literacy about mental well-being and positive mental health. The adolescent' version comprises 23 items measured on a 5-point Likert-type scale (from 1= *strongly disagree* to 5 = *strongly agree*) and the adult version 20. All subscales are measured as the sum of all items that compose each subscale. It is used as a unidimensional measure. In the original study, internal consistency was .93 for adolescents and .92 for adults. In this study, pretest values were $\alpha = .82$ for adolescents and $\alpha = .67$ for adults. Posttests were $\alpha = .85$ for adolescents and $\alpha = .81$ for adults.

*Brief Symptom Inventory* (BSI; Derogatis, 1982/1993; Portuguese version, Canavarro, 1999). The BSI is used to assess psychopathological symptoms or psychological distress (e.g., *"*faintness or dizzyness*"*) which is the focus of MHL about mental illness as measured in the MHLq. The instrument has 53 items measured on a 5-point Likert-type scale from 0 = *not at all* to 4 = *extremely*. Nine dimensions represent the psychopathology subscales: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Dimension scores are calculated by summing the values for the items included in that dimension and dividing them by the number of items endorsed

in that dimension. Internal consistency of the subscales for the Portuguese adaptation ranges from .62 to .80 (Canavarro, 1999).

*Mental Health Continuum-Short Form* (MHC-SF; Keyes, 2005, 2007; Portuguese version, Matos et al., 2010). The MHC-SF is one of the most widely used instruments to measure positive mental health or mental well-being, evaluating three domains: emotional well-being (e.g., "happy"), psychological well-being (e.g., "life has meaning or purpose"), and social well-being (e.g., "people are basically good"), using 14 items ranging from 0 (*never*) to 6 (*always*). Subscale scores are calculated by summing the items that comprise its subscale. In our sample, scores ranged from 0 to 15 for emotional (hedonic) well-being, from 0 to 25 for social well-being, and from 0 to 30 for psychological well-being. Flourishing, languishing, and moderate mental health are calculated considering the scoring levels on the first three items concerning hedonic well-being (1-3) and the last items concerning psychological well-being (4-14). The syntax for creating the categories is available in the instrument description. The Portuguese adaptation of the scale resulted in good psychometric properties for all subscales: from $\alpha = .80$ to $\alpha = .85$.

## Data Analyses

SPSS Statistics Version 23.0 software was used to conduct exploratory factor analysis (EFA), Pearson's partial intercorrelations, and *t*-tests. Amos Version 22.0 software was used for confirmatory factor analysis (CFA).

As we considered theoretically hypothesized factors of PosMHLit to be correlated (Tabachnick & Fidell, 2007), we first performed exploratory factor analyses, using principal axis factoring (PAF) with direct oblimin rotation to examine factor structure. To define the number of factors to extract, we used eigenvalues > 1 and inspected the scree-plot points of inflection (Johnson, 1998). To buffer the potential over-extraction from the Kaiser criterion, a parallel analysis (PA) followed (Hubbard & Allen, 1987; Zwick & Velicer, 1986). PA corroborates the factor structure when eigenvalues are greater than the corresponding means generated randomly by PA.

Keyser Meyer-Olkin (KMO) criteria were used to assess data adequacy. KMO > .70 suggests data adequacy (Kaiser, 1974; Sharma, 1996). Additionally, we extracted communalities in which values < .30 ensure the item shares little variance with other variables, being, therefore, eligible for elimination.

Confirmatory factor analysis was conducted with maximum likelihood (ML) and followed recommendations by Brown (2006) and Kline (2005). Model fit was assessed in accordance with several goodness-of-fit indices and respective cut-off recommendations: chi-square ($\chi^2$); comparative fit index (CFI $\geq$ .90, acceptable, and $\geq$ .95, excellent; Hu & Bentler, 1999); Tucker-Lewis index (TLI $\geq$ .90, acceptable, and $\geq$ .95, excellent; Hu & Bentler, 1999); root-mean-square error of approximation (RMSEA $\leq$ .05, excellent fit; $\leq$ .08, acceptable fit; $\geq$ .10, poor fit; Brown, 2006; Kline, 2005) using a 90% confidence interval. Local model fit was assessed through items' standardized factor loadings ($\lambda$) and individual reliability ($R^2$), where $\lambda \geq .50$ can be interpreted as the model having factorial validity, and $R^2 \geq .25$ as the items having internal reliability (Hair et al., 1998). Internal consistency coefficients were calculated with Cronbach's $\alpha$ for each subscale. Reliability was considered acceptable when $\alpha >. 70$, and when correlations between items are $r >$ .30 (Nunnaly & Bernstein, 1994). Finally, construct validity was explored using Pearson's partial correlation coefficient of PosMHLit with other relevant measures, such as mental well-being, psychopathology, and literacy about mental illness (Cohen et al., 2003).

## RESULTS

### Exploratory Factor Analysis (EFA)

The conceptual procedure for content validation (cf. Table 1) was followed by the psychometric study. Results from EFA, using principal axis factoring (PAF), with direct oblimin rotation, indicated that data were adequate, KMO = .949, $\chi^2(435) = 6174.402$, $p < .001$, with eigenvalues suggesting two factors explaining 33.37% of variance. In the second step, three items did not meet the criterion of acceptable values ($h^2 > .30$): Item 7 (.25), Item 16 (.18), and Item 17 (.24); we repeated the PAF without them. In this stage, Item 2 (.18) did not show an acceptable value of communality. After removing this item, the EFA was applied, but Items 1 (.26) and 26 (.28) did not reach acceptable values of communality. We rerun the analysis after eliminating these items as well, and the results suggested that 24 items had acceptable communalities: lowest = $h^2 = .31$ (Item 15), highest = $h^2 = .63$ (Item 20). Four factors were then: Factor 1 presenting an eigenvalue of 4.86 (33.80% of variance); Factor 2 an eigenvalue of .86 (5.97%); Factor 3 an eigenvalue of .47 (3.30% of variance); and Factor 4 an eigenvalue of .24 (1.69% of variance). This finding suggests a 1-factor solution according to the Kaiser criterion. Furthermore, we used a parallel analysis (PA) to control potential overextraction. In line with the previous results, four factors were suggested: three eigenvalues from the PAF were greater than the corresponding randomly generated matrix in PA (for the latter, Factor 1: .45; Factor 2: .38; Factor 3: .33), and Factor 4 was suggested to be overextracted (Factor 4: .29). Thus, in the fifth step, we have forced a 3-factor solution using the same extraction and rotation procedure. The results show good adequacy of data, KMO = .954, $\chi^2(276) = 5520.205$, $p < .001$. The 3-factor solution explains 43.14% of variance. Item 21 did not reach acceptable values of communalities (.25), so we reran the analysis after excluding this item. Results found all items present acceptable communalities. Nevertheless, factor loadings suggest a 1-factor solution (see Table 2).

TABLE 1
Conceptual validation

| Items *initially hypothesized* | Clinicians | | | Researchers | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 1 | 2 | 3 |
| 1 – D | B | D | D | D | B | D |
| 2 – B | B | D | B | B | B | B |
| 3 – B | B | B | B | B | B | D |
| 4 – B | D | V | B | B | ER | B |
| 5 – SR | SR | SR | SR | SR | SR | SR |
| 6 – ER | ER | ER | ER | ER | B | ER |
| 7 – B | D | D | B | B | B | B |
| 8 – B | B | D | B | B | B | B |
| 9 – B | B | V | V | V | ER | B |
| 10 – B | B | D | D | B | B | B |
| 11 – G | G | G | G | G | G | G |
| 12 – ER | ER | ER | ER | ER | ER | ER |
| 13 – B | B | D | G | B | B | V |
| 14 – ER | ER | ER | ER | ER | B | ER |

(table 1 continues)

Table 1 (continued)

| Items *initially hypothesized* | Clinicians | | | Researchers | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 1 | 2 | 3 |
| 15 – D | B | D | D | D | B | D |
| 16 – D | B | B | D | D | B | B |
| 17 – D | B | B | D | D | B | D |
| 18 – SR | SR | SR | SR | SR | SR | SR |
| 19 – V | V | V | V | V | V | V |
| 20 – ER | ER | ER | ER | ER | ER | ER |
| 21 – SR | SR | SR | SR | SR | SR | SR |
| 22 – B | D | B | B | B | B | D |
| 23 – V | B | V | V | V | B | V |
| 24 – B | D | B | B | B | B | D |
| 25 – B | D | B | V | B | B | B |
| 26 – V | V | ER | V | V | V | V |
| 27 – G | B | G | G | G | G | G |
| 28 – B | B | D | G | B | B | RE |
| 29 – ER | ER | ER | ER | ER | ER | ER |
| 30 – G | B | G | G | G | B | G |

*Note*. D = definition; B = beliefs; SR = social relationships; ER = emotion regulation; G = gratitude; V = values. Clinicians = 3; Researchers = 3.

TABLE 2
Complete item pool and factor loadings (*N* = 539)

| Items (Portuguese) | Items (English) | Factor loadings | | |
|---|---|---|---|---|
| | | F1 | F2 | F3 |
| 3*. A história do desenvolvimento de cada pessoa (os genes que herdou, a família onde nasceu, os acontecimentos de vida) não condiciona a sua saúde mental | The developmental story of each person (genes, family, and life events) doesn't affect their mental health | .03 | **.49** | –.27 |
| 4. Cada fase do desenvolvimento pode ser uma fonte de aprendizagens sobre o que causa bem-estar e o que causa sofrimento | Each developmental stage can be a source of learning about what contributes to well-being and what contributes to suffering | **.57** | –.06 | .07 |
| 5. Cultivar relações com pessoas que transmitem apoio, aceitação e respeito pelo outro é benéfico para a saúde mental | Cultivating relationships with people that provide us with support, acceptance and respect is good for mental health | **.66** | –.11 | –.07 |
| 6. Ter estratégias para lidar com as emoções é benéfico para a saúde mental | Having strategies to cope with emotion is good for mental health | **.60** | –.03 | –.06 |

(table 2 continues)

Table 2 (continued)

| Items (Portuguese) | Items (English) | Factor loadings | | |
|---|---|---|---|---|
| | | F1 | F2 | F3 |
| 8. Ao longo da vida é importante obter informação sobre como cuidar da saúde mental | It is important to have information about how to take care of our mental health, throughout the life span | **.61** | –.12 | .01 |
| 9. Para ter boa saúde mental uma pessoa deve cuidar de si e cultivar aquilo que lhe traz bem-estar | To have good mental health, a person must have self-care strategies, and cultivate what provides well-being | **.76** | –.05 | –.10 |
| 10. A saúde mental vai variando ao longo da vida e com os desafios do desenvolvimento | Mental health varies across the life span and according to developmental challenges | **.57** | .02 | .14 |
| 11. Apreciar e agradecer o que se tem de bom, mesmo em momentos difíceis, promove o bem-estar | Being appreciative and grateful about the good things one has promotes well-being, even in difficult moments | **.65** | .07 | –.07 |
| 12*. A maneira como se lida como as emoções não influencia o bem-estar e o sofrimento | The way one manages emotions does not impact on well-being or suffering | –.07 | **.73** | .10 |
| 13. É possível crescer com os momentos de bem-estar na vida | It is possible to grow when having moments of well-being | **.59** | .09 | .04 |
| 14. Lidar com as emoções em vez de fugir destas leva, a longo prazo, a maior bem-estar e menor sofrimento | Dealing with emotions, instead of running from them, leads to higher well-being and less suffering in the long term | **.60** | .08 | –.03 |
| 15. A saúde mental é mais do que a ausência de doença mental, implica sentir níveis significativos de bem-estar e ter bom funcionamento | Mental health is more than the absence of mental illness, it involves feeling high levels of well-being and functioning well | **.50** | .02 | .11 |
| 18. Planear tempo para estar com pessoas com quem se tem interesses em comum é benéfico para a saúde mental | Planning time to be with people with whom one has common interests is good for mental health | **.59** | .04 | .05 |
| 19. Planear tempo para fazer atividades valorizadas promove bem-estar | Planning time to do valued activities promotes well-being | **.64** | .06 | .04 |
| 20. Aprender a reconhecer e gerir as emoções é benéfico para a saúde mental | Learning to recognize and manage emotions is good for mental health | **.83** | –.04 | –.10 |
| 22. A história do desenvolvimento de cada pessoa (os genes que herdou, a família onde nasceu, os acontecimentos de vida) condiciona sua vulnerabilidade para doenças mentais | The developmental history of each person (genes, family, and life events) affects their vulnerability to mental illnesses | .13 | –.05 | **.62** |
| 23. Reservar tempo para fazer atividades que trazem realização pessoal é benéfico para a saúde mental | Having time to do activities that bring personal fulfillment is good for mental health | **.66** | –.14 | .07 |

(table 2 continues)

Table 2 (continued)

| Items (Portuguese) | Items (English) | Factor loadings | | |
|---|---|---|---|---|
| | | F1 | F2 | F3 |
| 24. A história de desenvolvimento (os nossos genes, a nossa família, os acontecimentos que não controlámos e que controlámos) condicionam as nossas fontes de bem-estar e influenciam as nossas fontes de sofrimento | Our developmental history (genes, family, and events we control and do not control) affects our sources of well-being and affects our sources of suffering | .07 | –.00 | **.69** |
| 25. Para cuidar da saúde mental é fundamental estar-se atento às necessidades e limites pessoais | Taking care of mental health is fundamental to be aware of our needs and boundaries | **.55** | –.03 | .21 |
| 27. Prestar atenção e apreciar as coisas boas que acontecem é benéfico para a saúde mental | Paying attention and appreciating good things that happen is good for mental health | **.74** | .05 | .06 |
| 28. É possível crescer com os momentos de sofrimento na vida | It is possible to grow from moments of suffering in life | **.46** | –.15 | .06 |
| 29. Reconhecer, permitir e regular os estados emocionais é benéfico para a saúde mental | Recognizing, allowing, and regulating emotional states is good for mental health | **.68** | –.04 | .05 |
| 30. Reconhecer e reflectir sobre o que se tem de bom potencia o bem-estar | Recognizing and reflecting about the good things we have promotes well-being | **.73** | .04 | .00 |

*Note*. *Items reversed. Items 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 22, 23, 24, 25, 27, 28, 29, 30 are the 23 items that compose the final version of the scale. Numbers in bold indicate that the items load into the respective factor.

## Confirmatory Factor Analysis (CFA)

A CFA was conducted to confirm the 1-factor solution suggested by the factor loadings of the final solution of EFA. Results indicated a poor model fit, $\chi^2(230) = 835.65$, $p < .001$; CFI = .88; TLI = .87; RMSEA = .07, $p < .001$. Regarding local fit, results showed that Item 3 did not reach an acceptable value of standardized regression weights ($\lambda = .01$, $R^2 = .00$); thus, we performed the analysis again without this item. The model improved and presented acceptable model fit, $\chi^2(209) = 668.92$, $p < .001$; CFI = .91; TLI = .90; RMSEA = .06, $p < .001$, although standardized regressions weights suggested local fit problems for Item 12 ($\lambda = –.25$, $R^2 = .06$). Even after removing it, model fit did not change considerably, $\chi^2(189) = 630.20$, $p < .001$; CFI = .91; TLI = .90; RMSEA = .07, $p < .001$, because Item 24 presented problems of local fit ($\lambda = .45$, $R^2 = .20$). Running the analysy again after eliminating it, we obtained an improved model fit, $\chi^2(170) = 492.42$, $p < .001$; CFI = .93; TLI = .92; RMSEA = .06, $p = .006$. Item 22 presented local fit issues ($\lambda = .47$, $R^2 = .22$), so was eliminated and the analysis repeated. Result showed a good model fit, $\chi^2(152) = 469.93$, $p < .001$; CFI = .93; TLI = .92; RMSEA = .06, $p = .001$, with acceptable values of local fit (i.e., $\lambda > .50$, $R^2 = .25$). These results corroborate a 1-factor solution comprising 19 items (Items 4, 5, 6, 8, 9, 10, 11, 13, 14, 15, 18, 19, 20, 23, 25, 27, 28, 29, 30).

## Internal Consistency

To assess reliability, we calculated Cronbach's αs and the results suggested that the scale presents good internal consistency: α = .93 (Table 3). Results from corrected item-total correlations showed that all items presented an item-total correlation higher than .30. For Cronbach αs, if an item is deleted, they reflect the contribution of all items to the internal consistency of the instrument.

TABLE 3
Means (*M*), standard deviation (*SD*), corrected item-total correlation (*r*), Cronbach's α if item deleted and Cronbach's α for each subscale (*N* = 539)

| | *M* | *SD* | Corrected item-total *r* | α if item deleted | α |
|---|---|---|---|---|---|
| | | | | | **.93** |
| Item 4 | 4.02 | 0.70 | .60 | .93 | |
| Item 5 | 4.40 | 0.67 | .63 | .93 | |
| Item 6 | 4.11 | 0.76 | .55 | .93 | |
| Item 8 | 4.38 | 0.66 | .63 | .93 | |
| Item 9 | 4.36 | 0.65 | .70 | .92 | |
| Item 10 | 4.18 | 0.67 | .62 | .93 | |
| Item 11 | 4.07 | 0.78 | .57 | .93 | |
| Item 13 | 4.09 | 0.72 | .56 | .93 | |
| Item 14 | 3.90 | 0.88 | .55 | .93 | |
| Item 15 | 3.94 | 0.77 | .53 | .93 | |
| Item 18 | 4.12 | 0.77 | .58 | .93 | |
| Item 19 | 4.17 | 0.70 | .61 | .93 | |
| Item 20 | 4.23 | 0.67 | .76 | .92 | |
| Item 23 | 4.23 | 0.69 | .71 | .92 | |
| Item 25 | 4.06 | 0.71 | .64 | .93 | |
| Item 27 | 4.14 | 0.69 | .73 | .92 | |
| Item 28 | 4.22 | 0.82 | .51 | .93 | |
| Item 29 | 4.08 | 0.72 | .70 | .92 | |
| Item 30 | 4.16 | 0.73 | .69 | .92 | |

## Construct Validity

Before correlation analysis, a *t*-difference test was conducted to evaluate whether any differences in PosMHLit were found between those whose data were collected before (*n* = 205) versus after (*n* = 334) the COVID-19 pandemic. Results revealed a significant difference, with participants examined before the COVID-19 pandemic (*M* = 79.99, *SD* = 7.67), reporting higher PosMHLit than post-COVID-19 participants, *M* = 78.1, *SD* = 9.96; $t(537) = -2.246$, $p < .001$.

Given this difference, we computed partial Pearsons' correlations to examine the relation between PosMHLit and close constructs, while controlling for the time of data collection (pre-/post-COVID-19). Intercorrelations can be found in Table 4.

Concerning literacy about mental illness, the closest construct, PosMHLit, was positively correlated with the three subscales of MHLq: first aid skills and help-seeking, knowledge and stereotypes, and self-help strategies (effects size from medium to large). On the other side, from mental illness indicators captured by BSI (Canavarro, 1999), depression, anxiety, and somatization showed the highest and most significant negative correlation with positive mental health literacy. In the context of mental well-being, subjective and psychological well-being were positively related to PosMHLit, while social well-being was not.

### Differences in PosMHLit

Concerning gender, girls ($M$ = 80.32, $SD$ = 9.29) reported higher PosMHLit than boys ($M$ = 76.91, $SD$ = 8.72), $t(536) = 4.32$, $p < .001$. On the other hand, when evaluating differences in flourishing, flourishers ($M$ = 78.97, $SD$ = 8.81) and nonflourishers ($M$ = 79.20, $SD$ = 8.59) did not differ in terms of PosMHLit, $t(501) = –.28$, $p = .780$.

## Discussion

Adolescence is a crucial developmental period to build psychological resources and to develop protective factors of mental health. MHL entails the skills necessary to manage mental health crises and promote mental well-being. The pathogenic focus of MHL research is present in most MHL instruments and, although recent measures incorporate items that assess positive mental health (BjØrnsen et al., 2017; Chao et al., 2020; Mcluckie et al., 2014), none targets two fundamental aspects in the comprehension of mental health: the distinction between mental health and mental illness and the importance of mental well-being as a promoting and protective factor of mental health. We aimed to overcome this significant research gap by developing a new measure of mental health literacy. The PosMHLit was developed to be applicable to both adolescents and adults.

We examined the factor structure of the PosMHLit through exploratory factor analysis and parallel analysis, but these procedures did not support our initial 6-factor structure, theoretically outlined for the adults' study (Maia de Carvalho et al., 2022) and the current study. As it occurred in the study of PosMHLit in adults, this study found a unidimensional solution comprising 19 items. The items that compose the PosMHLit for adolescents are consistent with the adults' version (Maia de Carvalho et al., 2022), thus reflecting the definition of mental health and the promoters and protectors of positive mental health. Internal consistency examined by Cronbach αs, item-total correlation, and item deletion procedures suggested that the PosMHLit measure presents adequate reliability.

To examine construct validity, Pearson's partial correlations were calculated, controlling for time of data collection (pre- versus post-COVID-19), given that $t$-test analysis showed that participants whose data were collected before the COVID-19 pandemic presented significantly more positive MHL than those whose data were collected after the pandemic. Scores on PosMHLit were significantly correlated with literacy about mental illness, although the PosMHLit and MHLq dimensions did not overlap. This result corroborates the dual nature of mental health and reinforces the need for complementary instruments in the measurement of literacy about mental pathology and mental well-being.

TABLE 4

Mean (*M*), standard deviation (*SD*), and Cronbach's α for all variables, and Pearson's partial intercorrelations[1] (*N* = 539)

| Variable | *M* | *SD* | α | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. PosMHLq | 78.86 | 9.20 | .93 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 2. MHLq-FAS | 40.53 | 4.54 | .76 | .34*** | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 3. MHLq-KS | 61.68 | 6.22 | .69 | .59*** | .29*** | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 4.MHLq-SH | 32.88 | 3.62 | .69 | .53*** | .47*** | .42*** | – | – | – | – | – | – | – | – | – | – | – | – | – |
| 5.MHC-SF-Em | 10.47 | 3.39 | .89 | .13** | .28*** | –.07 | .22*** | – | – | – | – | – | – | – | – | – | – | – | – |
| 6.MHC-SF-So | 11.89 | 6.08 | .83 | .08 | .33*** | –.12* | .20*** | .64*** | – | – | – | – | – | – | – | – | – | – | – |
| 7.MHC-SF-Psy | 17.98 | 7.12 | .85 | .17*** | .33*** | –.08 | .22*** | .71*** | .70*** | – | – | – | – | – | – | – | – | – | – |
| 8.BSI-SOM | 6.72 | 6.41 | .90 | –.10* | –.10* | .00 | –.13** | –.18*** | –.06 | –.20*** | – | – | – | – | – | – | – | – | – |
| 9.BSI-OB | 9.64 | 5.50 | .87 | –.06* | –.12* | .07 | –.11* | –.20*** | –.13* | –.22*** | .70*** | - | – | – | – | – | – | – | – |
| 10.BSI-SI | 5.24 | 4.13 | .84 | –.07** | –.15** | .01 | –.10* | –.23*** | –.17*** | –.24*** | .67*** | .75*** | – | – | – | – | – | – | – |
| 8.BSI-DEP | 8.52 | 6.31 | .83 | –.14*** | –.17*** | –.02 | –.17*** | –.26*** | –.18*** | –.27*** | .68*** | .78*** | .84*** | – | – | – | – | – | – |
| 9.BSI-ANX | 1.23 | 0.94 | .77 | –.09* | –.12* | .00 | –.13* | –.20*** | –.08 | –.21*** | .84*** | .76*** | .74*** | .79*** | – | – | – | – | – |
| 10.BSI-H | 6.70 | 4.81 | .81 | –.07 | –.12** | –.01 | –.10* | –.15** | –.06 | –.15* | .70*** | .68*** | .68*** | .72*** | .76*** | – | – | – | – |
| 11.BSI-PA | 4.26 | 4.52 | .87 | –.03 | –.07 | –.00 | –.07 | –.14** | –.04 | –.17** | .75*** | .66*** | .69*** | .65*** | .78*** | .62*** | – | – | – |
| 12.BSI-PI | 6.76 | 4.42 | .82 | –.07 | –.11* | –.03 | –.05 | –.17*** | –.12* | –.21*** | .66*** | .68*** | .79*** | .76*** | .74*** | .69*** | .67*** | – | – |
| 13.BSI-P | 5.86 | 4.67 | .85 | –.07 | –.15** | .02 | –.15** | –.22*** | –.15*** | –.23*** | .72*** | .76*** | .83*** | .83*** | .80*** | .75*** | .70*** | .80*** | – |

*Note*. [1] Pearson's partial intercorrelations were conducted controlling for the COVID-19-related time of data collection: pre-COVID-19 (*n* = 205), post-COVID-19 (*n* = 334). PosMHLq = Positive Mental Health Literacy questionnaire — characteristics and promoters; MHLq = Mental Health Literacy questionnaire (FAS = first aid skills and help-seeking; KS = knowledge and stereotypes; SH = self-help strategies); MHC-SF = Mental Health Continum-Short Form (Em = emotional well-being; So = social well-being; Psy = psychological well-being); BSI = Brief Symptom Inventory (SOM = somatization; OB = obsession-compulsion; SI = interpersonal sensitivity; DEP = depression; ANX = anxiety; H = hostility; PA = phobic anxiety; PI = paranoid ideation; P = psychoticism).
*$p$ < .05; **$p$ < .01; ***$p$< .001.

In line with past studies, including the validation of PosMHLit for adults, PosMHLit is significantly correlated in the expected direction with both mental well-being (BjØrnsen et al., 2017, 2019; Chao et al., 2020; Chrisholm et al., 2016) and depression, anxiety, and somatization (Chao et al., 2020; Lam, 2014). Surprisingly, many of the dimensions of BSI were not correlated with PosMHLit but had significant associations with literacy about mental illness. This finding seems to suggest the dual pathology and mental health nature of MHL. It was expected that positive MHL was more significantly correlated with positive mental health and mental illness, nonetheless, there can be differences in samples of adolescents and adults, clinical samples, and community samples, countries in which prevention is not present from early years. Future studies should better test these possibilities using distinct samples from each group. It is also possible that those equipped with literacy about mental illness feel more confident to face their challenges. At this developmental stage, hormonal imbalance and social changes can contribute to several psychological symptoms of distress. Literacy about mental illness might be seen as more needed for mental well-being than positive MHL, although research suggests mental wellness prevents mental illness.

Corroborating the existing literature (Campos et al., 2016; Dias et al., 2018), girls reported more MHL than boys. This result can be interpreted considering gender differences in socialization, because girls are more socialized into understanding and tackling emotional and interpersonal themes. Also, women tend to have higher levels of psychopathology; therefore, they may search for more mental health information (Van Droogenbroeck et al., 2018).

Considering those who would benefit from mental well-being improvement (for example, those living with mental illness but still being able to feel mental well-being, and those with low rates of mental well-being), a first step should be the assessment of their positive MHL. An important note, nevertheless, is that flourishers and nonflourishers are not different in terms of PosMHLit. This suggests that, although MHL may benefit from mental well-being, it does not count as a major factor to distinguish between those who flourish and those who do not. Previous studies have suggested other factors, such as personality, positive life events, and social support, as contributors to flourishing, whereas socioeconomic factors such as education are reported to have a less predictive effect (Schotanus-Dijkstra et al., 2015).

The present study has several limitations. The psychometric study of PosMHLit did not hold test-retest procedures nor multigroup measurement invariance analysis. Other studies could overcome this limitation by examining temporal stability and the PosMHLit factor structure in different sociodemographic subsets of the population. Because our sample was extracted from the general Portuguese population, we suggest future researchers replicate this study in clinical and multicultural samples. Also, given the limitations of having a relatively small sample to conduct two separate analyses (which would implicate a reduction in statistical power, given that the PosMHLit was initially composed of 30 items), we have performed both the EFA and the CFA using the same sample. Future studies should replicate this study and carry out both analyses in independent larger samples. Additionally, although we tested differences in PosMHLit between genders and between groups according to the levels of flourishing, we could not conduct a multigroup confirmatory factor analysis that would test measurement invariance between these groups due to sample size and power concerns. Future studies should perform these analyses to definitively conclude whether the same factor structure of the PosMHLit can be applied to different groups of adolescents.

Despite some weaknesses in the study, some strengths should be acknowledged. The research design followed recommendations for psychometric studies, such as the use of a mixed methodology (using content validation with clinicians and academic experts, and empirical validation with a community sample; Wei et al., 2016), the sample size, and the use of valid and reliable instruments for construct validity.

Additionally, we explored the relationship between PosMHLit and literacy about mental illness, mental well-being, and psychopathology, to examine construct validity, a much-needed output in adolescent studies.

These results suggest preliminary evidence of the validity and reliability of the instrument. The PosMHLit seems to be a valid and reliable MHL measure that covers a more recent element of MHL, good mental health protectors/promoters, and the dual continua model. More evidence is needed through replication studies. For example, future studies should conduct measurement invariance research of PosMHLit to test whether the factor structure is invariant in different developmental stages and/or age clusters, thus contributing to new avenues of research on MHL across the lifespan.

Adolescents may benefit from positive MHL interventions when reporting low MHL or low mental well-being, given that positive MHL may enhance mental health, help-seeking, and self-care. Also, mental well-being prevents the risk of mental illness (BjØrnsen, 2017, 2019; Chao et al., 2020). The PosMHLit can be used to assess positive MHL at school or in health settings and further recommend adolescents at risk to be enrolled in MHL interventions. The use of this questionnaire can help national surveys to assess adolescents' knowledge about well-being.

We recommend researchers interested in promoting mental well-being (beyond preventing mental illness) to not only evaluate literacy about mental illness but also track and teach literacy about mental well-being. If the PosMHLit is used with an illness-focused MHL instrument, the effects of both elements can be controlled and explored. Tracking students with lower PosMHLit allows educators and clinicians to recommend health education interventions such as MHL and positive psychology interventions. More studies are needed to consolidate the psychometric qualities of the PosMHLit, although the findings presented suggest this measure is solid and can be used to examine MHL in adolescents.

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