

Predicting quality of life in pediatric asthma: the role of emotional competence and personality

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Abstract

Purpose The present study examined the predictive value of emotional competence and the five-factor model of personality on the quality of life of children with asthma.

Methods Participants were 90 children (M age = 11.73, SD = 2.60) having controlled and partly controlled asthma, undergoing everyday treatment. Children filled in questionnaires assessing emotional competence and quality of life. Parents completed questionnaires assessing the personality of their child.

Results Results showed that two emotional competences, bodily awareness and verbal sharing of emotions, were related to the quality of life of children with asthma. Moreover, one personality trait, benevolence, was associated with children's quality of life. Regression analyses showed that the predictive value of these three dimensions remained significant over and above asthma control and socio-demographic variables frequently associated with the

quality of life of children with asthma (age, gender, and educational level of parents).

Conclusions These findings emphasize the importance of alerting the clinician who works with children with asthma to observe and assess the child's expression of emotions, attention to bodily sensations, and benevolence.

Keywords Pediatric asthma · Quality of life · Emotional competence · Personality

Introduction

Asthma is a chronic inflammatory disease of the airways, which is now the most common chronic illness in childhood and adolescence [1]. In addition to physical symptoms such as wheezing, coughing, and shortness of breath, childhood asthma has also been associated with an impaired quality of life (QOL) [2–4].

However, research has tended to show inconsistencies in these results. Indeed, some studies revealed that children having asthma did not have a diminished QOL compared with healthy children [5]. These findings emphasized that although children with asthma have more risks of having an impaired QOL than their peers, these differences are not systematically observed. In part, these inconsistent results could be explained by methodological issues because studies question different informants (children, parents, or practitioners), recruit different participants (racial or ethnic differences), and use different indices of asthma activity or asthma control [6].

The presence of individual differences, such as psychological characteristics, could also explain the variability of QOL in pediatric asthma. Indeed, there is, in the pediatric asthma literature, a growing interest in the implication

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of psychological factors for explaining the QOL of children with asthma [7]. Some research showed that psychological (such as emotional and behavioral) problems were more related to QOL in pediatric asthma than asthma-related factors, such as asthma severity [8]. In the present study, the main objective is to examine whether emotional competence (EC) and the five-factor model of personality (FFM) would be related to the QOL of children with asthma. Both EC and FFM seem to be particularly worthwhile investigating in pediatric asthma, since both contribute to the adaptation of individuals to their environment [9, 10].

EC consists of individual differences in the way people identify, express, understand, analyze, regulate, and use their emotions and the emotions of others. A growing number of studies with healthy children have demonstrated associations between EC and adaptive outcomes, such as subjective physical and psychological health [11–13]. In pediatric populations, research has shown that a lack of EC was associated with poor glycemic control among children with type 1 diabetes [14, 15]. Moreover, a recent study in pediatric asthma demonstrated that EC had an indirect effect on QOL through specific coping strategies (such as ignoring and worrying about asthma) [16].

Regarding the FFM (including extraversion, benevolence, conscientiousness, imagination, and neuroticism), previous research has revealed their predictive role on the QOL and behavioral adjustment of healthy children and children with a chronic illness [17–19]. To illustrate, neuroticism was a significant predictor of an impaired QOL in pediatric patients and healthy children [17, 19]. Imagination and conscientiousness predicted a better QOL in healthy children and children surviving cancer [17]. Finally, a recent study investigated the personality and the QOL of adolescents with asthma [7]. The authors showed that high scores on extraversion and benevolence and low scores on neuroticism were related to a better QOL. This study also revealed that the associations between personality and QOL were fully mediated by different coping strategies (such as restricting lifestyle, positive reappraisal, hiding asthma, and worrying about asthma) [7]. Finally, a recent study in adult population has shown that benevolence was particularly relevant to predict the adaptation of individuals to their disease [9].

All these results highlighted that EC and FFM are important contributors to adaptation in different pediatric and healthy populations. However, to our knowledge, no study has investigated the combined contribution of EC and FFM dimensions. In adulthood, the FFM is often considered as the prominent model for describing individual differences in personality. Nevertheless, some recent research has demonstrated the incremental validity of EC vis-à-vis personality variables (e.g., FFM) and mood

variables (e.g., positive and negative affectivity) to predict adaptive psychological outcomes [20–22]. In childhood, this question has been rarely studied. Therefore, in the present study, we aim to test the added value of EC to predict the QOL in pediatric asthma vis-à-vis the FFM. More specifically, we postulate that EC scores would be positively associated with children's QOL and that high scores on extraversion, benevolence, conscientiousness, and imagination would be associated with a high QOL, while high scores on neuroticism would be related to an impaired QOL. Moreover, we expect that EC would remain a significant predictor of the QOL over and above the FFM.

Finally, some studies have already demonstrated the impact of some socio-demographic and asthma-related factors on QOL. To illustrate, asthma control was positively associated with QOL [23, 24]. Among socio-demographic variables, being a girl [25, 26] and having a low family income [27] have also been related to a lower QOL in children with asthma. Therefore, another aim of the study is to test whether EC and FFM would be associated with QOL when we controlled for socio-demographic variables and asthma control. We hypothesize that EC and personality dimensions would remain significantly related to QOL after having controlled for socio-demographic variables and asthma control in the model. Such a study will provide better understanding of the specific role and the weight that each EC and personality dimensions play in predicting adaptive outcomes in pediatric asthma.

Methods

Study sample

Participants were 90 Belgian children with controlled (45.6 %) and partly controlled asthma, undergoing everyday treatment, and accompanied by their parents. Children (M age = 11.73, SD = 2.60) were 61 boys (67.8 %) and 29 girls. These children do not present another chronic disease or a serious mental health disease. Marital status and education level of parents are presented in Table 1.

Procedure

The study was approved by the ethics committee of the Mont-Godinne University Hospital (Belgium). After a routine appointment within the pediatric outpatient department, the patient and accompanying parents met the investigator. Children and their parents were informed about the confidentiality of their data, their freedom to ask any question they had, and to stop participating in the study at any time without explanations. After informed consent was given, children and parents responded to a battery of

Table 1 Information about parents ($N = 89$)

	%
Respondents ($N = 89$)	
Mothers	80.9
Fathers	15.7
Others	3.4
Marital status of parents ($N = 87$)	
Living together	74.2
Separated or divorced	21.4
Other	4.5
Mothers' education ($N = 87$)	
Primary education diploma	3.4
General secondary education diploma	25.3
Technical and vocational secondary education diploma	26.4
Advanced degree	39.1
University degree	5.7
Fathers' education ($N = 87$)	
Primary education diploma	11.5
General secondary education diploma	19.5
Technical and vocational secondary education diploma	27.6
Advanced degree	26.4
University degree	14.9

The educational level of the parents was assessed by the highest degree they obtained

questionnaires in the presence of the investigator. Testing time was around 1 h. We asked the children and their parents to respond separately to avoid biased responses. Participants who had difficulty with a question were told that there was no right or wrong responses and were asked to try to respond based on “how it happens most of the time.”

Measures

Emotional competence

Emotional competence was assessed using the emotion awareness questionnaire (EAQ30 [28]; French validation [11]). The EAQ30 is a self-report questionnaire of 30 items rated on a 3-point scale from 1 (not true) to 3 (true) and includes six scales described in Table 2. Twenty items are negatively formulated and thus reverse-scored. The questionnaire is suitable for children and adolescents between 8- and 16-years old. The French version of the EAQ30 has been shown to have acceptable internal consistency reliability (Cronbach's α between 0.65 and 0.73) as well as convergent (EAQ30 scores being positively related to emotional intelligence), discriminant (EAQ30 scores being weakly related to school performance), and concurrent

validity (EAQ30 scores being negatively related to somatic complaints, depression, and anxiety) [11].

Five-factor model

We assessed the FFM through a parent's report questionnaire, the hierarchical personality inventory for children (HiPIC [29]; French validation [30]). Parents are asked to complete a 5-point scale from 1 (not characteristic of my child) to 5 (fully characteristic of my child). This questionnaire is composed of 144 items and 18 facets, divided into five factors (described in Table 2). In the original Dutch version, the Cronbach's α for all factors and facets were above 0.80. Evidence of validity and reliability of the French version of the HiPIC were found by Rossier et al. [30].

Quality of life

We assessed the QOL through the pediatric asthma quality-of-life questionnaire (PAQLQ [31]), a self-report questionnaire which includes 23 items rated on a 7-point scale from 1 (not at all) to 7 (always). It involves 3 dimensions described in Table 2. Higher scores indicate a better QOL. The original version demonstrated evidence of reliability, with intraclass correlation coefficients between 0.84 and 0.95. The PAQLQ was validated in French and also showed good reliability and evidence of validity [31].

Demographic data

Demographic information such as age, gender, educational level, and marital status of parents were reported in a questionnaire by the caregiver of the child.

Asthma control

Asthma control was assessed by a physician with expertise in pediatric pulmonology, according to the Global Initiative for Asthma [1], which categorized asthma control in three groups: uncontrolled, partly controlled, and controlled asthma.

Data analysis

All analyses were performed with statistical package for social sciences (SPSS), version 18.0, software. Firstly, means, standard deviations, and Pearson moment correlations between EC, FFM, and QOL were calculated. Secondly, in order to examine the respective contributions of each EC and personality dimensions to the QOL in pediatric asthma, we performed independent multiple regressions. To be as rigorous as possible in the subsequent

Table 2 Description of the different scales and their subscales, including definitions and examples of items

Dimensions	High scores on the dimension reflect	Examples of items
Emotion awareness questionnaire		
Differentiating emotions	The ability to differentiate discrete emotions and locate their antecedents	When I am upset, I don't know if I am sad, scared or angry ^a
Verbal sharing of emotions	The ability to communicate one's feelings to others	I find it difficult to explain to a friend how I feel ^a
Not hiding emotions	The tendency not trying to conceal your feelings	When I am angry or upset, I try to hide this ^a
Bodily awareness	The tendency to pay low attention to bodily sensations	When I am scared or nervous, I feel something in my tummy ^a
Attending to others' emotions	The tendency to be interested in the emotions of others	If a friend is upset, I try to understand why
Analyses of emotions	The willingness to face one's emotions	When I have a problem, it helps me when I know how I feel about it
Hierarchical personality inventory for children		
Extraversion	The tendency to show optimism, expressiveness, and energy	[My child] shows feelings
Benevolence	The tendency to be compliant and altruist and not to be egocentric, irritable, and dominant	[My child] defends the weak
Conscientiousness	The tendency to be concentrated, perseverant, and well-ordered	[My child] works with sustained attention
Neuroticism (emotional instability)	The tendency to be anxious and not self-confident	[My child] is afraid of failure
Imagination	The tendency to be creative, curious, and quick-witted	[My child] can use everyday things in a new way
Pediatric asthma quality of life questionnaire		
Activities limitation	That children are less bothered by their limitation in activities	How often did you feel you couldn't keep up with others because of your asthma during the past week?
Symptoms	That children are less bothered by physical symptoms of asthma	How much did coughing bother you in the past week?
Emotional function	That children feel less negative emotions due to asthma	How often did your asthma make you feel frustrated during the past week?

^a Reversed items

analyses (according to the principle of economy [32]), we only included variables that were significantly or marginally significantly ($p < 0.10$) related to at least one of the dimensions of QOL. Finally, we conducted hierarchical regressions to test the incremental validity of EC and personality dimensions over and above asthma control and socio-demographic data frequently associated with the QOL of children with asthma (age, gender, and educational level of parents). It has to be noted that the number of participants varies between the different statistical analyses because some questionnaires were incomplete.

Results

Preliminary statistics

The means, standard deviations, Cronbach's α of the EAQ30, the HiPIC, and the PAQLQ, and correlations

between these variables are presented in Table 3. The results showed that the global score of QOL and aspects of the QOL linked with emotional functioning and symptoms were (1) positively related to three EC dimensions (verbal sharing of emotions, not hiding emotions, and bodily awareness) and two personality dimensions (benevolence and conscientiousness), and (2) negatively associated with analyses of emotions and neuroticism. Moreover, the third dimension of QOL linked with the limitation of activities was positively related to verbal sharing of emotions, bodily awareness, and benevolence, and negatively associated with analyses of emotions. Finally, EC and FFM were weakly associated. The only significant relationship concerned the positive association of attending to others' emotions with benevolence and conscientiousness.

In addition, findings indicated that children who controlled their asthma had a better QOL in terms of limitation of their activities than their peers with partial control over their asthma ($M = 6.10$, $SD = 0.94$ vs. $M = 5.64$,

Table 3 Means, standard deviations, and Cronbach's α for the EAQ30, the HiPIC, and the PAQLQ and Pearson moment correlations between the different variables

	Emotional competence						Big 5-D					Quality of life			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Emotional competence															
1. Differentiating emotions															
2. Verbal sharing of emotions	0.21*														
3. Not hiding emotions	0.36**	0.23*													
4. Bodily awareness	0.11	-0.08	0.31**												
5. Others' emotions	0.09	0.15	0.06	-0.13											
6. Analyses of emotions	0.09	-0.01	0.01	-0.21 [†]	0.26*										
Personality dimensions															
7. Extraversion	0.08	0.05	0.09	-0.09	-0.09	0.02									
8. Benevolence	0.18	0.11	0.11	0.05	0.21 [†]	-0.10	0.12								
9. Conscientiousness	0.09	0.12	0.11	0.04	0.34**	0.08	0.29*	0.61**							
10. Emotional instability	-0.03	0.12	-0.06	-0.10	-0.10	-0.02	-0.25*	-0.39**	-0.33**						
11. Imagination	0.01	0.01	0.02	0.01	-0.09	0.12	0.45**	0.16	0.35**	-0.23 [†]					
Quality of life															
12. Activity limitation	0.14	0.26*	0.13	0.32**	-0.02	-0.19 [†]	0.04	0.26*	0.17	-0.13	0.12				
13. Symptoms	0.10	0.19 [†]	0.21*	0.38**	0.03	-0.21*	0.07	0.40**	0.23 [†]	-0.22 [†]	0.14	0.79**			
14. Emotional function	0.16	0.19 [†]	0.21*	0.35**	0.01	-0.22*	0.10	0.42**	0.29*	-0.30*	0.15	0.83**	0.85**		
15. Total score	0.13	0.21*	0.21*	0.38**	0.02	-0.23*	0.08	0.41**	0.25*	-0.24*	0.15	0.89**	0.96**	0.95**	
<i>N</i>	87	87	87	87	87	86	70	70	70	70	70	88	88	88	88
Mean	2.25	2.01	1.96	1.94	2.40	2.21	3.50	3.62	3.20	2.92	3.75	5.85	5.33	5.83	5.62
SD	0.44	0.62	0.43	0.55	0.46	0.44	0.51	0.56	0.66	0.66	0.62	1.09	1.57	1.35	1.31
Cronbach's α	0.64	0.70	0.46	0.66	0.67	0.56	0.70	0.79	0.85	0.72	0.77	0.69	0.94	0.91	0.96

EAQ30 emotion awareness questionnaire, HiPIC hierarchical personality inventory for children, PAQLQ pediatric asthma quality-of-life questionnaire

* $p < 0.05$; ** $p < 0.01$; [†] $p < 0.10$

SD = 1.16, $t(86) = -2.04$, $p < 0.05$). Moreover, we found that age had a tendency to influence aspects of the QOL linked with limitation of activities [$r(88) = -0.20$, $p < 0.10$], indicating that older children were more bothered by the limitation of their activities than younger children. Other relationships between asthma control, socio-demographic variables, and QOL were not significant.

EC and QOL

Multiple regressions were conducted to assess the predictive value of EC on the QOL. The EC dimensions significantly related to the QOL in the Pearson moment correlations analyses (namely verbal sharing of emotions, not hiding emotions, bodily awareness, and analyses of emotions) were considered as predictors and the global score of QOL and its three subscales as dependent variables. Results showed that verbal sharing of emotions, not hiding emotions, bodily awareness, and analyses of emotions taken together can account for 19 % of the variation in the global score of the PAQLQ [$F(4, 81) = 5.95$, $p < 0.01$], and 16, 16, and 17 %, respectively, of the variation in aspects of the QOL linked with limitation of activities [$F(4, 81) = 5.02$, $p < 0.01$], emotional functioning [$F(4, 81) = 5.12$, $p < 0.01$], and symptoms [$F(4, 81) = 5.44$, $p < 0.01$]. Results provided support for positive significant associations between two specific EC dimensions, namely verbal sharing of emotions and bodily awareness, and self-reported QOL. More specifically, higher scores on bodily awareness were related to a better QOL, characterized by higher scores on the global PAQLQ [$\beta = 0.35$, $t(85) = 3.25$, $p < 0.01$] and on its three subscales. Indeed, children with higher scores on bodily awareness were less bothered by the limitation of their activities [$\beta = 0.33$, $t(85) = 2.99$, $p < 0.01$] and by their symptoms [$\beta = 0.34$, $t(85) = 3.16$, $p < 0.01$], and they had a better emotional functioning [$\beta = 0.31$, $t(85) = 2.88$, $p < 0.01$] than children with lower scores on bodily awareness. Higher scores on verbal sharing of emotions were also associated with a better QOL, with higher scores on the global PAQLQ [$\beta = 0.23$, $t(85) = 2.30$, $p < 0.05$] and on its three subscales. Children with higher scores on verbal sharing of emotions were less bothered by the limitation of their activities [$\beta = 0.29$, $t(85) = 2.84$, $p < 0.01$] and by their symptoms [$\beta = 0.21$, $t(85) = 1.99$, $p < 0.05$], and they had a better emotional functioning [$\beta = 0.21$, $t(85) = 2.02$, $p < 0.05$] than children with lower scores on verbal sharing of emotions. The two other EC dimensions (not hiding emotions and analyses of emotions) were not significantly related to QOL in the present regression analyses.

Personality and QOL

Multiple regressions were conducted to assess the predictive value of personality traits on children's QOL with the personality dimensions significantly related to the QOL in the Pearson moment correlations analyses (namely benevolence, conscientiousness, and neuroticism) as predictors and the global score of QOL and its three subscales as dependent variables. Results revealed that benevolence, conscientiousness, and neuroticism explained 13 % of the variation in the PAQLQ total score [$F(3, 64) = 4.46$, $p < 0.01$] and in the symptoms subscale [$F(3, 64) = 4.26$, $p < 0.01$] and 16 % of the variation in the emotional function subscale [$F(3, 64) = 5.26$, $p < 0.01$]. However, benevolence is the only significant predictor of the QOL global score [$\beta = 0.37$, $t(67) = 2.50$, $p < 0.05$] and of two aspects of the QOL: emotional functioning [$\beta = 0.35$, $t(67) = 2.38$, $p < 0.05$] and symptoms [$\beta = 0.39$, $t(67) = 2.63$, $p < 0.05$]. These findings indicated that children with higher scores on benevolence had a better QOL, were less bothered by their symptoms, and had a better emotional functioning than children with lower scores on benevolence. Other personality factors did not predict the children's QOL and none of the personality dimensions significantly explained the variation in activity limitation.

EC, personality, socio-demographic data, and asthma control as predictors of QOL

We conducted hierarchical regressions to test the incremental validity of EC and FFM over and above asthma control and socio-demographic data frequently associated with the QOL of children with asthma. In the subsequent incremental analyses, we only included variables that were significantly or marginally significantly ($p < 0.10$) related to at least one of the dimensions of QOL.

Preliminary analyses showed that at least one dimension of the QOL was predicted by age, asthma control, one personality factor (benevolence), and two EC dimensions (verbal sharing of emotions and bodily awareness). Therefore, hierarchical regressions were conducted entering age and asthma control as block 1, benevolence as block 2, and EC dimensions as block 3. As shown in Table 4, age and asthma control explained between 0 and 8 % of the variation in the children's QOL and its different subscales. Block 2, including benevolence, explained an additional 8–20 % of variance in children's QOL and its three subscales, and benevolence remained a significant predictor of QOL when age and asthma control were in the model. Block 3, including verbal sharing of emotions and bodily awareness, explained an additional prediction between 9 and 13 %, resulting in 29–35 % of the total

variance explained in the different dimensions of QOL. Therefore, higher scores on the global score of QOL and on aspects of the QOL linked with emotional functioning and activities limitation were predicted by higher scores on benevolence, bodily awareness, and verbal sharing of emotions. The aspects of QOL linked with symptoms were predicted by higher scores on benevolence and bodily awareness, but not by verbal sharing of emotions.

Discussion

The present study aimed to examine the predictive value of EC and personality dimensions on the QOL of children with asthma. Findings demonstrated that higher scores on two specific EC dimensions, namely verbal sharing of emotions and bodily awareness were associated with a better QOL and remained significant predictors of the QOL over and above asthma control, age (the only significant socio-demographic variable), and benevolence (the only significant personality dimension). Such results indicate that EC dimensions are independent predictors of adaptive outcomes in pediatric asthma, which brings additional information over well-established concepts, such as the FFM. These results also concur with those found in adult populations [20–22].

Expressing emotions has already been shown as a significant predictor of psychological and physical health. To illustrate, studies among healthy children showed that higher scores on verbal sharing of emotions were related to fewer self-reported symptoms of depression, anxiety, and somatic complaints [11]. Studies also revealed that in adults with asthma, a difficulty expressing emotions was related to poorer pulmonary function, but not to self-report of emotional or physical symptoms of asthma [33]. In children with type 1 diabetes, a difficulty expressing emotions was also associated a poor glycemic control [14].

Bodily awareness also appears as an important predictor of QOL. Therefore, it has to be reminded that higher scores on bodily awareness reflect a lower attention to bodily sensations. Then, our results tend to suggest that paying too much attention to the analysis of physical aspects of emotions would be detrimental for the QOL. Considering bodily awareness as a global concept leads to some confusion and prevents subtle analysis of its components and its consequences [34]. Indeed, a fundamental difference exists between an excessive attention to bodily symptoms, associated with hypervigilance and catastrophization, and paying attention to these symptoms “nonjudgmentally and mindfully.” While the first type of attention is mainly associated with maladaptive outcomes, the second can lead to adaptive consequences [34]. It seems that items of Bodily Awareness subscale in the EAQ30 reflect the first

Table 4 Hierarchical regression analyses predicting quality of life by age, asthma control, benevolence, verbal sharing of emotions, and bodily awareness ($N = 66$)

	Activity limitation			Symptoms			Emotional function			Total score		
	Block 1	Block 2	Block 3	Block 1	Block 2	Block 3	Block 1	Block 2	Block 3	Block 1	Block 2	Block 3
1. Age	-0.21 [†]	-0.21 [†]	-0.18 [†]	-0.18	-0.18 [†]	-0.14	-0.15	-0.15	-0.11	-0.18	-0.19 [†]	-0.15
Asthma control	0.23 [†]	0.24*	0.18 [†]	0.15	0.17	0.14	0.09	0.11	0.06	0.15	0.17	0.13
2. Benevolence		0.30*	0.25*		0.45**	0.41**		0.45**	0.40**		0.44**	0.40**
3. Verbal sharing of emotions			0.27*			0.17			0.22*			0.22*
Bodily awareness			0.28*			0.30**			0.32**			0.32**
Adjusted R^2	0.08	0.16	0.29	0.04	0.23	0.32	0.00	0.20	0.32	0.04	0.23	0.35
F change	4.05*	7.16*	6.45**	2.24	17.06**	5.18**	1.15	16.27**	6.80**	2.30	16.90**	6.89**

Higher scores on activity limitation mean that children are less bothered by the limitation of their activities, which is an indicator of a better QOL. Higher scores on symptoms mean that children are less bothered by their symptoms, which is an indicator of a better QOL. Higher scores on emotional function mean that children have a better emotional functioning, which is an indicator of a better QOL. Higher scores on total score indicate a better QOL

* $p < 0.05$; ** $p < 0.01$; [†] $p < 0.10$

type of attention rather than the second one. These results suggest that it would also be interesting to investigate the predictive value of the second category. Moreover, it underscores the importance of considering EC dimensions separately, rather than a global score because not all EC dimensions were associated with the QOL in pediatric asthma.

Regarding personality, results revealed the specific role of benevolence to predict the QOL of children with asthma, which is in accordance with the results that showed agreeable individuals adapt better to their disease [9]. These findings concur with the results of Van de ven and Engels [7] who demonstrated an association between benevolence and some aspects of the QOL in adolescents with asthma. In pediatric injury patients, at 1-year follow-up, benevolence was also a significant predictor of children's global score of QOL [19]. Children with social and agreeable characteristics can easier adapt to their illness, through different processes such as using functional coping strategies (e.g., positive reappraisal) or receiving social support from their caregivers and peers [7, 19].

The present study also showed that conscientiousness and neuroticism were correlated with QOL in Pearson moment correlations, but they did not remain significant predictors in multiple regression analyses, maybe because of their overlap with benevolence. Though, neuroticism has frequently been shown as a significant predictor of impaired QOL in pediatric patients and healthy children [17, 19]. These results could reflect real differences between children, depending on their physical condition. Neuroticism could be a more important predictor of QOL in children who are not affected by an illness at the time of the assessment or in healthy children [17, 19] than in children with a current disease, such as children with asthma. The QOL of children with a current affection is maybe better explained by other psychological factors, such as benevolence. However, a recent study revealed that low scores on neuroticism were also related to a better QOL in children and adolescents with asthma [7]. These inconsistent results could also be partly explained by methodological issues, such as the design of the study (cross-sectional in the present study vs. longitudinal in [17, 19]) or the type of informants (children vs. parents). De Clercq et al. [17] showed, for example, that in childhood, self-reported QOL was best predicted by self-reported personality traits, whereas parent-rated QOL was best predicted by parent-rated personality traits of children. These findings highlight that the type of informant seems to widely participate in the percentage of explained variances. Indeed, explained variances are larger when the sources of data are similar than when they are different, suggesting stronger covariations when predictors and outcomes are rated by the same observer. In our study, we use a self-

report measure of QOL and a parent's measure of FFM, which can decrease the problem of shared method variance. However, using different respondents can also make the data collection and the interpretation of the results more difficult. Indeed, collecting data of different informants can increase the risk of missing data. Moreover, the complexity of drawing conclusions can be emphasized because of the low level of agreement between the responses of the different informants [35].

Finally, the results revealed verbal sharing of emotions, bodily awareness, and benevolence remain significant predictors of QOL over and above other relevant variables, such as socio-demographic factors and asthma control. In the present study, we observed that socio-demographic variables and asthma control were weak predictors of QOL, which dovetails with other research finding that psychological factors were more related to QOL in pediatric asthma than asthma-related factors [8].

Limitations and future research

The present study underlines the role of specific individual differences (verbal sharing of emotions, bodily awareness, and benevolence) in the QOL of children with asthma. However, some limitations must be acknowledged. Firstly, the sample was not representative of all children with asthma, which could limit the generalizability of our study. Indeed, children who participated in this study had been referred to a university hospital. Thus, they could have more severe asthma than those who are treated by a general practitioner or, conversely, they could have better asthma control because they regularly visit their health care provider. Moreover, we did not compare children with asthma with another control group (e.g., children without asthma, children with another chronic illness). Such a comparison would allow examination of whether the role of EC and FFM is specific to asthma or could be extended to other illness populations.

Secondly, we assessed personality dimensions of children through parents' reports. However, we did not take into account parents' characteristics, such as their personality and their emotional state. These variables could have influenced parents' assessments [36, 37], and should, therefore, be considered in further analyses.

Thirdly, because of the cross-sectional nature of the design, we are not able to confirm the direction of the relationships. For example, the results suggest that EC has an impact on QOL, but we cannot rule out the possibility that children with good psychological health are more able to identify, express, or understand their emotions and those of others. Therefore, conducting longitudinal studies or examining indirect pathways (such as health behaviors, illness representation, etc.) by which individual differences

influence QOL would be necessary to understand causal directions of EC and personality with QOL.

Finally, the present findings contribute to an understanding of the associations of EC and FFM with subjective indices of health. We then encourage conducting further studies that aim to investigate whether EC and FFM also predict objective indicators of physical health, which could be especially worthwhile examining among chronically ill children.

Clinical implications

Such results should encourage practitioners who are involved in the treatment of children with asthma to pay a particular attention to specific psychological aspects, such as benevolence, verbal sharing of emotions, and bodily awareness, since they are related to QOL in pediatric asthma. Indeed, children who do not express easily their emotions, who seem to be hyper vigilant to their physical symptoms or who are irritable, not compliant or not altruist (different aspects of benevolence) would have more risks for having an impaired QOL. Therefore, these findings also suggest that if children with asthma present some of these characteristics, they should be referred to psychologists to assess whether low scores in verbal sharing of emotions, bodily awareness, and/or benevolence are affecting the QOL and to provide appropriate intervention to address these contributing factors.

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