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Alternative models of DSM-5 PTSD in Portuguese adolescents exposed to trauma and childhood adversity

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Abstract

The factor structure of DSM-5 posttraumatic stress disorder (PTSD) has been extensively debated with evidence supporting the recently proposed seven-factor Hybrid model. However, despite the several studies examining PTSD symptom structure, few have assessed the implications of these proposed models on "diagnostic" criteria and PTSD prevalence. This study examined seven alternative DSM-5 PTSD models within a confirmatory factor analysis (CFA) using the Child PTSD Symptom Scale – Self-Report - DSM-5 (CPSS-5; Foa, Asnaani, Zang, Capaldi, & Yeh, 2017). Additionally, this study generated prevalence rates for each of the seven models by using a symptom-based diagnostic algorithm and assessed whether substance abuse, depression, anxiety symptoms, and daily functioning were differentially associated with PTSD depending on the model used to derive the "diagnosis." The participants were 317 adolescents between 13 and 17 years old (M = 15.93; SD = 1.23) who had experienced a DSM-5 Criterion A trauma and/or childhood adversity. CFA results showed good fit indices for all models, with the seven-factor Hybrid model presenting the best fit. The rates of PTSD diagnosis varied according to each model. The four-factor DSM-5 model presented the highest rate (30.6%), and the seven-factor "Hybrid" model presented the lowest rate (17.4%). Similarly to the CFA analysis, the inclusion criteria for the "diagnosis" based on the Hybrid model also presented the best association with substance abuse, depression, anxiety symptoms, and daily functioning. Research and clinical implications of these results are discussed, and suggestions for future investigation are presented.

Keywords: adolescents, alternative models of PTSD DSM-5; diagnostic implications, prevalence rates;

Alternative models of DSM-5 PTSD in Portuguese adolescents exposed to trauma and childhood adversity

Several studies have investigated the latent factor structure of posttraumatic stress disorder (PTSD) symptoms following the new fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5 - American Psychiatric Association, 2013), and to date there is no consensus on the best structural model of PTSD. Nevertheless, several recent CFA studies indicated that the seven-factor Hybrid model, which incorporates the key features of previous six-factor models, such as the Anhedonia (Liu et al., 2014), and the Externalizing Behavior (Tsai et al., 2015) models, has been the one which best seems to represent the PTSD DSM-5 symptoms. For instance, the seven-factor Hybrid model has been presenting significantly better fit than the alternative PTSD models both in traumatized adult samples exposed to natural disasters (Mordeno, Carpio, Nalipay, & Saavedra, 2017) war (Erwin et al., 2017), or one or multiple traumatic events (Contractor, Caldas, Dolan, Lagdon, & Armour, 2018), as well as in community and traumatized youth samples exposed to high-intensity earthquakes (Cao, Wang, Cao, Zhang, & Elhai, 2017) or one or multiple traumatic events (Murphy et al., 2017).

However, there is a lack of knowledge about the impact of these alternative models on DSM diagnostic criteria and PTSD prevalence. Considering this limitation, Shevlin and colleagues (2017a), based on data from two clinical samples of 434 adults from the United Kingdom (UK), proposed a symptom-based diagnostic algorithm for each seven existing DSM-5 models to examine if PTSD prevalence varied according to the different models. This study found significant variation in prevalence estimates with the highest estimate generated by the DSM-5 model (83.9%) and the lowest from the Hybrid model (64.5%). The authors also assessed if the different models generated consistent risk estimates about the effects of childhood maltreatment history. Findings indicated that the odds ratios for an estimated PTSD diagnosis associated with childhood maltreatment varied between 1.89 for the Hybrid model and 3.50 for

the DSM-5 model. Additionally, Murphy and colleagues (2017) replicated the findings of Shevlin and colleagues (2017a) using a community sample of 589 Malaysian adolescents. This study found considerable variation between prevalence rates and the alternative factor analytic models of PTSD, with the DSM-5 model producing the highest diagnostic rates (21.8%) and the Hybrid model producing the lowest (10.0%). Estimates of risk associated with PTSD were inconsistent across the alternative models, with substantial variation emerging for sexual victimization, which varied between 6.47 for the Hybrid model and 3.71 for the DSM-5 model.

Following these recent and promising findings, the authors (Shevlin et al., 2017a; Murphy et al., 2017) suggested that future research should continue to study the latent structure of PTSD symptoms and to compare different alternative factor analytic models in terms of "diagnostic" prevalence rates, different correlates, and risk factors. Such data can aid in the refinement of diagnostic criteria and to establish clinically useful diagnostic measures (Armour et al., 2015; Contractor et al., 2018). To address such recommendations, this study had three aims. First, we examined the most optimal PTSD model in a Portuguese sample of adolescents exposed to traumatic events and/or childhood adversities. Therefore, we conducted CFAs to examine the factorial structure of the four-factor DSM-5 model and six alternative models that have been studied in the literature (e.g., Dysphoria 4-factors; Dysphoric arousal 5-factors; Anhedonia 6-factors; Externalizing behaviors 6-factors; Alternative dysphoria 6-factors and Hybrid 7-factors). The second aim was to generate prevalence estimates from the existing seven PTSD models based on the symptom-based diagnostic algorithm, as proposed by Shevlin and colleagues (2017a). The third aim was to examine whether a broader range of variables were differentially associated with PTSD depending on the model used to derive the diagnosis. We included variables that are more closely related to the construct of PTSD, such as trauma exposure severity (Murphy et al., 2017), adverse childhood experiences (Murphy et al., 2017; Shevlin et al., 2017a) and daily functioning (criterion G of PTSD), as well as other variables

that are mostly comorbid with PTSD, such as substance abuse (McCauley, Killeen, Gros, Brady, & Back, 2012), depression and anxiety symptoms (Spinhoven, Penninx, van Hemert, de Rooij, & Elzinga, 2014). These two latter variables are also predictors of PTSD development after adolescent trauma exposure (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). These associations with PTSD based on different diagnostic models would contribute for finding a more accurate link between the statistical approach and the clinical meaning of each model.

Method

Participants

We contacted 738 adolescents, ages between 13 and 17 years old and invited them to participate in the study. Three hundred and fifty-six (48.24%) were from institutions run by Child Protective Services (CPS), and 382 (51.76%) were from attending vocational schools. In Portugal, CPS only removes children from their homes and families when either the family poses a high risk for the child, or when all previous interventions that CPS implemented, did not work, and the family proved to be unable to take care of the child. However, when the decision is removing the child from the family, he/she is moved to an institution. Only a small number of children are moved to foster families. Also, vocational schools are usually alternatives to regular schools chosen by adolescents who are not successful at regular educational institutions and/or want to drop-out of school. Thus, these two places (i.e. CPS institutions and vocational schools) were selected for participants' recruitment because of the high-risk nature of the adolescents involved in these programs. From these, 372 (50.41%) participants were eligible for the study after returning the signed informed consent from parents or legal guardians. Upon assessment completion, only those who fulfilled the criterion of being exposed to at least one traumatic event or one childhood adversity (physical or sexual abuse) were included in analyses of the present study, and 325 (87.4%) of the adolescents met this

final criterion. However, eight (2.5%) of the protocols were not properly completed, so the final sample size was 317 participants. One hundred and fifteen (36.3%) of these adolescents were living in institutions run by CPS and 202 (63.7%) adolescents were attending vocational schools. This sample included 148 (46.7%) males and 169 (53.3%) females and the mean age was 15.93 years old (*SD* = 1.23) and ranged between 13 and 17 years old. One hundred and fifty-eight (49.8%) adolescents had been previously identified by CPS due to exposure to childhood abuse, neglect, domestic violence or other family dysfunction. Regarding the level of education, the mean was 9.21 years (*SD* = 1.53), which corresponds to 9th grade level, and ranged from the 5th grade to the 12thgrade level. The monthly family income of this sample ranged between 250€ and 2,000€, however, most of the adolescents (*n* = 66, 20.8%) reported a monthly household income between 250€ and 500€.

Procedure

After obtaining permission from the authors to perform the adaption of the CPSS-5 scale, we started by doing a translation of the original instrument into European Portuguese by two independent bilingual translators (i.e. fluent in both English and Portuguese language). An expert in the field of PTSD was additionally recruited. The aim was to examine the first translated version and provide suggestions to maintain semantic equivalence for the Portuguese population. The resultant version of the scale comprising the suggestions made by the expert was tested by the "thinking aloud" procedure (Shaughnessy, Zechmeister, & Zechmeister, 2015) with 15 individuals, to test how well it worked regarding instructions, response format and the clarity of the items. Minor linguistic adjustments were made and the resultant version, after those adjustments, was back-translated by a professional fluent in Portuguese and English, who did not have access to the original scale. After the completion of this process, both translation and back-translation were sent to the authors of the original scale who gave positive feedback.

The present study is part of a larger longitudinal research project on the impact of traumatic events on adolescents in northern Portugal. All procedures performed in this study were in accordance with the APA ethical standards. The study was approved by the ethics committee of the [removed for blind review]. To recruit participants, 14 institutions run by Child Protective Services (CPS) and 16 vocational schools were contacted. Upon authorization by these institutions, the data collection began. The adolescents who agreed to participate were given more detailed information about the study and delivered a written informed consent to be signed by parents or legal guardians, to allow participation in the study. The questionnaires were administered by three trained psychologists in a private room for the purposes of confidentiality. In addition, adolescents could send an email to the researchers if they wished to have access to their results or felt the need to talk with the researchers about any information contained in the protocol.

Measures

A demographic questionnaire, composed of multiple-choice questions, was used to collect information about age, gender, educational level, and family information (i.e., number of households, educational level of the parents, income and housing changes). This measure also included items about current residence (e.g. with parents, grandparents, institution, etc.) and if the adolescent ever was identified by Child Protective Services (CPS).

The Life Events Checklist for DSM 5 (LEC-5) (Weathers, et al., 2013; Portuguese version Correia-Santos, et al., 2017) is a self-report measure developed to assess traumatic events in an individual's life according to the DSM 5. It assesses exposure to 16 potentially traumatic events (e.g., natural disasters, accidents, sexual assault) and includes an additional item where respondents could report another traumatic event that was not listed in the 16 previous items. For each event, respondents indicate their level of exposure (e.g. *direct experience; witnessing*). Additionally, participants were asked to select the most traumatic

event they had experienced and to indicate how long ago it had happened. The LEC-5 has been demonstrated to be a good measure of exposure to traumatic events. The study of the original version showed Pearson coefficients ranging from .44 to .48 between LEC and PTSD symptom severity. In the present study, the correlation between LEC and PTSD total score was $r = .34$, $p < .001$.

Adverse Childhood Experiences Study Questionnaire (ACE: Felitti et al., 1998; Portuguese version by Pinto, Correia, & Maia, 2014) is a retrospective self-report measure which assesses the occurrence of adverse experiences in childhood. This questionnaire includes detailed information on 10 adverse childhood experiences (e.g., emotional abuse, physical abuse, sexual abuse, exposure to domestic violence, substance abuse in the family environment, divorce or parental separation, family member, mental illness or suicide, physical neglect and emotional neglect), organized into two areas: children's experiences and household dysfunction. Responses range from 0 (never) to 4 (very often), except for sexual abuse, for which a dichotomous response (yes or no) was given and all items were dichotomized (as present or absent) based on how often the experiences occurred. If the experience was rated as having occurred "often" or "very often" then it was considered present. If the experience was rated as having occurred "sometimes", "rarely" or "never", it was considered absent (Felitti et al., 1998). We then computed a total score of the adverse experiences exposure for each subject ranged from zero to 10. The study of the original scale demonstrated good test-retest reliability for ACE score ($\kappa = .64$) (Dube, Williamson, Thompson, Felitti, & Anda, 2004), and the reliability of the ACE Study Questionnaire, Portuguese version, presented appropriate kappa values, ranging between .65 and .86. In the present study, the internal consistency for the ACE score was good ($\alpha = .82$).

The Child PTSD Symptom Scale – V (CPSS-V; Gillihan et al., 2013; Portuguese version by Correia-Santos, et al., 2017) is a self-report measure that aims to assess the severity

of PTSD symptoms presented in the past month by children and adolescents after having been exposed to a traumatic event. The inventory comprises 20 items corresponding to PTSD symptoms according to the criteria of the DSM-5. An additional seven items that inquire about daily functioning (e.g., relationships with friends, schoolwork) are rated as either absent (0) or present (1) and yield a total impairment severity score ranging from 0 to 7. Participants rate the frequency that they experience each symptom using a 4-point Likert scale, ranging from 0 (*never*), to 4 (*6 or more times per week/ almost always*), yielding a total score of 80 possible points, indicating PTSD symptom severity. The original study demonstrated an excellent internal consistency for the total score (α = .92), and the internal consistency for each scale ranged from acceptable to good, meaning: for criterion B (α = .81), for criterion C (α = .63); for criterion D (α = .86) and for criterion E (α = .72) (Foa et al., 2017). The internal consistency for this study was obtained through composite reliability (CR), as this is a more appropriate measure of internal consistency in the context of latent variable modeling (Raykov, 1998). Evidence of internal consistency is obtained when CR is higher than 0.70. The following results were found: for criterion B (CR = .89), for criterion C (CR = .76); for criterion D (CR = .90) and for criterion E (CR = .86).

Brief Symptom Inventory (BSI) (Derogatis, 1993; Portuguese version of Canavarro, 1999) is a well-established self-report questionnaire that evaluates nine symptom dimensions of psychological distress. The inventory comprises 53 items on a 5-point rating scale that ranges from 0 (not at all) to 4 (extremely) and describe how they were affected by symptoms in the past 7 days. For the present study, we used the depression and anxiety subscales. The Portuguese version of the scale demonstrates good internal consistency for both depression scale (α = .73) and anxiety scale (α = .77). This study also demonstrated strong reliability for depression scale (α = .87) and anxiety scale (α = .84).

Substance Use. Three items from the Scale of Coping Strategies in Adolescence

(EECA; Burnett & Fanshawe, 1997; Dias, Rodriguez, & López-Sánchez, 2015) were used to assess tobacco, alcohol, and drug usage. The items were "Smoke"; "Use drugs (not necessarily prescribed by a doctor)"; and "Drink beer, wine, liquor"; rated on a five-point Likert scale ranging from "strongly disagree" to "strongly agree". The respondent rated each as to how often the behavior was used during a difficult time. We computed a composite variable by summing these items, which is the substance abuse variable presented in the analysis. The internal consistency for the substance abuse was good ($\alpha = .74$).

Data Analysis

All analyses were performed using Mplus statistical modeling software (Version 6.12; Muthen & Muthen, 2011). After performing descriptive statistics, we tested seven alternative latent structures using confirmatory factor analysis (CFA) based on responses to the 20 items. No missing data were analyzed because we removed the protocols that were not fully completed (2.5%). Seven models were specified and estimated using the robust maximum likelihood estimation (MLR) (Yuan and Bentler, 2000). In order to assess the goodness-of-fit for each model, a range of fit statistics were examined, including the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), the Standardized Root-Mean-Square Residual (SRMR: Joreskog & Sorbom, 1996), and the chi-square adjustment adequacy test, where the null hypothesis is an indicator of good adjustment. However, the chi-square test is extremely sensitive to the size of the sample, and in large samples (N >200) the test result tends to reject the null hypothesis. For this reason, due to the restrictiveness of the Model Chi-Square, researchers have sought alternative indices to assess model fit (Hooper, Coughlan, & Mullen, 2008). Therefore, the relative chi-square test $\chi 2/df$ (Wheaton, Muthen, Alwin, & Summers, 1977) has been used, in which a value lower than two is indicative of good adjustment (Tabachnick & Fidell, 2012). The extant literature suggests that a CFI/TLI above 0.95 indicate

a good fit between the model and the data, and RMSEA values less than 0.05 indicate close fit. For the Standardized Root-Mean-Square Residual (SRMR), values less than 0.06 indicating excellent fit and values less than 0.08 indicative of acceptable model fit. To compare nested models, we used the scaled $\chi 2$ difference ($\Delta S–B\chi 2$) following Satorra and Bentler's recommended algorithm (Satorra & Bentler, 2001). For the non-nested models, we used the Bayesian Information Criterion (BIC: Schwarz, 1978) with the smallest value indicating the best fitting model. Differences between models of 2-6 points suggest positive evidence of model superiority, differences between 6-10 points, suggest strong evidence of model superiority and differences upon 10 points between models suggest very strong evidence of model superiority (Raftery, 1996). Additionally, we sought to assess the probable prevalence rate of PTSD for each model. To account for symptom endorsement, a score of 2 or higher was considered. Given that there is little research that provides a possible symptom-based diagnostic algorithm, we used the algorithm proposed by Shevlin and colleagues (2017a), which involves using the conventions within the DSM-5 for the number of symptoms for each of the clusters in each model. For example, following the requirements for Intrusion and Avoidance criteria, for any symptom cluster including 2–5 symptoms, then only one symptom needed to be endorsed to meet criteria. Following the requirements for Negative Alterations in Cognition and Mood and Alterations in Arousal and Reactivity criteria, for any symptom cluster that contains 6 or more symptoms, two symptoms needed to be endorsed to meet criteria. An exception is the requirement of 3 of the 11 ‘dysphoria’ symptoms from the four-factor Dysphoria model because of the large number of symptoms included within this cluster and to include a total of 6 out of 20 symptoms for diagnosis, as per the DSM-5 criteria (Shevlin et al., 2017a, p. 56). And so, for each alternative model, we used this symptom-based diagnostic algorithm (Table 1). Finally, using logistic regression models, odds ratios (OR) with 95% confidence intervals were estimated between the cut-off scores derived from the symptom-

based diagnostic criteria of PTSD for each model and the variables of adverse childhood experiences, trauma exposure severity, depression and anxiety symptoms, substance abuse and daily functioning were entered in a single step. We used the BIC and the AIC estimators to assess which overall model presented the best explanatory predictive power between the independent variables and the different cut-off score derived from each model.

Results

More than half of the sample reported having been exposed to at least five traumatic events (n = 189; 59.62%). The exposure ranged from zero (n = 26; 8.3%) to 13 events (n = 4; 1.3%) (M = 4.83; SD = 3.30), within 13 possible events. Two hundred and eighty-two adolescents (91.6%) reported at least one adverse childhood experience, and 169 (54.7%) reported at least three adverse childhood experiences, ranged from zero to 10 (M = 3.19; SD = 2.24). The mean of PTSD total score was 24.52 (SD = 20.43) ranging between zero and 73, in 80 possible points. Participants reported a mean of depression symptoms of 7.43 (SD = 5.8), ranging from zero to 24, and anxiety symptoms of 5.86 (SD = 4.88), ranging from zero to 23. As for substance abuse, 100 (31.5%) adolescents reported smoking, 57 (18%) reported drinking alcohol and 31 (9.8%) reported using drugs. Further, 22 (6.9%) adolescents reported using all three substances. The mean of daily functioning impairment was 2.12 (SD = 2.19), with 201 (63.4%) adolescents reporting at least one item of daily function impairment, and 121 (38.17%) endorsing at least three items of daily function impairment.

Considering fit indices models, results showed that all tested models presented acceptable to good fit. Specifically, all models presented a relative chi-square value lower than two, which indicates a good adjustment. Considering CFI and TLI values most of the models presented values above .95, except for Dysphoria model with CFI value (CFI = .94) and DSM-5 model for both CFI and TLI values, both values of .94. Considering RMSEA values, only the Dysphoria model did not present a close fit, with a value of .06, which is higher than the .05

recommended value. For the SRMR all models presented values lower than the 0.06, which indicates an excellent fit, with the Hybrid model presenting the lowest value of 0.03. The Hybrid model also presented the highest CFI and TLI values (.98 and .97 respectively), and the lowest relative chi-square value ($\chi 2 = 1.4$). The fit statistics for the seven competing CFA models are presented in Table 2. Using BIC differences to compare non-nested models, the 4-factor DSM-5 model revealed a better fit than 4-factor dysphoria model. Concerning 5-factor models, the anhedonia model revealed a better fit than both externalizing behaviors and alternative dysphoria models. Thus, for the non-nested models, the DSM-5 model reveals a better fit for a 4-factor model and anhedonia model reveals a better fit for a 5-factor model. When compared nested models, using the Satorra-Bentler chi-square difference, the results revealed that all models provide a better fit than the DSM-5 model. Additionally, the 7-factor hybrid model also presented significantly better values than all other models (Table 3).

In terms of prevalence rates, the 7-factor "Hybrid" model presented the lowest rate (17.4%) and DSM-5 model presented the highest rate (30.6%). With exception of the anhedonia model, all others 6-factor models as well as the 7-factor hybrid model presented lower prevalence rates than the 4-factor and 5-factor models (Table 2). Considering the whole model including all variables, the logistic regression analyses showed that the "Hybrid" model had the lowest BIC, thus indicating model superiority, especially considering the differences of 10 points between this model and the other models. Daily functioning impairment and adverse childhood experiences were best associated with the "Hybrid" model; depression, substance abuse and trauma exposure severity were best associated with Anhedonia model; and anxiety was best associated with "Dysphoria" model (Table 4).

Discussion

The overall aims of this study were to examine seven alternative DSM-5 PTSD models using CFA and generate prevalence rates for each of the seven models by using a symptom-

based diagnostic algorithm. Additionally, we examined whether adverse childhood experiences, trauma exposure severity, substance abuse, depression and anxiety symptoms, and daily functioning were differentially associated with PTSD depending on the model used to derive the diagnosis.

We found that all models generally fit the data well. Nonetheless, the Hybrid model is slightly better than other models, which is consistent with previous findings (e.g., Armour et al., 2015; Cao et al., 2017; Murphy et al., 2017). However, despite this, our findings showed that the diagnostic rates vary significantly depending on the chosen model to derive the diagnosis. The current findings support those reported by previous studies (Murphy et al., 2017; Shevlin et al., 2017a) showing considerable variation in diagnostic rates derived from the different models, as well as the highest diagnostic rates were evident from the DSM-5 model and lowest rates were seen in the Hybrid model. The 4-factor DSM-5 model presented the highest rate (30.6%) and the 7-factor "Hybrid" model presented the lowest rate (17.4%). Over 40% of those who met the DSM-5 criteria did not meet the criteria from the Hybrid model, similar to the prior study of the Murphy and colleagues (2017). It is noteworthy that the higher the number of clusters, the lower the diagnostic rates. This is consistent with what was already reported in the literature, when compared the DSM-IV three-factor with two four-factor models, with the four-factor models presenting lower rates of PTSD when compared with the three-factor model from DSM-IV (Ford, Elhai, Ruggiero, & Frueh, 2009).

The considerable variation in diagnostic rates derived from different models draws attention to the clinical implications, such as on individuals accessing and receiving treatment for PTSD, particularly in this case involving adolescents with history of childhood adversity and trauma exposure. To our knowledge there are no studies using CPSS-5 that have compared how different outcomes are associated with alternative models of PTSD. Some studies have examined associations between the different subscales of "hybrid" model with

several variables, such as anger and impulsivity (Armour, et al., 2016), and Generalized Anxiety Disorder and Major Depressive Disorder (Pietrzak et al., 2015) but not associations with alternative models as a whole, and then making a categorical determination of PTSD as the diagnosis. The studies that used the alternative models as a whole, did it using PCL-5, a similar measure to assess PTSD among adults (Bovin et al., 2015). These studies assessed childhood maltreatment (Shevlin et al., 2017a) and sexual victimization (Murphy et al., 2017) as risk-factors for PTSD diagnosis and found substantial variation in the magnitude of risk. Inconsistent results were found between the 'best' fitting model and the 'best' "diagnosis". For instance, the study of Shevlin and colleagues (2017a) showed that while the Hybrid model was the 'best' fitting model, the DSM-5 model, which had an unsatisfactory fit, was the 'best' diagnostic model in association with childhood maltreatment. In our study, using independent variables that are central to the construct of PTSD, including trauma exposure, childhood adversity and daily functioning, as well as those that are commonly comorbid with PTSD, such as substance abuse (McCauley et.al, 2012), depression and anxiety symptoms (Spinhoven et. al., 2014), the Hybrid model was found to be the best-fitting model and the 'best' "diagnostic" model. This is consistent with the literature that a "better" model can be predicted even if some variables are not significantly associated with the outcome but have theoretical foundation to be present in the model, and BIC/AIC information help deciding whether to keep or remove variables (Burnham & Anderson, 2004). Our results showed that trauma exposure and substance use were the variables that were more strongly associated with this model, followed by daily functioning impairment and adverse childhood experiences. Moreover, those two latter variables had stronger associations with the Hybrid model compared with any of the other models, which we think makes sense since this model has more clusters, thus it is more likely to be related to more aspects of daily functioning, (e.g. relationship with friends and/or family, schoolwork, being happy with life, etc.). Thus,

even though it is more difficult to meet criteria for diagnosis with the "Hybrid" model, as the strongest model, its association with a broader range of compromised aspects of daily functioning suggests that this model may be the best way to capture the continuum of distress severity in individual's psychological response to traumatic events (Shevlin et al., 2017b). This, in turn, may also suggest that Hybrid model is also more prone to identify individuals with greater severity of PTSD, and therefore, more indicated interventions may be delineated in order to meet the psychological needs of those exposed to traumatic events (Marsac, Donlon, & Berkowitz, 2014).

Importantly, this study adds new information to the literature, by not only showing that the hybrid model better represents the data, but also suggesting its superiority on the symptom-based diagnostic algorithm compared with the other competing "diagnostic" models. Despite the focus on the prevalence of PTSD across these various models seems premature at this point, testing the "best' factor analytic model will result in better diagnoses if that structure is the basis for diagnostic decisions (Shevlin et al., 2017a). However, the goodness-of-fit is not the only index upon which to choose a diagnostic model (Schmitt et al., 2018). It is very important to establish clinically useful diagnostic tools, as well as developing sophisticated assessment and intervention programs for adolescents with PTSD (Armour et al., 2015), Furthermore, alongside the clinical meaning, underlying the accuracy of the "best" diagnosis is also important in forensic context, given that after crime or other trauma – e.g. accident – the determination of "yes" or "no" PTSD can have great implications in contexts assessing psychological damage. However, some researchers (Sachser et al., 2018) advocates that models with more than four factors may limit the practicality and clinical utility, as that an increase of factor complexity also tends to increase the threshold for a probable diagnosis. Nevertheless, although a simple structure (e.g., derived from ICD-11 - whose analysis and interpretation are out of scope of this article) may be useful in some assessment contexts, a

more complex set of criteria is recommended for forensic and clinical contexts, whose may require a more accurate diagnosis (Frances & Nardo, 2013).

The greatest limitation here is the lack of a clear criterion because there are no diagnostic interviews with any established criteria as a benchmark, and this makes it much more challenging to obtain strong conclusions on what model accurately represents the PTSD diagnose within this study. Therefore, it is important that future research further investigate the diagnostic implications based on these models and work towards achieving consensus. Nevertheless, our findings are promising as they contribute for the clinical (and forensic) meaning of a given model of PTSD through the relation between the cut-off score derived from each model and other measures.

This study has some important limitations. An important limitation, not unique to this study, is that it relied on a finite set of items by using the 20 item CPSS-5, and the DSM-5 symptoms, thus reducing our capacity to examine "true" factor structure of a construct. Future research should not limit itself to particular measures, but instead use a larger pool of PTSD-related items in order to find the "true" factor structure and be able to examine its stability. Second, despite the host of statistical competing models to assess the "optimal" factor-structure, as well as the examining of a diagnostic criteria based on each model and the relationship with other measures, there are no diagnostic interviews with any established criteria as a benchmark and therefore the conclusions about the "best diagnostic" model should be made with caution. Further investigation is needed to bridge the gap between psychometric modeling and clinical reality. Finally, the sample only consisted of Portuguese adolescents from high-risk contexts. Further research should consider an increased heterogeneity of participants, such as community and clinical settings to replicate and extend these findings.

Despite these limitations, this study makes some important contributions to the literature. First, to the authors' knowledge, no previous study has investigated PTSD latent

models based on DSM-5 among adolescents with history of childhood maltreatment and trauma exposure. This is relevant because that most of the studies examining PTSD latent structure were conducted with adult samples (e.g., Contractor et al., 2018; Erwin et al., 2017; Mordeno et al., 2017). The few studies conducted with adolescents used clinical samples (Sachser et al., 2018), or from the community (Liu, Wang, Cao, Qing, & Armour, 2016), exposed to natural disasters (Cao et al., 2017; Zhou, Wu, & Zhen, 2017), and accidents (Wang et al., 2017). Second, this study provides data on possible alternative models of PTSD symptoms, which have important implications in the definition and assessment of PTSD and its consequent interventions among adolescent populations with history of childhood adversity. Nevertheless, contrary to some studies (Contractor et al., 2018; Shevlin et al., 2017a), our results found good fit for all models, including the DSM-5 model, which highlights the complexity of the construct. Likewise, all competing models in terms of inclusive criteria for PTSD diagnosis were significantly associated with other variables, but the Hybrid model has shown to have the best association, which may be an indicator that is the one that most accurately represents the disorder. Future investigations can help clarify and refine a "truly" better model, avoiding the pitfalls of relying solely on statistical accuracy, but linking statistics and clinical practice. We believe that it would be valuable to conduct a cooperative research project in order to validate the most accurate model. This would include several countries, considering children, youth and adults, clinical and non-clinical samples, single trauma type and multiple trauma type and the association with other variables that tend to co-occur with PTSD. It would include different screening, self-report measures and clinical interviews.

References

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Arlington, VA: American Psychiatric Association.

Armour, C., Tsai, J., Durham, T. A., Charak, R., Biehn, T. L., Elhai, J. D., & Pietrzak, R. H. (2015). Dimensional structure of DSM-5 posttraumatic stress symptoms: Support for a hybrid Anhedonia and Externalizing Behaviors model. *Journal of Psychiatric Research, 61*, 106–113. https://doi.org/10.1016/j.jpsychires.2014.10.012

Armour, C., Contractor, A., Shea, T., Elhai, J. D., & Pietrzak, R. H. (2016). Factor structure of the PTSD Checklist for DSM-5: Relationships among symptom clusters, anger, and impulsivity. Journal of Nervous and Mental Disease, 204(2), 108–115. https://doi.org/10.1097/NMD.0000000000000430

Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2015). Psychometric Properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition (PCL-5) in Veterans. *Psychological Assessment*. https://doi.org/10.1037/pas0000254

Burnett, P. C., & Fanshawe, J. P. (1997). Measuring school-related stressors in adolescents. *Journal of Youth and Adolescence, 26*, 415–428. http://dx.doi.org/10.1023/A:1024529321194.

Burnham, K. P., & Anderson, D. R. (2004). Multimodel inference: Understanding AIC and BIC in model selection. *Sociological Methods & Research, 33*(2), 261-304

Canavarro, M. C. (1999). Inventário de Sintomas Psicopatológicos: BSI. In M. R. Simões, M. Gonçalves, & L. S. Almeida (Eds.), *Testes e provas psicológicas em Portugal* (Vol. II, pp. 87–109). Braga: SHO/APPORT.

Cao, X., Wang, L., Cao, C., Zhang, J., & Elhai, J. D. (2017). DSM-5 Posttraumatic Stress Disorder Symptom Structure in Disaster-Exposed Adolescents: Stability across Gender

and Relation to Behavioral Problems. *Journal of Abnormal Child Psychology, 45*, 803–814. https://doi.org/10.1007/s10802-016-0193-1

Contractor, A. A., Caldas, S. V, Dolan, M., Lagdon, S., & Armour, C. (2018). PTSD's factor structure and measurement invariance across subgroups with differing count of trauma types. *Psychiatry Research, 264*, 76–84. https://doi.org/10.1016/j.psychres.2018.03.065

Correia-Santos, P., Jongenelen, I., Maia, Â., Pinto, R. J. (2017). *Child PTSD Symptom Scale – V – Portuguese version*.

Derogatis, L. R. (1993). *BSI: Brief Symptom Inventory (3rd ed.)*. Minneapolis: National Computers Systems.

Dias, P. C. A., del Castillo Rodriguez, J. A. G., & López-Sánchez, C. (2015). Adaptação da Escala de Estratégias de Coping na adolescência numa amostra Portuguesa. *Estudos de Psicologia, 20*, 12-21.

Dube, S. R., Williamson, D. F., Thompson, T., Felitti, V. J., & Anda, R. F. (2004). Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse and Neglect, 28*, 729–737. https://doi.org/10.1016/j.chiabu.2003.08.009

Erwin, M., Charak, R., Durham, T. A., Armour, C., Lv, X., Southwick, S. M., … Pietrzak, R. H. (2017). The 7-factor hybrid model of DSM-5 PTSD symptoms and alcohol consumption and consequences in a national sample of trauma-exposed veterans. *Journal of Anxiety Disorders, 51*, 14–21. https://doi.org/10.1016/j.janxdis.2017.08.001

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., … Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine, 14*, 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8

Foa, E. B., Asnaani, A., Zang, Y., Capaldi, S., & Yeh, R. (2017). Psychometrics of the Child PTSD Symptom Scale for DSM-5 for Trauma-Exposed Children and Adolescents. *Journal of Clinical Child and Adolescent Psychology, 47*, 38–46. https://doi.org/10.1080/15374416.2017.1350962

Ford, J. D., Elhai, J. D., Ruggiero, K. J., & Frueh, B. C. (2009). Refining Posttraumatic Stress Disorder Diagnosis: Evaluation of Symptom Criteria With the National Survey of Adolescents. *Journal of Clinical Psychiatry, 70*, 748–755. https://doi.org/10.4088/JCP.08m04692

Frances, A. J., & Nardo, J. M. (2013). ICD-11 should not repeat the mistakes made by DSM-5. *The British Journal of Psychiatry*, *203*(1), 1-2.

Gillihan, S. J., Aderka, I. M., Conklin, P. H., Capaldi, S., & Foa, E. B. (2013). The Child PTSD Symptom Scale: Psychometric properties in female adolescent sexual assault survivors. *Psychological Assessment, 25*, 23–31. https://doi.org/10.1037/a0029553

Hooper, D., Coughlan, J., & Mullen, M (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods, 6*, 53-60. Retrieved from: https://arrow.dit.ie/buschmanart

Jöreskog, K. G., & Sörbom, D. (1996). *LISREL 8: User's reference guide. Scientific Software International*.

Liu, L., Wang, L., Cao, C., Qing, Y., & Armour, C. (2016). Testing the dimensional structure of DSM-5 posttraumatic stress disorder symptoms in a nonclinical trauma-exposed adolescent sample. *Journal of Child Psychology and Psychiatry, 57*, 204-212. doi: 10.1111/jcpp.12462

Liu, P., Wang, L., Cao, C., Wang, R., Zhang, J., Zhang, B., … Elhai, J. D. (2014). The underlying dimensions of DSM-5 posttraumatic stress disorder symptoms in an epidemiological sample of Chinese earthquake survivors. *Journal of Anxiety Disorders,*

28, 345–351. https://doi.org/10.1016/j.janxdis.2014.03.008

Marsac, M. L., Donlon, K., & Berkowitz, S. (2014). Indicated and selective preventive interventions. *Child and Adolescent Psychiatric Clinics*, *23*(2), 383-397. doi: 10.1016/j.chc.2013.12.001.

McCauley, J. L., Killeen, T., Gros, D. F., Brady, K. T., & Back, S. E. (2012). Posttraumatic stress disorder and co-occurring substance use disorders: Advances in assessment and treatment. *Clinical Psychology: Science and Practice, 19* (3), 283-304. doi: 10.1111/cpsp.12006

Mordeno, I. G., Carpio, J. G. E., Nalipay, M. J. N., & Saavedra, R. L. J. (2017). PTSD's Underlying Dimensions in Typhoon Haiyan Survivors: Assessing DSM-5 Symptomatology-Based PTSD Models and Their Relation to Posttraumatic Cognition. *Psychiatric Quarterly, 88*, 9–23. https://doi.org/10.1007/s11126-016-9429-z

Murphy, S., Hansen, M., Elklit, A., Yong Chen, Y., Raudzah Ghazali, S., & Shevlin, M. (2017). Alternative models of DSM-5 PTSD: Examining diagnostic implications. Psychiatry Research, 262, 378–383. https://doi.org/10.1016/j.psychres.2017.09.011

Pietrzak, R. H., Tsai, J., Armour, C., Mota, N., Harpaz-Rotem, I., & Southwick, S. M. (2015). Functional significance of a novel 7-factor model of DSM-5 PTSD symptoms: Results from the National Health and Resilience in Veterans Study. *Journal of Affective Disorders, 174*, 522–526. https://doi.org/10.1016/j.jad.2014.12.007

Pinto, R., Correia, L., & Maia, Â. (2014). Assessing the Reliability of Retrospective Reports of Adverse Childhood Experiences among Adolescents with Documented Childhood Maltreatment. *Journal of Family Violence, 29*, 431–438. https://doi.org/10.1007/s10896-014-9602-9

Raftery, A. E. (1996). Approximate Bayes factors and accounting for model uncertainty in generalised linear models. *Biometrica, 83*, 251–266.

https://doi.org/10.1093/biomet/83.2.251

Raykov, T. (1998). Coefficient alpha and composite reliability with interrelated nonhomogeneous items. *Applied Psychological Measurement, 22*, 375-385.

Sachser, C., Berliner, L., Holt, T., Jensen, T., Jungbluth, N., Risch, E., ... & Goldbeck, L. (2018). Comparing the dimensional structure and diagnostic algorithms between DSM-5 and ICD-11 PTSD in children and adolescents. *European Child & Adolescent Psychiatry, 27*, 181-190. doi: 10.1007/s00787-017-1032-9

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*, 507-514.

Schmitt, T. A., Sass, D. A., Chappelle, W., & Thompson, W. (2018). Selecting the "Best" Factor Structure and Moving Measurement Validation Forward: An Illustration. *Journal of Personality Assessment*, 1–18. https://doi.org/10.1080/00223891.2018.1449116

Shaughnessy, J., Zechmeister, E., & Zechmeister, J. (2015). *Research Methods in Psychology* (10th ed.). New York, NY: McGraw-Hill Educattion.

Shevlin, M., Hyland, P., Karatzias, T., Bisson, J. I., & Roberts, N. P. (2017a). Examining the disconnect between psychometric models and clinical reality of posttraumatic stress disorder. *Journal of Anxiety Disorders, 47*, 54–59. https://doi.org/10.1016/j.janxdis.2017.02.006

Shevlin, M., Hyland, P., Vallières, F., Bisson, J., Makhashvili, N., Javakhishvili, J., … Roberts, B. (2017b). A comparison of DSM-5 and ICD-11 PTSD prevalence, comorbidity and disability: an analysis of the Ukrainian Internally Displaced Person's Mental Health Survey. *Acta Psychiatrica Scandinavica, 137*, 138–147. https://doi.org/10.1111/acps.12840

Spinhoven, P., Penninx, B. W., van Hemert, A. M., de Rooij, M., & Elzinga, B. M. (2014). Comorbidity of PTSD in anxiety and depressive disorders: Prevalence and shared risk

factors. *Child Abuse & Neglect, 38*, 1320-1330.

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*, 173-180.

Tabachnick, B. G., & Fidell, L. S. (2012). *Using multivariate statistics* (6th ed.). Boston, MA: Allyn & Bacon/Pearson Education.

Trickey, D., Siddaway, A. P., Meiser-Stedman, R., Serpell, L., & Field, A. P. (2012). A meta-analysis of risk factors for post-traumatic stress disorder in children and adolescents. *Clinical psychology review, 32*(2), 122-138.

Tsai, J., Harpaz-Rotem, I., Armour, C., Southwick, S. M., Krystal, J. H., & Pietrzak, R. H. (2015). Dimensional Structure of DSM-5 Posttraumatic Stress Disorder Symptoms. *The Journal of Clinical Psychiatry*, 546–553. https://doi.org/10.4088/JCP.14m09091

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*, 1-10.

Weathers, F.W., Blake, D.D., Schnurr, P.P., Kaloupek, D.G., Marx, B.P., & Keane, T.M. (2013). *The Life Events Checklist for DSM-5 (LEC-5)*. Instrument available from the National Center for PTSD at www.ptsd.va.gov

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. F. (1977). Assessing reliability and stability in panel models. *Sociological methodology, 8*, 84-136.

Yuan, K. H., & Bentler, P. M. (2000). Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Sociological Methodology, 30*, 165-200.

Zhou, X., Wu, X., & Zhen, R. (2017). Assessing the latent structure of DSM-5 PTSD among Chinese adolescents after the Ya'an earthquake. Psychiatry Research, 254, 33-39. doi: 10.1016/j.psychres.2017.04.029

Table 1

Symptom-Based Diagnostic Algorithm for the Alternative Models of PTSD

PTSD Symptom Cluster	DSM-5	Dysphoria (4 factors)	Dysphoric Arousal (5 factors)	Anhedonia (6 factors)	EB (6 factors)	AD (6 factors)	Hybrid (7 factors)
Intrusion	1/5	1/5	1/5	1/5	1/5	1/5	1/5
Avoidance	1/2	1/2	1/2	1/2	1/2	1/2	1/2
NACM	2/7	-	2/7	1/4	2/7	-	1/4
AAR	2/6	1/2	-	-	-	-	-
Dysphoria		3/11	-	-	-	2/6	-
Dysphoric Arousal			1/4	1/4	1/2	-	1/2
Anxious Arousal			1/2	1/2	1/2	1/2	1/2
Anhedonia			-	1/3	-	1/3	1/3
EB			-	-	1/2	1/2	1/2
Total symptom required	6/20	6/20	6/20	6/20	7/20	7/20	7/20

Note. PTSD = Posttraumatic Stress Disorder. CPSS-5 - Child PTSD Symptoms Scale. NACM – negative alterations in cognition and mood. AAR – alterations in arousal and reactivity. EB – externalizing behaviors. AA – anxious arousal. AD – alternative dysphoria.

Table 2

Fit Indices of Factor-Analytical Models and Possible Diagnostic Rates for Each Model

Models	χ^2/df	χ^2	df	RMSEA	(90% CI)	CFI	TLI	SRMR	AIC	BIC	DX %
Anhedonia (6 factors)	1.55	240.50	155***	.04	(.03 - .05)	.97	.96	.04	18707.71	18989.63	25.6
DA (5 factors)	1.77	283.69	160***	.05	(.04 - .06)	.96	.95	.04	18755.30	19018.42	27.1
Dysphoria (4 factors)	1.95	318.98	164***	.06	(.05 - .06)	.94	.94	.04	18797.87	19045.95	29.3
DSM-5 (4 factors)	1.84	301.86	164***	.05	(.04 - .06)	.95	.94	.04	18772.46	19020.55	30.6
EB (6 factors)	1.62	251.37	155***	.04	(.03 - .05)	.97	.96	.04	18720.38	19002.30	18.3
AD (6 factors)	1.72	266.03	155***	.05	(.04 - 0.06)	.96	.95	.04	18740.45	19022.37	18.3
Hybrid (7 factors)	1.4	208.73	149***	.04	(.02 - 0.05)	.98	.97	.03	18675.69	18980.16	17.4

Note. $N = 317$.

DA = dysphoric arousal model. EB = externalizing behaviors. AD = alternative dysphoria. RMSEA = root mean square error of approximation. CFI = comparative fit index. GFI = goodness of fit index. AGFI = adjusted goodness of fit index. PGFI = parsimony goodness of fit index. TLI = Tucker-Lewis index. SRMR = standardized root mean square residuals. RMR = root mean square residuals. AIC = Akaike Information Criterion. BIC = Bayesian information criterion. DX % = percentage of sample meeting "diagnosis" according to each symptom profile.

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3

BIC difference for comparing non-nested models and Satorra-Bentler chi-square difference test for comparing nested models.

Non-nested model	ΔBIC			Best-fitting model
DSM-5 – Dysphoria	25.40			DSM-5
Anhedonia – EB	12.67			Anhedonia
Anhedonia – AD	32.74			Anhedonia
EB - AD	20.07			EB
Nested model	**ΔS-Bχ2**	**(df)**	***p***	**Best-fitting model**
DSM-5 – Anhedonia	54.54	9	.000	Anhedonia
DSM-5 – DA	16.98	4	.002	DA
DSM-5 – EB	45.67	9	.000	EB
DSM-5 – AD	33.71	9	.000	AD
DSM-5 - Hybrid	86.76	15	.000	Hybrid
Dysphoria – Anhedonia	69.25	9	.000	Anhedonia
Dysphoria – DA	27.86	4	.000	DA
Dysphoria – EB	56.77	9	.000	EB
Dysphoria – AD	46.23	9	.000	AD
Dysphoria – Hybrid	98.23	15	.000	Hybrid
DA - Anhedonia	42.38	5	.000	Anhedonia
DA – EB	28.51	5	.000	EB
DA - AD	16.71	5	.005	AD
DA - Hybrid	69.95	11	.000	Hybrid
Anhedonia - Hybrid	28.72	6	.000	Hybrid

EB – Hybrid	65.37	6	.000	Hybrid
AD – Hybrid	56.40	6	.000	Hybrid

Note: $N = 317$. DA = dysphoric arousal model. EB = externalizing behaviors. AD = alternative dysphoria.

Table 4

Odds Ratio Results Between Daily Functioning, Substance Abuse, Depression and Anxiety Symptoms, Trauma Exposure, Childhood Adverse Experiences and Meeting Symptom-Based Diagnostic Requirements for Each Model.

	Anhedonia OR (95% CI)	DA OR (95% CI)	Dysphoria OR (95% CI)	DSM-5 OR (95% CI)	EB OR (95% CI)	AD OR (95% CI)	Hybrid OR (95% CI)
Daily Functioning Impairment	1.09 (0.92 – 1.29)	1.24 (1.02 – 1.50)	1.33 (1.11 – 1.59)	0.95 (0.81 – 1.12)	1.00 (0.85 – 1.19)	1.23 (1.02 – 1.50)	1.48 (1.25 – 1.75)
Substance Abuse	2.17 (1.67 – 2.82)	1.36 (1.09 – 1.71)	1.20 (0.97 – 1.50)	1.70 (1.33 – 2.16)	1.45 (1.17 – 1.80)	1.10 (0.90 – 1.34)	1.92 (1.53 – 2.41)
Depression	2.37 (1.91 – 2.92)	1.68 (1.38 – 2.05)	1.61 (1.28 – 2.02)	1.70 (1.39 – 2.07)	1.45 (1.19 – 1.77)	1.40 (1.12 – 1.75)	1.24 (1.03 – 1.49)
Anxiety	1.38 (1.13 – 1.68)	1.27 (1.03 – 1.57)	1.64 (1.33 – 2.01)	1.11 (0.91 – 1.35)	1.37 (1.12 – 1.68)	1.11 (0.90 – 1.38)	1.00 (0.82 – 1.23)
Trauma exposure	2.16 (1.70 – 2.76)	1.36 (1.10 – 1.70)	1.19 (0.96 – 1.49)	1.65 (1.31 – 2.09)	1.48 (1.20 – 1.83)	1.04 (0.86 – 1.27)	1.97 (1.57 – 2.48)

Adverse childhood experiences	0.96 (0.78 – 1.17)	1.31 (1.04 – 1.63)	1.22 (0.96 – 1.56)	1.01 (0.83 – 1.23)	1.27 (1.06 – 1.53)	1.27 (1.06 – 1.51)	1.46 (1.16 – 1.82)
BIC	737.84	705.51	694.02	862.08	765.94	678.01	666.48
AIC	731.97	699.64	688.15	856.20	760.07	672.13	660.61

Note. $N = 317$.

BIC = Bayesian Information Criterion. AIC = Akaike Information Criterion. DA –dysphoric arousal model. EB – externalizing behaviors. AD – alternative dysphoria. OR – odds ratio. 95% CI – 95% Confidence Interval.