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ORIGINAL PAPER

Insights into a Novel Measure of Childhood Mental Illness Stigma from the Stigmatizer's Perspective

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Abstract

Developing psychometric instruments for understanding childhood mental illness stigma is challenging due to the complexity of the stigma concept. The objective of the present study was to validate a novel measure of childhood mental illness stigma from the perceiver´s perspective using modern psychometric techniques and to critically reflect on the insights generated by the results. A convenience sample of 290 Brazilian elementary schoolteachers was investigated for the presence of personal stigma (PS) and perceived public stigma (PPS). The items of each stigma type were analyzed using Item Response Theory. A 20-item Likert instrument was developed and validated allowing comparison of levels of PS and PPS. Although all items showed good potential for discriminating individuals with different levels of stigma, the items dangerousness, fear and intellectual disability exhibited greatest discriminative power. The difference in an individual's perceived behavior/attitude of others compared to their own was observed and described as the distance between PS and PPS. We report important insights into the novel measure of childhood mental illness stigma from the stigmatizer´s perspective which can help plan topics to be addressed and new approach strategies for anti-stigma campaigns in child mental health.

Keywords Social stigma · Child mental disorders · Psychometrics · Community/neighborhood influences · Assessment.

Highlights

- New assessment measure of the stigma from the stigmatizer´s perspective was proposed.
- The most relevant items were violence, incompetence and non-recovery.
- Different responses were observed in first or third person.
- Personal stigma and perceived public stigma were quantified.

The development of psychometric instruments to measure childhood mental illness stigma is an important topic to know more precisely the stereotype, prejudice and discrimination faced by these children and their families, since these experiences can be a significant barrier to access of children with emotional and/or behavioral problems (EBPr) to specialized help (Owens et al., 2002). Stigma is a personal attribute; visible or invisible "mark" linked to devalued social identity in a particular social context (Goffman, 1963). The individual is disqualified for their characteristics and behaviors (stereotypes), usually resulting in discrimination (Link & Phelan, 2001). Of the stigmas currently experienced, the one of mental disorder is often observed in modern society and may add the burden of a second disease to individuals with the condition (Heflinger & Hinshaw, 2010; Huggett et al., 2018).

This "mark" has been extensively studied in adults (Ando et al., 2013; Armiyau, 2015; Hinshaw & Stier, 2008; Mascayano et al., 2016; Parcesepe & Cabassa, 2013; Reavley & Jorm, 2011; Wahlbeck & Aromaa, 2011), but

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research among children remains scarce (Heary et al., 2017). In addition, research findings on stigma in adults cannot be generalized to children (Mukolo et al., 2010), because (i) they occupy a distinct place in society, compared to adults with less power and lower social status throughout history, in addition to vulnerability due to legal protection not always guaranteed (Hinshaw, 2005; Mukolo et al., 2010); (ii) they occupy a position of dependence on adults to reach help and treatment of mental disorder, *e.g.* the role of the caregiver, the stigma of courtesy and the traditional blame attributed to parents for not adequately controlling or disciplining the child (Patrick W Corrigan & Miller, 2004; Hinshaw, 2005); (iii) childhood is a stage of development with a social context very different from that of adulthood, promoting unique contexts in which stigma is experienced (Mukolo et al., 2010).

Concepts linked to the social stigma of mental disorder have been carefully reviewed by Fox et al (Fox et al., 2017). In a didactic scheme (The Mental Illness Stigma Framework), the authors subdivide this stigma into two perspectives: the stigmatized and the stigmatizing (Fox et al., 2017). In this research, our interest was the second perspective, also known as public stigma. Public stigma corresponds to the reaction that the general population has to people with mental disorders (Patrick W Corrigan & Watson, 2002). It can be subdivided into two types: the personal and the perceived. Personal stigma (PS) concerns the beliefs, feelings and behaviors of the individual (who does not have a mental disorder) about people with a mental disorder and can comprise three main mechanisms or core components of stigma, namely: stereotypes, prejudice and discrimination (Fox et al., 2017). These aspects were well studied by Corrigan, in parallel with the concepts presented by Link & Phelan (P. W. Corrigan, 2000; Patrick W. Corrigan et al., 2005; Link & Phelan, 2001).

Stereotypes are the negative beliefs or generalized knowledge structures about the characteristics or behaviors of children with EBPr and they are the cognitive component of stigma (Patrick W Corrigan & Watson, 2002; Fox et al., 2017). For example, a child with a mental disorder is dangerous (Hinshaw, 2005; Kaushik et al., 2016; Mukolo et al., 2010; B A Pescosolido et al., 2007).

Prejudice is the established "prejudgment" or agreement with the belief (stereotype) and/or negative emotional reaction or feeling towards children (group or individually) with mental disorder (Patrick W Corrigan & Watson, 2002; Fox et al., 2017; Hinshaw & Stier, 2008). This is the affective component of stigma. For example, the fear one may feel of a child with a mental disorder, once he is perceived as dangerous (Martin et al., 2007).

Discrimination is unfair behavior toward children with EBPr, giving them differentiated and unfavorable, in order to limit their rights (Patrick W Corrigan & Watson, 2002; Fox et al., 2017; Link et al., 2004). This is the behavioral component of stigma. For example, the child is perceived as dangerous (stereotype), which arouses the emotional reaction of fear (prejudice) and, consequently, the behavior of distancing them from social life (discrimination) (Martin et al., 2007; Mukolo & Heflinger, 2011).

Perceived public stigma (PPS) concerns the perception of society's beliefs, feelings and behaviors towards children with a mental disorder, and can be shared by people with or without a mental disorder (Fox et al., 2017). This type of stigma also includes stereotypes, prejudice and discrimination.

Stigma of children with EBPr is an obstacle to help-seeking and prevents access to early intervention (S Clement et al., 2015). Consequently, repercussions associated with failure to detect, evaluate and treat these children in a timely manner at this stage of development can occur in the short and long term, such as severe impairment in the formation of personal identity and autonomy, and a significant reduction in the chances of enjoying opportunities as an adult (Hinshaw, 2005; Kaushik et al., 2016). Knowledge on stigma as the basis for devising effective strategies combating the phenomenon can facilitate the access of children with EBPr to early evaluation and treatment, preventing the devastating consequences for these children and their families throughout life.

More than four hundred mental disorder stigma measures have been developed since 2004, with both personal and perceived public stigma of adult mental disorder being extensively investigated through many of them (Fox et al., 2017). However, there is a lack of measures to assess the public stigma of childhood mental disorders, considering the specifics of the context of illness at this stage of life (Heflinger & Hinshaw, 2010).

Two articles with validated instruments were located, with the aim of evaluating perceived (community) stereotypes and discrimination towards children with EBPr (Heflinger et al., 2014; Hirsch, 2013).

The first measure mentioned uses the macro framework "children with emotional and/or behavioral problems", assesses personal and perceived public stigma, takes into account potential stigmatizers of children with mental disorders. However, the instrument has 45 items, which can be discouraging to the participant (in the case of the study, a prize of five dollars was offered after completing the questionnaire, something that is more difficult to achieve in a Brazilian research) (Heflinger et al., 2014). Furthermore, there may be aspects of the reality of children with EBPr that have not been addressed. Shorter instruments may be more encouraged in everyday practice.

The second measure used, on some issues, an approach to mental disorders by diagnosis, other labels and technical terms that may not be as easily understood by a general

public. For example, schizophrenia, psychotic children, ethnic minority children, psychopathology, children with conduct disorder (Hirsch, 2013). Furthermore, addressing the stigma of mental disorder by a single term or macro framework (eg, children with EBPr) may be sufficient to provide the necessary clarity to the data, as suggested by Fox et al (Fox et al., 2017).

In addition to the two articles mentioned, a third article was found. It was a questionnaire to assess parents' attitudes towards children with mental disorders, which was validated in Iran. However, the article does not provide further details about its items specifically (Ebrahimi et al., 2019).

Specifically in our language, no validated instrument to assess the public stigma of childhood mental disorder has been found so far. In addition, no comparisons were found between the personal and perceived component of this stigma for the Brazilian reality.

The elaboration of measures in this topic is challenging, at least, for three reasons: (i) Previous studies with self-reported measures of adult mental disorder stigma showed respondents' preference for endorsing perceived stigma items over personal stigma items (Griffiths et al., 2006; Reavley & Jorm, 2011); (ii) The available literature on stereotypes, prejudices and discrimination in relation to children with EBPr is still incipient. There is the stereotype of dangerousness, incompetence, disruptiveness, parental guilt, discrimination by preference for social distance or treatment in restrictive environments (Heflinger et al., 2014; Hinshaw, 2005; Mukolo et al., 2010; B A Pescosolido et al., 2007; Bernice A Pescosolido et al., 2008). But there are still other components of this stigma to be studied and better consolidated in the literature; (iii) It is difficult to develop brief and reliable instruments using measures generated by Factor Analysis or Classical Test Theory (Marcorela et al., 1997). More details on the limitations of Classical Test Theory can be found in other works (Hambleton and Jones, 1993; Hambleton & Slater, 1997; Marcorela et al., 1997; Pasquali & Primi, 2003; Yang & Kao, 2014).

Psychometric instruments can be a powerful strategy for understanding the stigma of EBPr in childhood, especially in the context of middle-income countries. In addition, the stigma components (*i.e.* stereotypes, prejudice and discrimination) toward children with EBPr are still poorly acknowledged (Mukolo et al., 2010). The awareness of stigma (PPS) and agreement with them (PS) can be measured separately to better capture the potential effects the perceiver's perspective can have on stigmatized children (Heary et al., 2017). Modern psychometry techniques have been used to develop and refine brief, objective and comprehensive instruments in every construct to which they refer (Embretson & Reise, 2000). Of the host of modern psychometric techniques available, Item Response Theory (IRT) stands out for generating rich information on items, thus offering advantages over Classical Test Theory (Hambleton & Jones, 1993; Yang & Kao, 2014). IRT assumes that the individual has a latent trait, that is, an intrinsic characteristic that cannot be measured directly and that determines how to respond to test items. The individual's response to the item is dependent on the level he has in the latent trait (Pasquali & Primi, 2003).

In the present study, the stigma of EBPr in childhood from the perceiver´s perspective was explored in the context of Brazil by using IRT. As a proof of concept, we used the elementary school teacher's perspective to study this stigma specifically. Such choice was based on the reality that the teachers are adults who have frequent and longitudinal opportunities to observe changes in child development (Rothì et al., 2008). Thus, they have an important role to play in early identification of changes in child development and in referral to a specialized child mental health service (Williams et al., 2007). In addition, how teachers perceive their students with EBPr, if biased by stigma, it can result in a barrier to children's access to specialized treatment (Owens et al., 2002). The objective was to validate a new measure of stigma of childhood mental illness from the teacher´s perspective and to critically reflect on the insights generated by the results for PS and PPS of EBPr in childhood. Moreover, we proposed and validated (by statistical methods) an instrument that allows its use by other perceivers, such as parents, family members, health professionals and community members.

Method

A cross-sectional study of a psychometric evaluation based on modern psychometry using IRT was conducted. Theoretical, experimental and analytical procedures for the construction of evaluation instruments were adopted (Pasquali, 1998; Yang & Kao, 2014).

Theoretical Procedure

The theoretical basis was constructed based on the concepts of PS and PPS (Fox et al., 2017; Griffiths et al., 2006) and the components of stigma (Patrick W. Corrigan et al., 2017; Patrick W Corrigan & Watson, 2002; Fox et al., 2017), all adapted specifically in relation to children with EBPr. Furthermore, the components of stigma most widely accepted in the relevant literature on stigma of adult and child mental illness were explored. For this investigation, other specific concepts related to childhood issues based on studies and our clinical practice were also suggested. The criteria adopted for devising items were those recommended by Pasquali (Pasquali, 1998).

The form of the instrument was developed by adapting ideas from the Attribution Questionnaire (Pinto et al., 2012) and The Self-Stigma of Mental Illness Scale (P. W. Corrigan et al., 2006) and initially comprised 24 items on a *Likert* scale with 9 response categories. The objective was to investigate 12 statements (regarding stereotypes, prejudice and discrimination of EBPrs in childhood) from the personal perspective of the respondent (personal stigma), all of which were preceded by the same statement: "I, as an individual, think that…". In the second part, the same assertions were investigated, but were preceded by a different statement: "I think most people believe that…" in order to verify the respondent's perception about the general public (perceived public stigma).

The first version of the instrument was submitted to a semantic analysis by 13 elementary school teachers to check understanding of the items. Subsequently, the proposed instrument was submitted to analysis by judges (8 specialists in child psychiatry) in order to evaluate the construct. The instrument produced after these theoretical steps consisted of 24 items, but on a reduced *Likert* scale with 5 response categories ranging from 1 to 5, where 1 = "totally disagree", 3 = "neither agree nor disagree", and 5 = "totally agree".

Experimental Procedure

The experimental procedure included the application of the instrument to elementary school teachers of the municipal public schools network of a city in the interior of São Paulo State in 2016. All 342 teachers were invited to participate in a training program on the main emotional and behavior problems of childhood during their work hours, with the support and authorization of the local Office of Education. The questionnaires were completed by participants before the start of the training. The sample comprised 290 questionnaires completed by the teachers, all of whom had agreed to take part in the study by signing the Free and Informed Consent Form. The profile of the sample of participating teachers was 91.7% women, mean age 47.4 ± 8.9 years (95% CI: 46.3–48.5 years), 86.8% white and average teacher experience time of 20.1 + 8.2 years (95% CI: 19.1–21.1 years).

Analytical Procedure

The Graded Response Model (GRM) proposed by Samejima (Samejima 1970) was used for its effectiveness in the analysis of data from Likert attitude scales, whose responses are corrected in a graded manner. In this model, the categories of item i, denoted by hi = 1, 2, …, m can be placed in ascending order. The probability of an individual j choosing a particular category h from item i is given by:

$$P\left(Y_{ijh}=y_{ijh}\middle|\theta_j,\,a_i,b_i\right)=\begin{cases}1-\frac{1}{1+e^{-Da_i\left(\theta_j-b_{i(h+1)}\right)}}, & if\ h=1,\\ \frac{1}{1+e^{-Da_i\left(\theta_j-b_{ih}\right)}}-\frac{1}{1+e^{-Da_i\left(\theta_j-b_{i(h+1)}\right)}}, & if\ 1<h\,m,\\ \frac{1}{1+e^{-Da_i\left(\theta_j-b_{ih}\right)}} & if\ h=m\end{cases}$$

where a_i represents the discrimination (or inclination) parameter of the i-th item and b_{ih} represents the parameter related to the difficulty of the h-th category of item i, and θ is the latent trait (proficiency or ability) of the j-th individual.

The IRT analytical procedure validated the instrument in two steps. The first step, called independent analysis, entailed the analysis of PS and PPS items separately, i.e. ignoring the dependence between PS and PPS responses. In this case, the objective was to estimate the parameters of discrimination (parameter a_i) and of difficulty (parameter b_{ih}) of the items for both cases. The respective latent traits (PS and PPS of EBPr of children with EBPr) were estimated. One of the assumptions of the model is the distribution of the population studied, which should be Normal (Gaussian) with mean, μ = 0 and standard deviation, σ = 1. Notably, the means are centered at zero, precluding any comparison of the items (or latent traits) between PS and PPS.

The second step, called joint analysis, comprised the comparison of PS and PPS items in a joint and simultaneous manner. In this case, only one population was considered, composed of two pooled subpopulations, namely, the groups that answered in the first person (personal stigma) and in the third person (perceived public stigma), referred to in the IRT literature as multiple groups (Bock & Zimowski, 1997). Thus, after the simultaneous estimation of these groups, the distance between the mean personal stigma and perceived public stigma was quantified. In addition, the test resulting from the estimation of item parameters using this procedure is a unified useful instrument for comparing both stigmas.

The internal consistency of the set of items was analyzed by Cronbach's alpha (Cronbach, 1951) in the independent and joint analysis steps. Akin to any IRT analysis, items are assumed to be locally independent (Anderson, 1970). This means that the response given by an individual to an item does not influence his/her response to the other items. This criterion is directly linked to the second assumption: that the instrument is inferring only one latent trait (unidimensionality). In short, all items measure only one ability, and this does not change as the individual answers the questions. There is currently no standard procedure for evaluating unidimensionality. For this study, a model with one dimension and another with two dimensions were considered and compared according to the Bayesian

Table 1 Relevant themes about childhood mental illness stigma from the stigmatizer´s perspective addressed in our study

Relevant Stigmatizing Themes	• Violence: Children are unpredictable*, dangerous* and evoke fear**
	• Disability or incompetence: Children are less intelligent*; unable to complete their education*; and evoke pity**
	• Chronicity: Children never recover or get better, because there is no treatment*
	• Physical attribute: Children have a careless physical appearance *
	• Blame: Children are blamed for their own problems *; parents are blamed for children's EBPr*
	• Social distance: Children should be avoided or left out of everyday life activities***; they should be placed in a special classroom or school for them***

*stereotype; **prejudice; ***discrimination

information criterion (BIC), which indicated only one dimension. All analyses were conducted using the statistical software R (Team RDC and Development Core Team R, 2016).

Results

Theoretical Construction

The theoretical basis of the instrument drew on three fundamental aspects of childhood mental illness stigma from the stigmatizer´s perspective, all adapted specifically to children with EBPr (Table 1). The first aspect was the dimensionality of the instrument, which was based on the concepts of PS and PPS (Fox et al., 2017; Griffiths et al., 2006). The second aspect was the components of stigma, including stereotypes, prejudice and discrimination (Patrick W. Corrigan et al., 2017; Patrick W Corrigan & Watson, 2002; Fox et al., 2017). These are the most widely accepted components of stigma in the related literature on stigma of adult and child mental illness. The concepts of the first two aspects mentioned are presented in the introduction to the article. The third aspect was the relevant stigmatizing themes, including violence, disability or incompetence, chronicity, physical attribute, blame and social distance. All themes are presented in Table 1.

Analytical Construction

Independent analysis step

The initial instrument comprising 12 items for each type of stigma was submitted to calibration. However, two of the items (addressing child's guilt and social distance stereotypes) showed only one category with a greater chance of response to almost any latent trait. Because both these items were unable to differentiate individuals, they were subsequently excluded. This gave a modified instrument containing 10 items for each type of stigma for calibration, where all items retained the same categories of responses (Table 2 shows the items as formulated in the instrument).

The discrimination *(a)* and difficulty (b_1, b_2, b_3 e b_4) parameters for categories 1 to 5 of the *Likert* scale are shown in Table 3, together with the discrimination capacity of each item, according to the classification proposed by Baker (Baker, 2001). Overall results of GRM showed that all items exhibited good potential to discriminate individuals for different levels of latent trait and present satisfactory levels of information. The analysis of the discrimination parameters of the items (Table 3) showed that questions 6 and 7 for PS, and 18 and 15 for PPS, had greatest discriminative power, i.e. these questions more effectively discriminated individuals with different levels of latent trait. In general, all items had a high discriminatory capacity, especially the estimated parameters of the instrument for PPS, which had the highest levels of discrimination (1.725< to <2.929 for PPS compared to 0.802 <to <1.867 for PS). The parameter *b* represents the difficulty related to the response categories of an item, and there is no consensus in the literature regarding its interpretation in polytomous models. In practice, these parameters are summarized by the arithmetic mean of the b_{ik}, for k = 1,…, 5, or by its greatest value, or amplitude, etc. Regardless of the measure used, the parameters of the items estimated from the responses for PS had higher values for difficulty (Table 3). This indicates that higher levels of PS are required for individuals to choose higher categories for these items.

Due to the complexity of the IRT models, interpretation of the item parameters using graphical analysis is fundamental. The most common approach entails the item characteristic curve (ICC), depicting the probabilities of responses for each category, according to latent trait level (Samejima 1974). This allows identification of the response category most likely to be chosen according to the stigma. Figure 1a shows the ICC for item 6, which has five response categories and measures the level of personal agreement regarding the dangerousness stereotype. The latent trait is on the abscissa axis (PS in this case). Theoretically, the latent trait can take on any

Table 2 Explanatory table on the statement of items in the proposed instrument

Type of stigma	Item		Stigmatizing theme investigated
Personal stigma: I, as an individual, think…	… children with emotional and/or behavioral problems, in general, are dangerous.	→	Dangerousness
	… children with emotional and/or behavioral problems, in general, are unable to complete their education.	→	School disability
	… children with emotional and/or behavioral problems, in general, has a careless appearance.	→	Careless appearance
	… parents of children with emotional and/or behavioral are guilty for their problems.	→	Parental blame
	… children with emotional and/or behavioral problems have intelligence below the average of the population in general.	→	Intellectual disability
Perceived public stigma: I think most people believe that…	… children with emotional and/or behavioral problems are, in general, unpredictable.	→	Unpredictability
	… children with mental disorders, in general, never recover or get better.	→	Chronicity
	… children with mental disorders, in general, make me feel fear.	→	Fear
	… children with mental disorders, in general, make me feel pity.	→	Pity
	… children with emotional and/or behavioral difficulties, in general, should be in a classroom or at specific schools for them.	→	School segregation

value between -∞ and ∞, as it is only an arbitrary scale that orders individuals from the less to the most skilled. Parameter a_i, or the discrimination parameter, represents the slope of the curves. The higher its value, the greater the item's capacity to discriminate individuals (especially those with similar abilities). The b_{ik} parameters are associated with the difficulty of the item category, and are on the same scale as the latent trait. Generally, the difference between b_{ik+1} and b_{ik} represents the range of values of θ (latent trait) in which the probability of choice of the b_{ik} category is greater than the probability of choice of the other $k-1$. Figure 1c shows that an individual with a latent trait between [−0.5, 0.6], for example, is more likely to choose category 4. The ICCs of the other items of the instrument are shown in Figs. 2, 3, 4 and 5.

The item information curve (IIC) is another important tool of IRT, and allows analysis of how much information an item contains to measure the latent trait, and for which individuals the item is more appropriate (people with more or less stigma). In other words, this curve indicates the amount of psychometric information that the item contains to infer different levels of stigma. The IICs of PS are shown in Fig. 1b, while the IICs of PPS are shown in Fig. 1d. Items 3, 6 and 7 are more informative to evaluate PS, while items 18, 15 and 17 provide more information for PPS. In addition, the best items to evaluate more stigmatized individuals (latent trait >2) are, in descending order, 6, 7 and 3 for PS and 13, 12 and 14 for PPS. The most informative items to evaluate individuals with lower stigma level (latent trait < −2) are 1 and 5 for PS and 16 and 11 for PPS.

The test information curve (TIC) is a graphical representation of the test information function (TIF). This function allows joint analysis of how much information the items contain for the latent trait measurement (Samejima 1974). The TIC of PS is shown in Fig. 1e, whereas the TIC of PPS is shown in Fig. 1f. The total amount of information provided by a group of items for each level of the latent trait is inversely proportional to the standard error associated with its estimation. In other words, the more information the test presents, the better the latent traits are inferred (with less error). Hence, the test information function provides a viable alternative to the reliability and standard error concepts of the Classical Test Theory. The TIC revealed for which latent trait interval the test shows best performance (in terms of quality of estimates). PS items showed better performance for the latent trait of −1 to +4, while PPS items were best for the latent trait of −2 to +2.

The internal consistency of the group of PS and PPS items on the independent analysis had a Cronbach's alpha of 0.75 and 0.91, respectively.

The agreement of the respondents (in percentage) for the questions in the instrument is given in Table 4. In general,

Table 3 Topic addressed, estimates of analytic parameters and discrimination capacity of each item ($n = 290$)

Item	a	Discrimination capacity	b_1	b_2	b_3	b_4
Personal stigma						
1 Unpredictability	0.857	moderate	−2.992	−1.217	0.063	1.718
2 Chronicity	1.141	moderate	0.116	1.158	2.350	4.903
3 School disability	1.340	moderate	0.332	1.226	2.043	3.804
4 Careless appearance	1.289	moderate	0.500	1.354	2.404	3.696
5 School segregation	1.138	moderate	−0.941	0.074	1.113	2.558
6 Dangerousness	1.867	moderate	−0.628	0.312	1.447	3.093
7 Fear	1.695	moderate	−0.558	0.344	1.143	2.613
8 Intellectual disability	1.167	moderate	−0.138	0.934	2.129	4.197
9 Pity	1.036	moderate	−0.036	0.989	1.993	4.341
10 Parental blame	0.802	moderate	−0.036	0.972	2.406	4.957
Perceived public stigma						
11 Dangerousness	1.739	very high	−2.151	−1.200	−0.499	1.011
12 School disability	1.725	very high	−1.868	−1.188	−0.488	1.163
13 Careless appearance	1.991	very high	−1.480	−0.808	0.143	1.432
14 Parental blame	1.813	very high	−1.488	−0.808	−0.172	1.023
15 Intellectual disability	2.683	very high	−1.795	−1.161	−0.545	0.838
16 Unpredictability	2.540	very high	−2.219	−1.403	−0.677	0.565
17 Chronicity	2.544	very high	−1.739	−1.055	−0.409	0.958
18 Fear	2.929	very high	−1.670	−1.073	−0.499	0.576
19 Pity	2.180	very high	−1.828	−1.088	−0.614	0.703
20 School segregation	2.313	very high	−1.852	−1.222	−0.505	0.470

PPS items had greater agreement than PS items. The PS items displaying greatest agreement were unpredictability and school segregation, whereas the PPS items with greatest agreement were unpredictability and pity.

Joint Analysis Step

The item parameters of the joint analysis are presented in Table 5 in a similar manner to Table 2. All items had good potential for discriminating individuals with different levels of latent trait and presenting satisfactory levels of information. The analysis of the discrimination parameters of the items (Table 5) showed that questions 8 (intellectual disability) and 2 (chronicity) had the greatest discriminative power, i.e. these questions more effectively discriminated individuals with a different level of latent trait. Conversely, questions 1 (unpredictability) and 10 (parental blame) had the least discriminative power. In general, all items had a very high discrimination capacity.

Figure 6 depicts the distance between the means of the two subpopulations - that which responds in the first person (personal stigma) and that which responds in the third person (perceived public stigma) for the same aspects. The internal consistency of the group of items in the joint analysis had a Cronbach's alpha of 0.92.

Discussion

Here we present the critical discussion of each item and the stigmatizing theme assessed through the instrument. The notions of violence, incompetence and non-recovery were the most contributing factors to personal stigma (PS) and perceived public stigma (PPS). Furthermore, teacher showed different behaviors when answering the same question on childhood mental illness in the first person (personal stigma) and third person (perceived public stigma).

The item about child's guilt was excluded because 90% of the respondents disagreed with this stereotype as presented. This may have occurred because the child occupies a vulnerable and devalued place in society and the causal attributions of his/her mental illness can be perceived as beyond their control (Hinshaw, 2005). The child would, therefore, not be blamed (Kaushik et al., 2016). Another explanatory possibility may be that the causal attribution is genetic, thus reducing the child's feeling of guilt over their illness (Mukolo & Heflinger, 2011).

The item about the child's desire for social distance was excluded, in view of personal disagreement by 99% of respondents. This finding was, at first, somewhat surprising, since Martin *et al* (Martin et al., 2000) reported that causal attributions suggesting individual or family blame (the latter

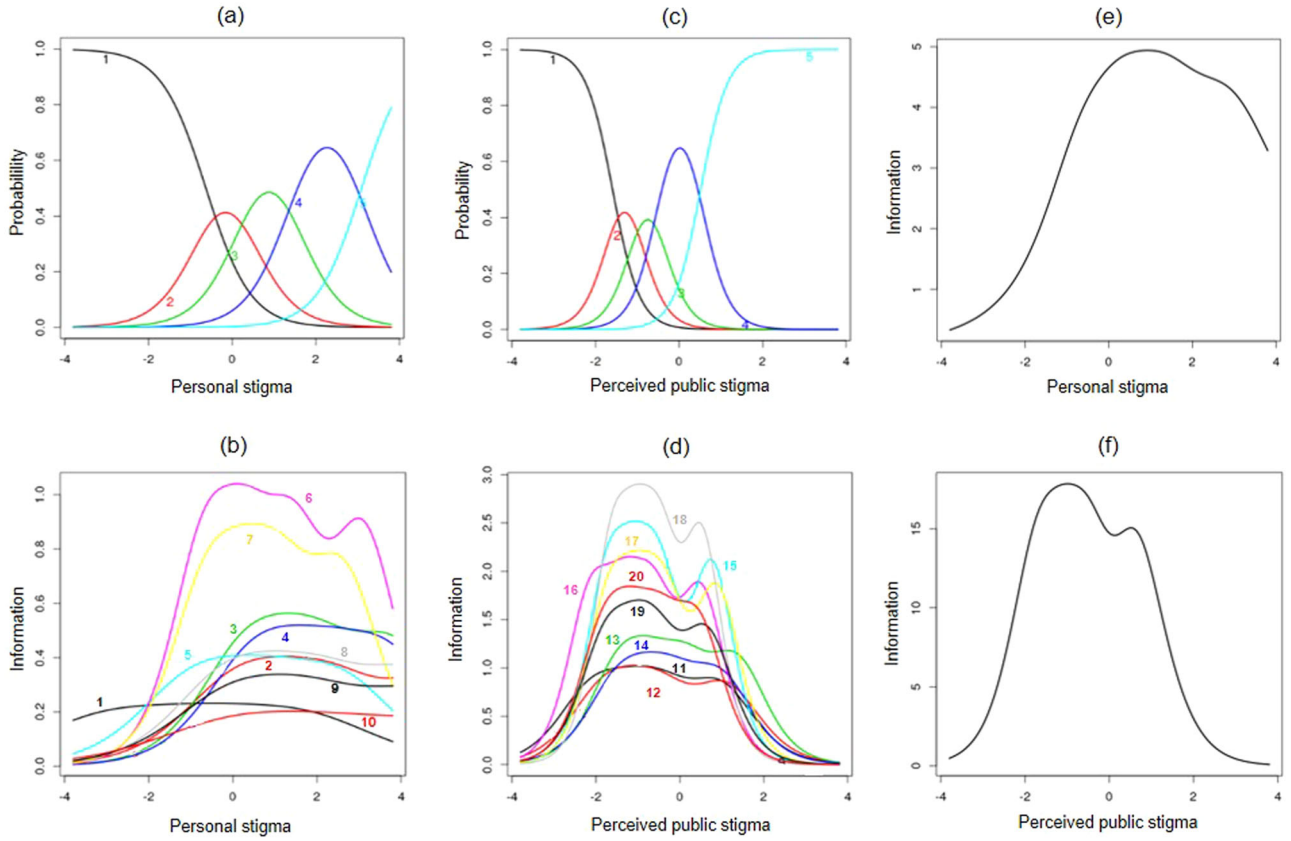

Fig. 1 Graphs for sample generated by Item Response Theory. **a** Item characteristic curve of item 6, personal stereotype of dangerousness. **b** Item information curve of personal stigma items. **c** Item characteristic curve of item 18, perceived public prejudice of fear. **d** Item information curve of perceived public stigma items. **e** Test information curve of personal stigma. **f** Test information curve of perceived public stigma

being the case assessed in the item on parental blame) increase the child's desire for social distance. This desire for distancing was also reported by Pescosolido *et al.* (B A Pescosolido et al., 2007). Kaushik *et al.*, in their review of the literature on the stigma of mental illness in children and adolescents (Kaushik et al., 2016), found that points of view attributing blame are associated with a greater desire for social distance. This leads us to believe that the causal attribution did not occur with the child, as mentioned in the previous item and consequently there was no desire for social distance. In addition, public reaction tends to suggest greater tolerance toward children (B. Pescosolido, 2013) than to adults with EBPr. Other possibilities are that the bias of social desirability was expressed in the disagreement or else, the formulation of the question was too direct. Moreover, because our sample comprised teachers, the guidelines of the government's inclusion policy may have favored this reaction.

The part of the instrument that evaluates PS had three prominent items, by order of importance: the stereotype of dangerousness, the stereotype of school incompetence and the prejudice of fear. These items had greater relevance in the exercise of three functions of the instrument: contribution to form the PS construct; discrimination of individuals with different levels of PS; and information from those with a higher level of PS.

Peril is one of the dimensions of stigma proposed by Jones (Jones et al., 1984) and reinforced by the media (Hinshaw, 2005). It is perhaps the most cited stereotype in the literature (Mukolo et al., 2010) associated with behavioral disorder in childhood (Kaushik et al., 2016). Dangerousness is considered one of the nuclear stereotypes of mental disorder rejection (Feldman and Crandall 2007) and supported by the issue of violence in the social imaginary (Martin et al., 2000). The realization that the notion of violence, mediated by danger and fear, is still so prevalent in individuals' consciousness regarding children with EBPr, is disappointing. Concerted effort must be made to combat these stereotypes in the 21st century.

The PS regarding fear prejudice is also based on violence (Hinshaw, 2005; Martin et al., 2000) and encouraged by media exposure, as seen in adults with mental disorders (Patrick W Corrigan & Watson, 2002; Hinshaw & Stier, 2008; Martin et al., 2008; Rüsch et al., 2005). The emotional reaction of fear has been identified as a negative

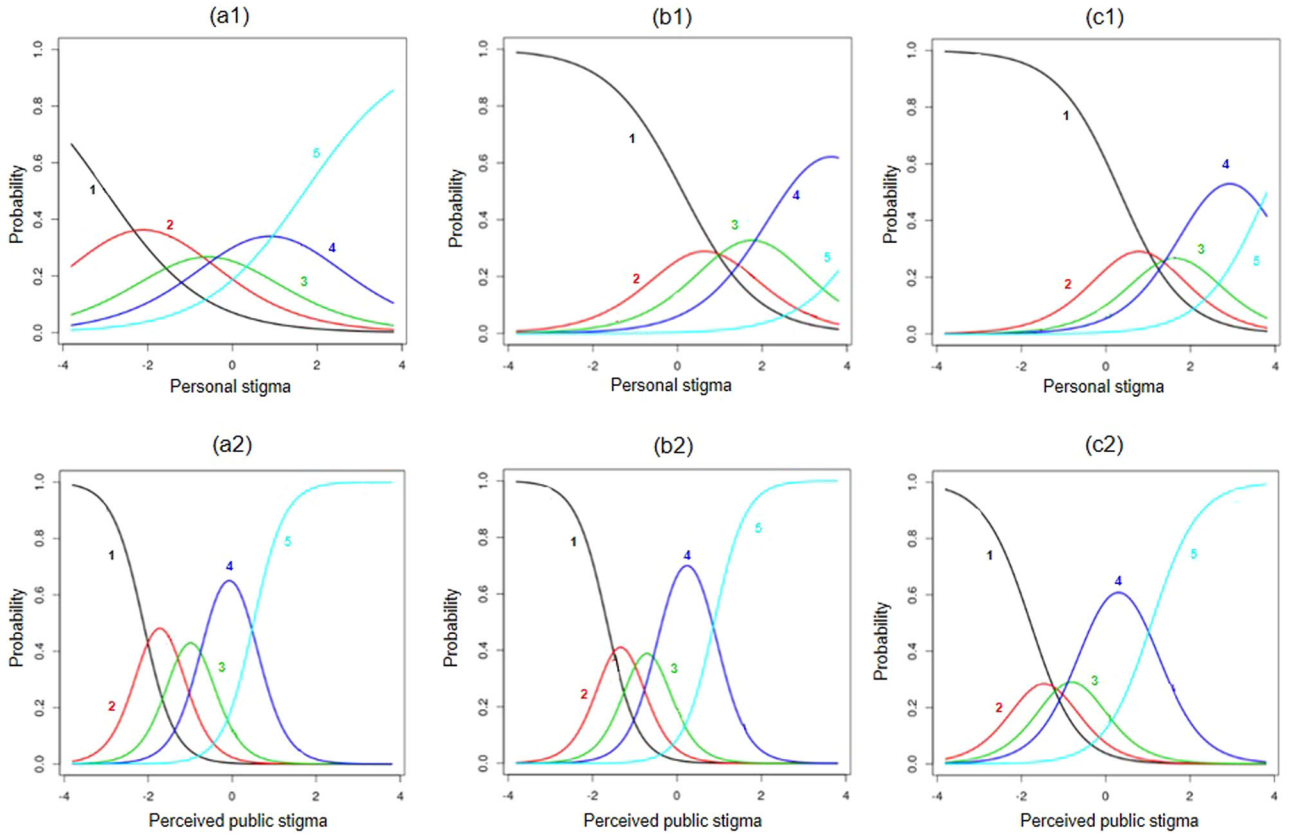

Fig. 2 Graphs of item characteristic curve of sample (ICC) generated by Item Response Theory. **a1** ICC of item 1, personal stereotype of unpredictability. **a2** ICC of item 1, perceived public stereotype of unpredictability. **b1** ICC of item 2, personal stereotype of chronicity. **b2** ICC of item 2, perceived public stereotype of chronicity. **c1** ICC of item 3, personal stereotype of school disability. **c2** ICC of item 3, perceived public stereotype of school disability

predictor of willingness to offer help (Hinshaw & Stier, 2008).

The PS demonstrated through the belief that children with EBPr will not be able to complete their school education is an important issue of child development and has been explored specifically for childhood for the first time by the present study. First, the finding of child incompetence as an aspect relevant to the PS construct of children with EBPr is in accordance with the literature on adults (Martin et al., 2008), together with the lack of future perspective for these individuals. In adults, the notion of incompetence may stem from the belief in the chronicity of mental disorder and in the stigma of benevolence (Patrick W Corrigan & Watson, 2004). This thinking is replicated for the issue in childhood, whereby belief in non-recovery of mental disorder underpins this notion. However, these children have many learning challenges and specificities, and teachers do not always receive specific training or invest in these students so that they may succeed academically. This lack of investment may contribute to the belief that they are unlikely to complete their school education. These findings confirm the notions of violence (represented by dangerousness and fear) and of incompetence as contributing facets in PS, specifically in childhood mental illness.

Also with regard to PS assessment, the stereotype item of unpredictability and the discrimination item of school segregation appear to be more informative for individuals with lower levels of PS. The stereotype of unpredictability is largely reinforced by the media in both children (Hinshaw, 2005) and adults (Martin et al., 2008). According to the present findings, this item had the highest agreement among respondents in both PS and PPS (50% and 74%, respectively). In the context of the biological argument for mental disorder, lack of control is recognized and, therefore, so is unpredictability (Patrick W Corrigan & Watson, 2004; Mannarini & Rossi, 2019). This is also a reasonable explanation for the unpredictability in childhood mental illness. Regarding the concept of violence mediating unpredictability of these children, this is possible, albeit more subtly than for the items of fear and danger. Thus, unpredictability could be an aspect of the media-supported image of violence that is more deeply rooted in individuals, even those with low levels of PS.

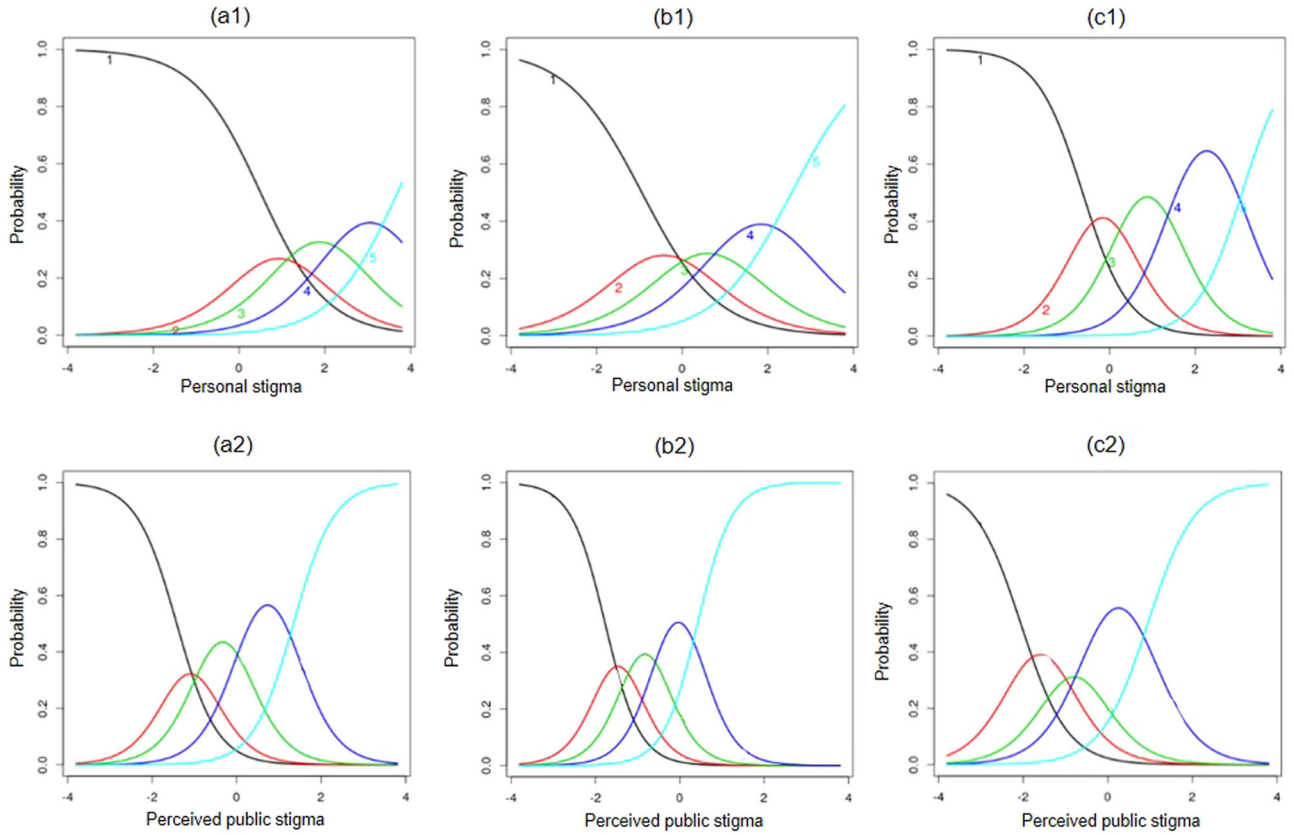

Fig. 3 Graphs of item characteristic curve of sample (ICC) generated by Item Response Theory. **a1** ICC of item 4, personal stereotype of careless appearance. **a2** ICC of item 4, perceived public stereotype of careless appearance. **b1** ICC of item 5, personal discrimination of school segregation. **b2** ICC of item 5, perceived public discrimination of school segregation. **c1** ICC of item 6, personal prejudice of dangerousness. **c2** ICC of item 6, perceived public prejudice of dangerousness

The approach to school segregation, whereby children with EBPr are placed in a special classroom or a school for them, is another aspect investigated that is specific to the situation of these children and addressed in the personal view by the present study for the first time. Agreement by the respondents for this item was 26% for PS and 67% for PPS. Two previous studies report findings in line with our results. Of 38 parents of children and adolescents hospitalized due to mental disorder in a children's hospital, 43% stated their children were excluded from school activities by EBPr, such as aggressive behavior, irritability or self-harm. Of the 81 mental health professionals in the hospital ward, 43% believed that these children should attend the same school as children without EBPr only in some instances (Bella & Vilarrodona, 2015). Heflinger *et al.* (Heflinger et al., 2014), however, found 71% for PPS involving many teachers who preferred not to have a child with EBPr in their classroom. A striking finding for this aspect in the present study is that even those with low PS levels tended to agree that children with EBPr should not remain in the regular classroom. This belief runs contrary to interventions that focus on integrating these children with their peers to promote and support the development of healthy relationships and learning, an approach which has proven effective for reducing stigma (Heary et al. 2017).

School segregation may be a more deeply rooted notion, even in individuals with low PS. Our respondents were teachers, which leads us to hypothesize that insecurity and lack of preparation to deal with the specificities of mental illness in childhood or to adapt the curriculum according to the child's developmental phase, lead to a desire to avoid having these children in the regular classroom. This may be a form of social distancing chosen by teachers, especially those with lower levels of stigma. The interpretation of these last two findings confers subtlety to PS, since even individuals with low PS still tend to agree that children with EBPr are unpredictable and should study in special schools separately from children considered "normal".

The part of the instrument that evaluates PPS has three items that contribute to the formation of the PPS construct, and also discriminate individuals with different levels of perceived public stigma: the prejudice of fear; and the stereotypes of low intelligence and chronicity.

Prejudice of fear was the greatest contributor to PPS, which leads us to think that the notion of violence of children with mental problems is also perceived by individuals

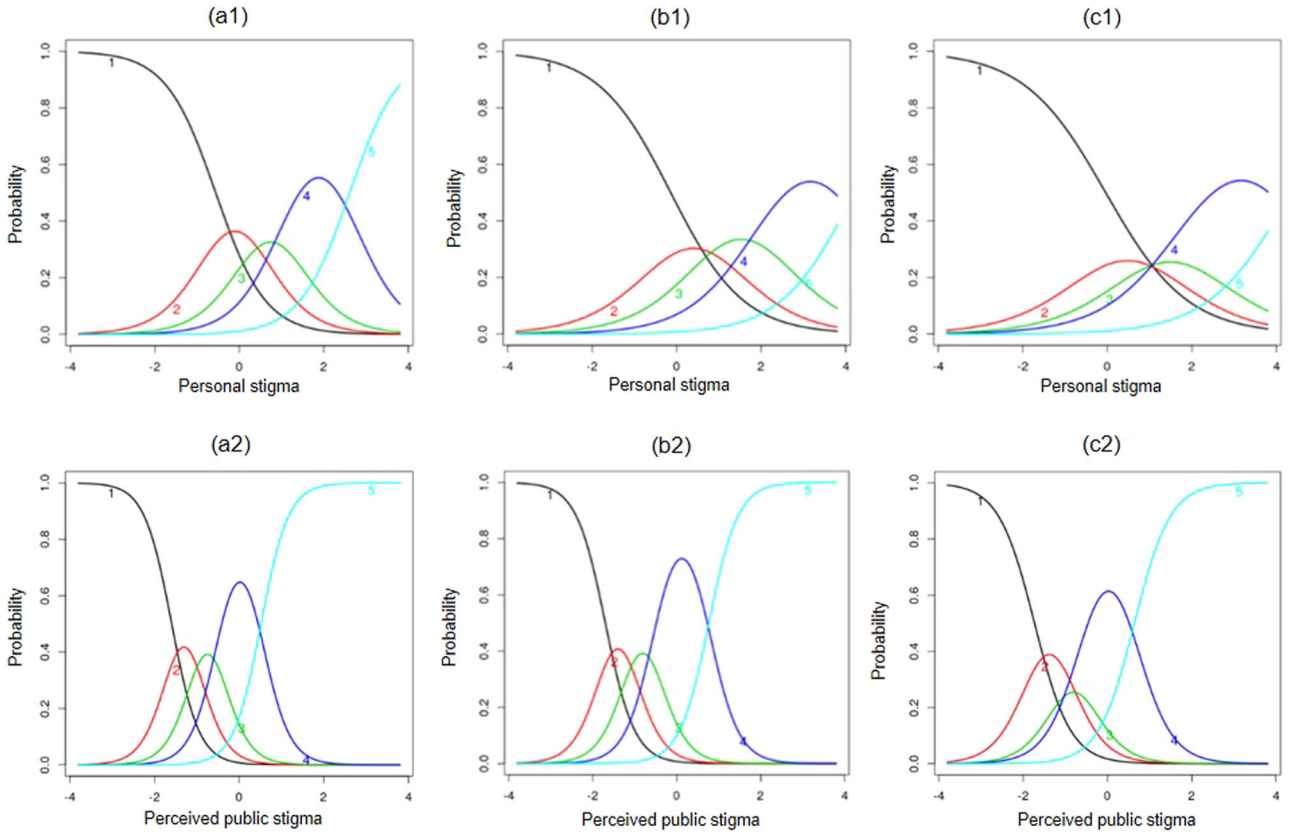

Fig. 4 Graphs of item characteristic curve of sample (ICC) generated by Item Response Theory. **a1** ICC of item 7, personal prejudice of fear. **a2** ICC of item 7, perceived public prejudice of fear. **b1** ICC of item 8, personal stereotype of intellectual disability. **b2** ICC of item 8, perceived public stereotype of intellectual disability. **c1** ICC of item 9, personal prejudice of pity. **c2** ICC of item 9, perceived public prejudice of pity

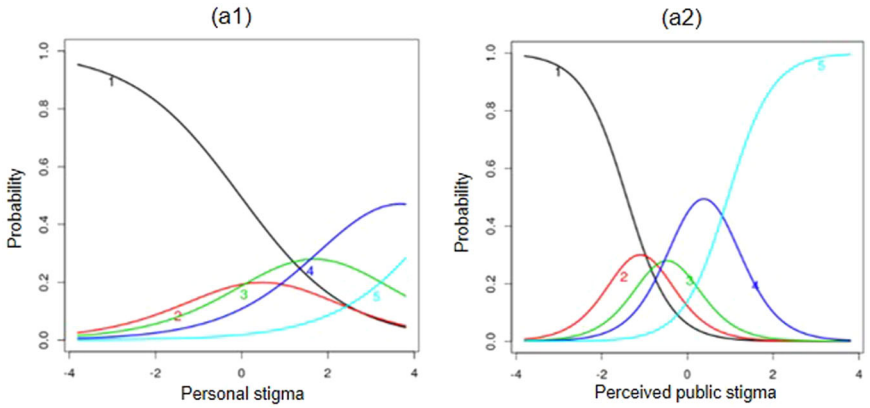

Fig. 5 Graphs of item characteristic curve of sample (ICC) generated by Item Response Theory. **a1** ICC of item 10, personal stereotype of parental blame. **a2** ICC of item 10, perceived public stereotype of parental blame

in society. The media widely disseminates the association between violence and mental illness, as do cartoons and films for children (Lawson & Fouts, 2004; Wahl, 2002). Overall, there is much less research focused on the affective components of stigma, including fear (Heary et al., 2017). Despite this, Angermeyer *et al.* (Angermeyer et al., 2010) hold that emotional reactions may be more important than stereotypes for predicting stigma. In the case of the present study, the emotional reaction of personal fear and its public perception ranked as one of the most important items in the construction of PS and PPS, respectively, thereby corroborating this finding.

The population´s perception of the stereotype that children with EBPr have intelligence below the population mean was also relevant for PPS. The investigation of this specific aspect of childhood is one of the novel elements of the present study. Heflinger *et al.* investigated the PPS of these children being less smart than the others, finding

Table 4 Agreement with instrument issues in percentage

Item	Agreement (%)	Neutrality (%)	Disagreement (%)
Personal stigma			
1 Unpredictability	50	23	27
2 Chronicity	10	16	74
3 School disability	10	11	79
4 Careless appearance	7	12	81
5 School segregation	26	24	50
6 Dangerousness	14	29	57
7 Fear	21	21	58
8 Intellectual disability	11	18	71
9 Pity	15	16	69
10 Parental blame	15	19	66
Perceived public stigma			
11 Dangerousness	61	19	20
12 School disability	63	17	20
13 Careless appearance	44	28	28
14 Parental blame	55	18	27
15 Intellectual disability	68	15	17
16 Unpredictability	74	15	11
17 Chronicity	64	17	19
18 Fear	68	15	17
19 Pity	70	11	19
20 School segregation	67	17	16

Table 5 Parameters of joint analysis items

Item	a	Discrimination capacity	b1	b2	b3	b4
Joint items						
1 Unpredictability	1.315	moderate	−2.484	−1.349	−0.424	1.027
2 Chronicity	2.819	very high	−0.617	−0.140	0.367	1.483
3 School disability	2.543	very high	−0.532	−0.086	0.356	1.522
4 Careless appearance	2.495	very high	−0.407	0.071	0.771	1.781
5 School segregation	2.030	very high	−1.174	−0.565	0.075	1.019
6 Dangerousness	2.360	very high	−1.089	−0.387	0.308	1.458
7 Fear	2.730	very high	−0.964	−0.388	0.134	1.131
8 Intellectual disability	2.877	very high	−0.727	−0.255	0.250	1.361
9 Pity	2.391	very high	−0.711	−0.207	0.215	1.279
10 Parental blame	1.854	very high	−0.643	−0.127	0.491	1.589

agreement by 27.9% of respondents (Heflinger et al. 2014). By contrast, 68% of our respondents perceived the public to believe that these children are less intelligent than the average population. To the best of our knowledge, no studies are available for further comparisons. This finding reinforces the importance of investigating specific aspects of childhood in addressing the stigma of childhood mental illness, as opposed to relying on assumptions from the vast adult literature on the subject. The aspects of childhood confer different experiences and consequences, including complexity and comprehensiveness when compared to adults. The idea of intellectual disability of children with EBPr may stem from the incompetence basis. Lower investment in the school environment may also often lead to lower performance than other children on standardized assessments and promote the idea they are less intelligent than their peers. This stereotype largely disregards their potential, where lack of investment in the environment (parents, school and society) may also be a consequence. Although not investigated in this cross-sectional study, the intelligence stereotype remains a potential target for future studies.

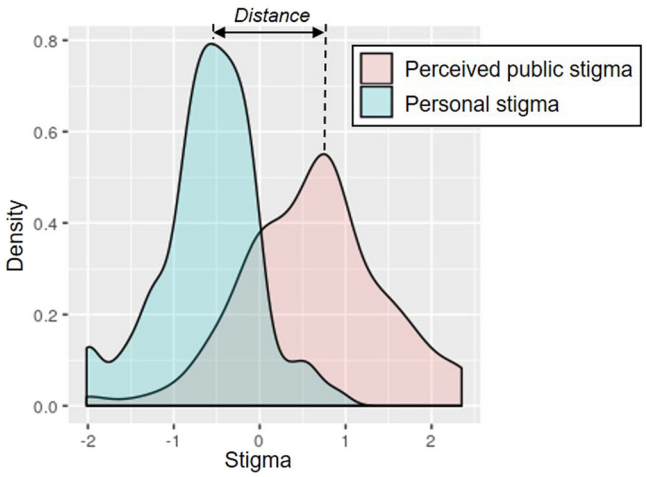

Fig. 6 Results of joint analysis

The public's perception that children with EBPr do not recover or improve was observed in 64% of respondents. This item had an important role for the PPS construct in this study. The specific consequences of this belief for children are alarming, and include lack of investment in school and society, besides being a barrier to help or treatment seeking. The perception that children with EBPr do not recover or improve may contribute to neglect in their treatment. A specificity of the child's vulnerable social situation is that of being dependent on an adult for help or treatment seeking (Brannan et al., 2003). Some adults in an unfavorable social and cultural context do not believe in treatment for mental problems in childhood, probably stigmatizing the adult (courtesy stigma) and considering them to blame, as discussed below. Therefore, children with EBPr are deprived of early intervention, therapy which could promote long-term benefits and prevent greater problems in child development (Kaushik et al., 2016). Based on the literature on stigma of adults with mental disorders, chronicity is one of the dimensions of the stigma proposed by Jones *et al*. (Jones et al., 1984), and the public often believes there is no recovery or treatment for these problems (Patrick W Corrigan & Watson, 2004; Jamison, 2006). Our findings contribute to corroborating these same beliefs for childhood. Encouraging the propagation of recovery messages and the belief that mental disorders can be treated is strongly recommended to reduce the stigma of EBPr in both adults (Sarah Clement et al., 2010) and children (Mukolo & Heflinger, 2011).

The PPS items regarding the stereotypes of careless appearance, school disability, and parental blame are the most informative for individuals who perceive more public stigma. The perception that the public believes children with EBPr have a careless appearance is intriguing, especially because this item is more informative for individuals who display greater PPS. Overall, the item received the lowest agreement among the respondents for both PS and PPS (7% and 44%, respectively). Jones *et al* (Jones et al., 1984) proposed the concealability of mental illness as one of the dimensions of their stigma. However, the present study showed that people who perceive more PPS noted that, in some way, there are physical characteristics in these children that indicate mental illness. Some childhood EBPr are highly disruptive, and may produce an unpleasant aesthetic in the eyes of others that is difficult to conceal (Feldman & Crandall, 2007), contributing to the perception of negative and unfavorable physical characteristics. Thus, in the public imagination there is probably an association of childhood mental illness with physical traits, a relationship which can be further explored in future studies.

Those who perceive more public stigma tended to agree that most people find that children with EBPr are unable to complete their school education. This item is congruent with the findings of Heflinger *et al*. (Heflinger et al., 2014), in which 69% of respondents agreed that a child with EBPr will achieve less at school than other children. As discussed earlier in the context of PS, our hypotheses raised in the discussion of this item from the personal perspective on incompetence, chronicity, and lack of school investment, also holds true for PPS.

In addition, the item on parental blame is also one of the most informative for individuals who perceive more public stigma of childhood mental illness. This tendency is acknowledged in the literature (Patrick W Corrigan & Miller, 2004; Hinshaw, 2005; Mak & Kwok, 2010; Mukolo & Heflinger, 2011; Mukolo et al., 2010; Perry et al., 2007) and usually attributed to poor parenting skills in the context of courtesy stigma. It may also be related to the sense of responsibility that parents have in relation to any event with their children, as well as to teachings communicated by mental health professionals (Patrick W Corrigan & Miller, 2004). The process of internalization of this stereotype, i.e. stigma by association, plays a fundamental role as a barrier

to children's access to treatment (Heflinger & Hinshaw, 2010).

The most informative items for individuals who perceive less public stigma were the items of stereotypes of unpredictability and dangerousness. These stereotypes have been discussed previously. It is important to emphasize that even those individuals who perceive little public stigma tend to confirm notions rooted in violence with respect to the behavior of children with EBPr. Moreover, the stereotype of unpredictability appears informative for individuals with low personal and perceived public stigma.

Finally, important findings were observed in the joint analysis step. First, a comparison between PS and PPS for the proposed instrument proposed was carried out.

Second, the distance between the means of the two subpopulations was determined. Table 5 pools the two heterogeneous subpopulations according to common items, allowing the distance between PS and PPS to be quantified, as shown in Fig. 6. This analysis revealed a key fact. Parameters for the same set of items changed when applied to different respondents, confirming that individuals had different behaviors when answering the same question on childhood mental illness in the first person (personal stigma) and third person (perceived public stigma). The individual's perceived behavior/attitude of others differs from their own. To the best of our knowledge, the present study is the first to report this finding, quantifying it with rigor and statistical consistency.

The perceptions of oneself and of others are now over a known distance (Fig. 6), which opens avenues for further research on this complex subject to gain a better understanding of this difference in perception. In this context, if individuals have a PS that is much lower than PPS, why do the signs of stigma of mental illness in childhood persist in practice? This gap between the two perceptions needs to be addressed, where this may be a viable target for anti-stigma campaigns.

In view of our findings, the first hypothesis is that we are observing an optimistic situation, in which people have a perception about mental illness that is less distorted than that of the public. These findings are consistent with the results of other studies on stigma of childhood mental illness from the perspective of adults (Heflinger et al., 2014) and of 12-year-old adolescents (Swaim & Morgan, 2001), as well as investigations on the stigma of adult mental illness from the perspective of adults (Eisenberg et al., 2009; Griffiths et al., 2006; Pedersen & Paves, 2015; Quinn et al., 2011; Reavley & Jorm, 2011) and of adolescents (Calear et al., 2011; Dardas et al., 2018). However, as most of these studies suggest, there is a possibility that the discrepancy between PS and PPS reflects the bias of social desirability, although measures have been taken to decrease this bias, in as far as the instrument devised is self-administered (Eisenberg et al., 2009) and assures response anonymity (Quinn et al., 2011). Instruments such as the proposed measure, designed to measure explicit attitudes, are susceptible to this bias (Hinshaw & Stier, 2008) and the stigma itself is an indicator of social desirability (Quinn et al., 2011). In this respect, respondents would prefer to evaluate the beliefs and attitudes of third parties than to reflect on their own (Griffiths et al., 2006), thereby underestimating PS. Thus, reported levels of PPS might provide a more accurate reflection of the respondents' own opinion (personal stigma) (Calear et al., 2011), while third-person affirmations are also freer from social pressures (Quinn et al., 2011).

There is also a possibility that PPS levels were overestimated. It may have been undesirable for individuals with high PS to cope with the malaise of cognitive dissonance associated with admitting to having an intolerant perspective not shared by others (Eisenberg et al., 2009). Therefore, they may have elected to impute their own personal opinions to others. Moreover, the divergence between PS and PPS may reflect pluralistic ignorance, in which most people give the misleading impression that they have different attitudes and thoughts about the majority (Shamir & Shamir, 1997). Akin to (Reavley & Jorm, 2011), we suspect that raising awareness about the issue of stigma in the community may have contributed to the overestimation of PPS (Reavley & Jorm, 2011).

Given these hypothetical considerations about the discrepancy between PS and PPS in our findings, several questions remain: What is the distance found? Does this reflect a measure of the bias of social desirability or of pluralistic ignorance? It is not yet possible to speculate on these questions. Further studies exploring this finding in more depth are needed, with longitudinal designs to establish causal relationships.

Based on the present analyses, it can be inferred which aspects of the two perceptions (personal and public) of the stigma of mental illness in children (represented by the items) are most discrepant. In this case, these were the items whose parameters changed most when applied to the different subpopulations. This is because the latent difference between these perceptions is imprinted in the change of these parameters. These items were the stereotypes of school disability, dangerousness and careless appearance. We recommend these topics be fully addressed to reduce stigma, as the individuals exhibited more cognitive dissonance in relation to them. In addition, it is noteworthy that unpredictability is still common to both PS and PPS perceptions, posing challenges to be addressed.

Implications

In summary, the instrument can be useful as a free easy-to-apply tool for the assessment and detection of PS and PPS

in different settings where adults are in contact with children. In general, the measure proposed may serve as a springboard for quantitative research in the area, furthering theoretical understanding of the phenomenon (*e.g.*, with the quantification of the distance between PPS and PS) and the development of anti-stigma campaigns (specifically, for childhood mental illness stigma) focused on different settings where adults are in contact with children, such as schools, churches and the community in general. We recommend that the notions of non-recovery, incompetence and violence discussed be widely addressed in anti-stigma campaigns in community contexts that influence the quality of life of children with EBPr.

Specifically for teachers, the information from this study can guide the construction of public policies to promote mental health at school. Through the instrument, the most relevant stigmatizing themes in the context of teachers can be known in order to guide anti-stigma interventions at school. This can facilitate the teacher to play the important role of referring the child with EBPr to specialized service. The knowledge that the notions of violence, incompetence and non-recovery perpetuate among teachers can also guide the development of specific content for teacher education during college and for training programs (continuing education programs) for teachers currently in practice. These teachers' training and education contexts should provide (i) basic notions of typical child development and developmental changes, (ii) know how to deal with agitated and/or aggressive children (to reduce fear of children with EBPr), (iii) socio-emotional education of children in the classroom, (iv) understanding to deal with the specificities, difficulties and potential of children with EBPr individually (in the context of the classroom and assessments), (v) knowledge that there are specific treatment and intervention for mental disorders in childhood, as well as the teacher can play an important part in this process, for example, acting in the referral.

Conclusion

In this study, we have reported the stigma of childhood mental illness from the perspective of public elementary school teachers in a middle-income country. In addition, we devised a questionnaire that was easy to apply, free of charge, and self-administered in Brazilian Portuguese, with 20 items calibrated to measure the level of personal stigma (PS) and perceived public stigma (PPS) of emotional and/or behavioral problems (EBPr) in childhood. Our findings showed that the most important items to measure stigma from the perceiver´s perspective entail notions of violence, incompetence and non-recovery (hopelessness) of children with EBPr. These concepts should therefore be addressed in anti-stigma campaigns of EBPr in childhood. At the joint data analysis step, the distance between PS and PPS of children with EBPr was quantified. In this context, individuals assume very different behaviors when responding to the same item in the first person (personal stigma) and third person (perceived public stigma) in relation to mental illness in childhood. This discrepancy was greatest for the items on school disability, dangerousness and careless appearance.

The quantity of items addressing the aspects of discrimination and prejudice is a limitation of the instrument. In addition, the instrument does not have a variety of items options to qualify individuals with the lowest level of PS. Further studies are needed to broaden the knowledge of these specific components of stigma (specifically discrimination and prejudice) and to evaluate other stigma aspects that may be more accurate to identify individuals with the lowest levels of PS. Thus, the understanding of the underlying mechanisms and specific components of the stigma of childhood mental illness may be broadened. These studies can be conducted using the instrument proposed and validated here. In addition, this instrument can be used to know the most prevalent stigmatizing components from the perspective of other perceivers, i.e., other adults who have contact with children, such as parents and other family members, health professionals and community members. This knowledge can be the starting point for anti-stigma campaigns that address more specific themes for each audience.

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Compliance with Ethical Standards

Conflict of interest The authors declare no competing interests.

Ethics approval All procedures performed in the study which involved human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The ethics approval was obtained from the board of the Research Ethics Committee of the School of Medical Sciences of University of Campinas (UNICAMP) (process number: CAAE 51337515.8.0000.5404).

Informed consent Informed consent was obtained from all individual participants involved in the study.

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