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**TRANSTORNO DE ESTRESSE PÓS-TRAUMÁTICO E DESEMPENHO  
ACADÊMICO EM ESTUDANTES UNIVERSITÁRIOS**

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ACADÊMICO EM ESTUDANTES UNIVERSITÁRIOS**

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## LISTA DE ABREVIATURAS E SIGLAS

ACT	American College Testing
AMBI/RMBI	Adult and Retrospective Measures of Behavioural Inhibition
BA	Bahia
BDI	Beck Depression Inventory
CAPS	Clinician-Administered PTSD Scale
CARB	Computerized Assessment of Response Bias
CES	Combat Exposure Scale
COWAT	Controlled Ora Word Association test
CPC	Child PTSD Checklist
CVLT	California Verbal Learning Test
DSM IV	Diagnostic and Statistical Manual Of Mental Disorders
fMRI	functional Magnetic Resonance Imaging
GPA	Grade Point Averages
K-SADS-PL	Kiddie Schedule for Affective Disorders and Schizophrenia-Present and Lifetime version
M.I.N.I.	Mini-International Neuropsychiatric Interview
MSLQ	Motivated Strategies for Learning Questionnaire
NE	Nordeste
OR	Odds Ratio
PCL-C	PTSD Checklist-Civilian Version
PCL-M	PTSD Checklist-Military Version
PB	Paraíba
PTSD	Posttraumatic Stress Disorder
PTSS	Posttraumatic Stress Symptoms
P/VDD	Persistence/Voluntary Dropout Decisions Scale
RJ	Rio de Janeiro
ROCF	Rey-Osterreith Complex Figure
R-SLESQ	Revised Stressful Life Events Screening Questionnaire
SCID	Structured Clinical Interview for DSM-IV
SLESQ	Stressful Life Events Screening Questionnaire
SP	São Paulo

STAI	State–Trait Anxiety Inventory
TEPT	Transtorno de Estresse Pós-traumático
THQ	Trauma History Questionnaire
TLEQ	Traumatic Life Events Questionnaire
TMT	Trail Making Test
UT-PTSD	Trauma Questionnaire
WAIS-IV	Wechsler Adult Intelligence Scale IV
WB-F2	Wechsler's Adult Intelligence Scale
WCST	Wisconsin Card Sorting Test
WMS-R	Wechsler Memory Scale-Revised
WMT	Word Memory Test



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## 1. RESUMO EM INGLÊS E PORTUGUÊS

### Resumo em Inglês

**Introduction:** There are as yet few studies focused on researching traumatic experience and Post Traumatic Stress Disorder (PTSD) in university students, and on the consequent impact on the academic performance of these individuals.

**Objective:** To investigate the association between traumatic experiences and PTSD with the academic performance of college students.

**Method:** Census method, with students present in the classroom during the survey, freshmen and seniors, at seven undergraduate institutions of higher education, public and private, in the Northeast of Brazil, aged 18 years or over and who agreed to participate. The self-reporting instruments used for the collection were: socio-demographic questionnaire; trauma history questionnaire (THQ); PTSD Checklist-Civilian Version (PCL-C). Information on academic performance was obtained from the results rankings of the entrance exam for the freshmen and the average grade for the graduates.

**Results:** Fourteen percent of the 2213 students who participated in the study, 13.3% of freshmen and 14.9% of graduates had PTSD. The 'Low' academic achievement category showed higher prevalence of PTSD for both first- and final-semester students.

**Conclusion:** We conclude that the students affected by PTSD are more likely to be among those with lower academic performance. These results indicate that attention is needed upon students who have gone through traumatic experiences and developed PTSD, in order to ensure success throughout their studies and in their future professional lives.

Keywords: PTSD; academic performance; university students.

## **Resumo em Português**

**Introdução:** Estudos voltados para a investigação de experiências traumáticas e Transtorno de Estresse Pós-Traumático (TEPT) em alunos universitários ainda são escassos, assim como a conseqüente repercussão no desempenho acadêmico desses indivíduos.

**Objetivo:** Investigar a associação entre experiências traumáticas e TEPT com o desempenho acadêmico de estudantes universitários.

**Método:** Método censitário, com os alunos presentes na sala de aula no momento da pesquisa, calouros e concluintes, dos cursos de graduação de sete instituições de ensino superior, públicas e privadas, localizadas no Nordeste do Brasil, com idade igual ou superior a 18 anos e que consentiram em participar do estudo. Os instrumentos auto-aplicáveis usados para a coleta foram: Questionário sócio-demográfico; Questionário de história de trauma (THQ); *PTSD Checklist-Civilian Version* (PCL-C). A informação sobre desempenho acadêmico foi obtida através de resultados da classificação no vestibular para os calouros e do escore médio para os concluintes.

**Resultados:** Quatorze por cento dos 2213 estudantes que participaram do estudo, 13.3% entre os calouros e 14.9% entre os concluintes apresentaram TEPT. A categoria rendimento acadêmico baixo apresentou maior prevalência de TEPT, tanto para os calouros, quanto para os concluintes.

**Conclusão:** Estudantes afetados por TEPT tem maior chance de estarem entre aqueles com pior desempenho acadêmico. Estes resultados indicam a necessidade de voltar a atenção para os estudantes que vivenciaram experiências traumáticas, e desenvolveram TEPT, a fim de garantir o sucesso na graduação, como também o desempenho profissional futuro.

Palavras-chaves: TEPT; desempenho acadêmico; estudantes universitários

## 2. INTRODUÇÃO

A aprendizagem é um processo de interação entre o indivíduo e o meio, no qual fatores intrínsecos, biológicos tem influência bem como a qualidade da estimulação desse indivíduo (Jean Piaget<sup>1</sup>). Dentre os fatores biológicos que influenciam o processo de aprendizagem, a saúde mental merece ser destacada.

Os graduandos, em sua maioria, se encontram na fase da adolescência e início da vida adulta. Esta população está particularmente sujeita a vivenciar eventos potencialmente traumáticos no curso de sua vida. Tal vulnerabilidade pode ainda ser vista como resultante da transição abrupta para a vida independente, muitas vezes associada à perda do suporte do lar, da monitorização dos pais e isolamento.

A vivência de experiências traumáticas pode evoluir ou não para o Transtorno de Estresse Pós-Traumático (TEPT). Este se caracteriza pelo desenvolvimento de sintomas de hipervigilância, esquiva de estímulos associados ao trauma e revivência da experiência, após estressor traumático que envolva intenso medo, impotência ou horror (APA<sup>2</sup>). O TEPT está relacionado a prejuízo significativo no funcionamento social, acadêmico ou ocupacional (APA, 1994).

A exposição a experiências traumáticas ao longo da vida é frequente na população geral, entretanto, a associação entre estas e o TEPT não é direta. Apesar da quase universalidade da exposição a eventos potencialmente traumáticos, podem existir marcantes diferenças individuais na maneira como se percebe, interpreta, reage e enfrenta eventos altamente aversivos.

Encontram-se na literatura brasileira trabalhos que abordam o desempenho da leitura e escrita em estudantes universitários, mas não avaliando a associação com TEPT. Alguns trabalhos de outros países possuem objetivos que se aproximam da temática desse projeto de pesquisa, como a revisão de literatura de Kristensen et al <sup>3</sup>, que estabeleceu uma relação entre TEPT e funções cognitivas, porém não teve como foco estudantes universitários.

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<sup>1</sup> Jean, P. A epistemologia genética. Presses Universitaires de France. Trad. Nathanael C. Caixeiro. 1970.

<sup>2</sup> American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. [Washington], DC: American Psychiatric Association. 1994.

<sup>3</sup> Kristensen, C H, Parente, M A, Kaszniak, AW. Transtorno de estresse pós-traumático e funções cognitivas. In: Psico-USF. 2006; 11 1:17-23.

Diante desse contexto, esbarramos em um hiato no que concerne ao desenvolvimento do TEPT nos estudantes universitários e conseqüências na vida acadêmica. Assim, este projeto de pesquisa teve como objetivo principal investigar a associação entre experiências traumáticas e TEPT com o desempenho acadêmico de estudantes universitários a partir de um estudo censitário conduzido em três áreas metropolitanas no NE (Nordeste) brasileiro. A questão de pesquisa foi: Existe influência das experiências traumáticas e do TEPT no desempenho acadêmico dos estudantes universitários na Região Nordeste do Brasil?

### **3. OBJETIVOS**

Geral – Investigar a associação entre experiências traumáticas e TEPT com o desempenho acadêmico de estudantes universitários de sete instituições em três cidades na Região Nordeste do Brasil (Salvado/BA, Feira de Santana/BA e Cajazeiras/PB).

#### Específicos

- Identificar os tipos de eventos traumáticos associados ao baixo desempenho acadêmico;
- Avaliar o TEPT e uso nocivo de substâncias como mediadores entre a exposição ao evento traumático e o baixo desempenho acadêmico dos universitários.

## 4. RESULTADOS

### 4.1 ARTIGO DE REVISÃO

**Title** – The relation between Post-Traumatic Stress Disorder and cognitive function: a systematic review

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## ABSTRACT

**Objective:** to perform a systematic review of research which establishes a relation between Posttraumatic Stress Disorder (PTSD) and cognitive function or academic performance. **Methods:** The authors searched MEDLINE databases and reviewed textbooks and reference lists of the studies selected. Observational studies enrolling humans were included if they investigated the possible relationship between PTSD and school/academic performance, or cognitive function. PTSD was diagnosed according to DSM or widely accepted and validated diagnostic tools. **Results:** 46 studies were screened for full text evaluation. A total of 23 studies were subsequently excluded after reading the full text, resulting in 07 articles and 03 articles manual search. Most of the articles show that individuals affected by PTSD have impairment in their academic performance and cognitive function, particularly memory and attention. **Conclusion:** investment in research which relates the influence of PTSD in academic performance and cognitive and executive functions should receive further investigation.

**Keywords:** PTSD; cognitive function; academic performance.

## BACKGROUND

Posttraumatic stress disorder (PTSD) is a psychiatric condition developed after exposure to one or more traumatic events. PTSD has often a chronic course, with patients suffering symptoms several years after initial exposure to their index trauma. It can induce clinically significant distress or impairment in social, emotional and occupational areas. The prevalence of PTSD in the U.S. general population is approximately 7.8% (Kessler, Berglund et al. 2005). A population-based survey carried out in Brazil has shown that the one-year prevalence of PTSD is 5% in São Paulo and 3.3% in Rio de Janeiro (Ribeiro, Mari et al. 2013).

Some studies have reported cognitive problems in individuals with PTSD, particularly in the areas of cognitive functioning, learning, and memory (Isaac, Cushway et al. 2006; Spates, Samaraweera et al. 2007; Stetz, Thomas et al. 2007; Johnsen and Asbjornsen 2008;



Moore 2009; Dere, Pause et al. 2010; Brewin 2011; Marin, Lord et al. 2011; Godsil, Kiss et al. 2013; Schuitevoerder, Rosen et al. 2013; Finsterwald and Alberini 2014), whereas others have not. Reasons for discrepant findings are unclear but may be related to differences in the composition of study samples.

The purpose of this study was to perform a systematic review of research which establishes a relation between Posttraumatic Stress Disorder (PTSD) and cognitive function or academic performance.

## **METHOD**

### ***Eligibility criteria***

In order to perform this systematic review of literature, the authors searched published articles regarding the possible relationship between PTSD and school/academic performance or cognitive function.

The articles were selected based on the following inclusion criteria: 1. observational studies investigating the possible relationship between PTSD and school/academic performance, or neuropsychological functions; 2. Humans as study subjects; 3. Papers published in the last ten years (July/2006 up to July/2016) in Portuguese, Spanish or English language; 4. PTSD diagnosis conducted by specialists using DSM IV criteria or widely accepted and validated diagnostic tools or symptoms scales.

Articles were excluded if they involved inpatients or if the participants had significant condition that would interfere with cognitive evaluation, such as traumatic brain injury, schizophrenia or bipolar disorder. Clinical trials were also excluded.

### ***Information sources and study selection***

Research was conducted between June and August 2016 using PubMed tool (granting access to the MEDLINE database and additional references from the National Library of Medicine). The following string terms were used: “Stress Disorders, Post-Traumatic” [Mesh]; “Psychological trauma” [Mesh]; “psychology, educational” [Mesh]; “academic skills”; “academic achievement”; “school performance”; “intelligence”; “neuropsychological function”; “cognitive function”. Filters were used for studies with humans and for English, Spanish or Portuguese languages.

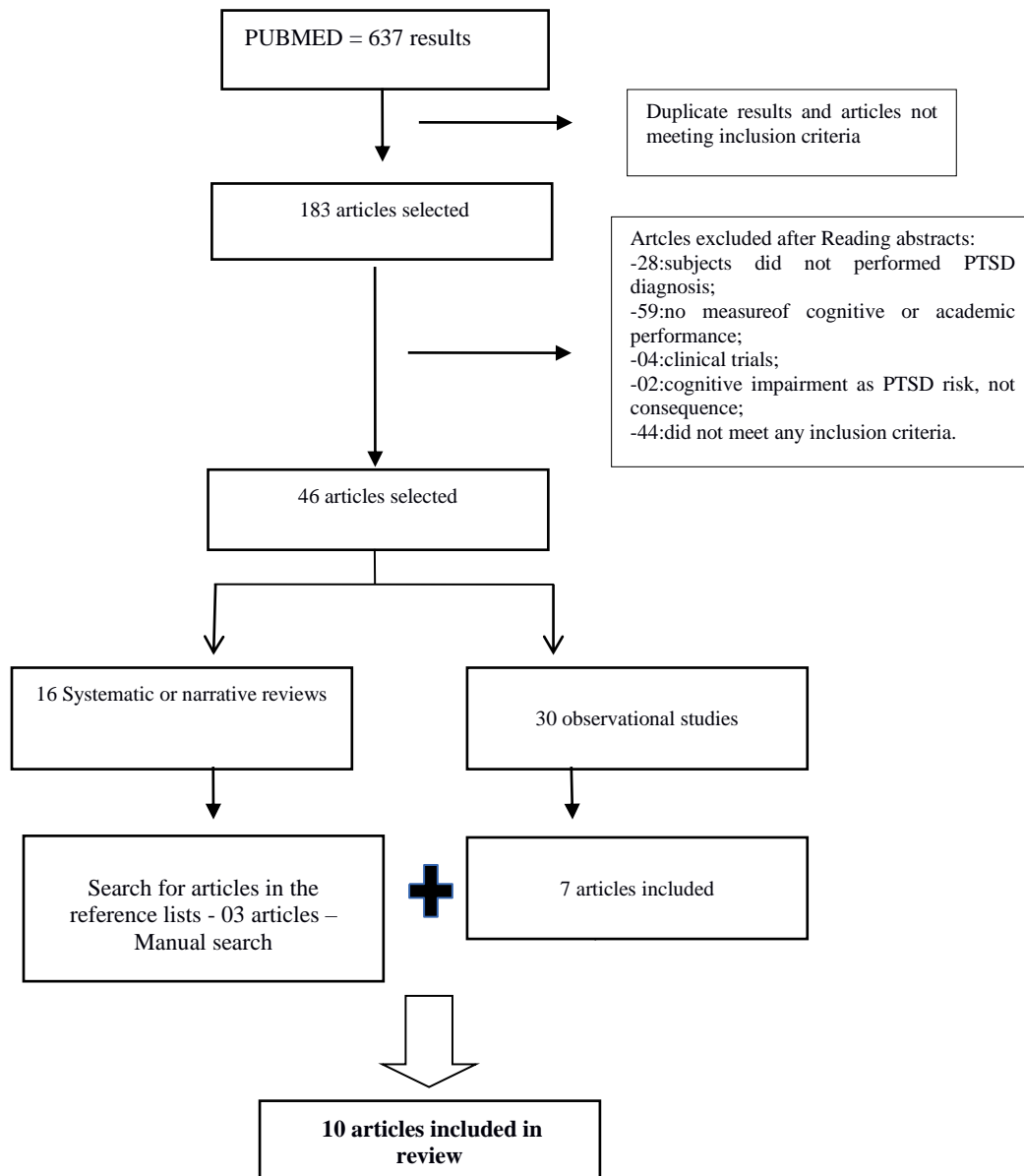
Reference lists of articles identified through database searches and bibliographies of systematic or non-systematic review articles were examined to identify further relevant studies.

Studies were identified and selected independently by two reviewers according to inclusion and exclusion criteria. A third independent reviewer was available to arbitrate in case of disagreement over a selection.

## **RESULTS**

Initial searches returned 637 published texts. After filtering for duplicate results and excluding title or abstract clearly not meeting inclusion criteria, 46 studies were screened for full text evaluation. A total of 23 studies were subsequently excluded after reading the full text, resulting in 07 articles and 03 articles manual search, total 10 articles

Figure 1: Displays the process flow regarding study selection.



### *Academic performance*

Some investigations differed by addressing the academic performance of university students. Bachrach and Read (2012) performed a study involving 1002 university students. They suggest that entering university with PTSD exerts a small influence upon academic results, however when PTSD is developed during the first year of university, it can lead to a lower GPA (Grade Point Average) at year end ( $M = 2.67$  v.  $3.04$ ; contrast estimate =  $-.33$ ,  $p = .001$ ). In this study, it was ascertained that the use of alcohol, widespread among university students, did not appear to mediate the PTSD-GPA relationship ( $p < 0.001$ ).

Similarly, Boyraz, Horne et al. (2013) conducted a longitudinal study, with African American students, and concluded that being a student in a predominantly white institution and experiencing high levels of PTSD symptomatology in the first semester of university were associated with lower cumulative GPA. Likewise, presenting a lower GPA in the first year of university increases the probability of dropping out before the end of year two ( $p < .01$ ).

Evaluating the potential mediating effects of effort regulation and academic achievement on the relationship between PTSD, the same research group Boyraz, Granda et al. (2015) found that the college dropout rate was significantly higher among PTSD-positive participants than those who were exposed to trauma but did not have PTSD ( $p = .013$ ). Moreover, these researchers found that students who entered college with high PTSD symptomatology reported lower levels of effort regulation, which in turn, had a significant indirect effect on 2nd-year enrollment through 1st-year GPA. These findings highlight the importance of 1st-year academic achievement in students' decisions to return to college after their 1st year and also suggest that students with high PTSD symptomatology may have difficulty maintaining a high GPA in their 1st year due to difficulties in effort regulation.

### *Learning*

The studies by Levy-Gigi, Keri et al. (2012) investigated the capacity to generalize learning in the face of novel situations in individuals with PTSD. The participants were police officers with or without PTSD in Israel, and civilians who went through a major natural disaster in Hungary (with or without PTSD). Both groups (Israel and Hungary – with and without PTSD) did not differ significantly from the average age and years of formal education (all values  $p > 0.1$ ).

The results indicate that only individuals with PTSD present a selective deficit in generalizing learning to novel situations ( $p < .001$ ). Levy-Gigi et al (2012) concluded that the selective deficit in generalizing learning to novel situations is associated with individuals with PTSD, and was not affected by cultural differences (Israel vs. Hungary) or by the type of trauma (combat - police vs. natural disaster - civilians).

The studies by Myers, Moustafa et al. (2013) assessed a sample of male veterans with self-reported current, severe PTSD symptoms (PTSS), to determine whether facilitated learning could be observed in a purely cognitive task that involved both learning to obtain reward and learning to avoid punishment. They found that the PTSS group out performed the control group, in terms of total points won as well as in percentage of participants reaching a performance criterion. The PTSS group showed better performance on reward trials than the control group ( $F(1,65) = 6.43, p = 0.014$ ), with no difference on punishment trials ( $p > 0.100$ ).

### *Cognitive function*

Pavlovic, Hasanovic et al. (2012); Schoeman, Carey et al. (2009); and Parslow and Jorm (2007) found that the individuals affected by PTSD presented compromised cognitive function.

The study of Werner, Meindl et al. (2008) concluded that the brain areas (hippocampal, parahippocampal and prefrontal) involved with memory presented functional alterations in patients with PTSD, however behavioral performance remained undamaged. Performance of verbal and spatial memory did not differ significantly between patients with

PTSD and healthy controls (verbal memory:  $p > 0,05$ ; spatial memory:  $p > 0,05$ ). The two groups did not differ in attention ( $p > 0,05$ ).

The findings of the Demakis, Gervais et al. (2008) studies contradict the investigations above. The group examined the influence of the severity of PTSD symptoms in the cognitive performance of 301 individuals, of whom 22% were diagnosed with PTSD. Cognitive tests were applied to evaluate: Intellectual/ Academic Functioning; Executive Functioning; Verbal Learning and Memory; Attention/Working Memory; and Cued Recall/Recognition, and demonstrated that the correlation between the severity of PTSD symptoms and cognitive ability is not significant ( $p = .32$ ).

**TABLE 1: PTSD vs. Cognitive Function and Academic Performance.**

Study	Nationality	Total sample or population size	Group with PTSD Group w/o PTSD	Instruments employed	Cognitive, function, executive function, learning, academic performance	Key results
Bachrach and Read (2012)	USA	1002 university students	Yes	- Attrition and transfer; - TLEQ; - PCL-C.	GPA	- Students who developed PTSD during the year (that is, new cases) had lower GPA at year end ( $p = .001$ ).
Boyratz, Horne, Owens and Armstrong (2013)	USA	423 university students	Yes	- SLESQ; - P/VDD; - PCL-C.	- GPA - college persistence	- the dropout rate was greater among students who met criteria for PTSD than those who had trauma but not PTSD ( $p < .010$ )
Boyratz et al, 2015	USA	484 university students	Yes	- R-SLESQ; - PCL-C; - ACT; - MSLQ.	- effort regulation and academic performance	- PTSD had shown a negative indirect effect on the GPA of 1st-years ( $p = .001$ ), on dropout rate and on 2 <sup>nd</sup> year enrollment through effort regulation ( $p < .001$ )
Demakis, Gervais, and Rohling (2008)	Canada	301 participants	Yes	- WMT; - CARB; - CVLT; - Test of Memory Malinger.	- cognitive performance	- none of the results revealed a significant association between the severity of PTSD symptoms and cognitive capacity ( $p = .40$ ).
Levy-Gigi, Myers, et al (2012)	Israel and Hungary	113 participants	Yes	- M.I.N.I.; - BDI-II; - STAI; - PCL-C; - AMBI/RMBI; - WAIS-IV.	- generalizing learned associations	- both PTSD and non-PTSD participants were capable of learning the initial stimulus-outcome associations, ( $p = .14$ ). However, as predicted, only individuals with PTSD showed a selective deficit in generalization of this learning to novel situations ( $p < .001$ ).
Myers, Moustafa et al (2013)	USA	87 war veterans	Yes	- PCL-M; - AMBI/RMBI; - CES.	- facilitated learning reward/punishment	- The PTSD group showed better performance on reward trials than the control group ( $F(1,65) = 6.43$ , $p = 0.014$ ), with no difference on punishment trials ( $p = 0.100$ ).
Parslow and Jorm (2007)	Australia	2097 participants	Yes	- Trauma Screening Questionnaire; - Wechsler Memory Scale; - Symbol-Digit Modalities Test; - California Verbal Learning Test; - Spot-the-Word Test -Version A; - National Adult Reading Test.	- neurocognitive deficits	- The group who developed PTSD had lower scores in neuropsychological evaluations before trauma exposure (Immediate recall $p < 0.01$ , Delayed recall $p < 0.01$ , Digits backwards $p < 0.05$ , Symbol-Digit Modalities Test $p < 0.05$ , Spot-the-Word Test 0.01)
Pavlović, Hasanovic &	Bosnia	100 war veterans	Yes	- WB-F2;	- intelligence level of veterans with	- War veterans with PTSD had significantly

Prelic (2012)				- UT-PTSD.	and without PTSD, with no prior history of academic difficulty	more participants whose IQ was below average (60.0%), as well as significantly lower results than war veterans without PTSD ( $p < 0.01$ ). - 50.0% of veterans with PTSD were in the range of low-average IQ (IQ = 80-90), 10.0% were at the borderline level (IQ = 66-79); - 68.0% of war veterans without PTSD were in the range of average IQ (IQ = 91-110) and 24.0% were high-average (IQ = 111-119).
Schoeman, Carey, et al (2009)	South Africa	40 adolescents	Yes	- K-SADS-PL; - CPC; - Wechsler Memory Scale; - TMT; - COWAT; - WCST; - Senior South African Individual Scale-Revised; - ROCF.	- neurocognitive function	- PTSD group was significantly lower than the group without PTSD on the Rey auditory-verbal learning test ( $p = 0.03$ );
Werner et al (2009)	Germany	12 patients with PTSD and 12 healthy controls	Yes	- CAPS; - SCID; - BDI; - WMS-R; - fMRI.	- performance of verbal and spatial memory	- PTSD patients and healthy control participants did not differ significantly (verbal memory: $p > .05$ ; spatial memory: $p > .05$ ). The two groups did not differ in attention either ( $p > .05$ ).

**Legend:** Grade point average (GPA); The Traumatic Life Events Questionnaire (TLEQ); PTSD Checklist-Civilian Version (PCL-C); The Stressful Life Events Screening Questionnaire (SLESQ); The Persistence/Voluntary Dropout Decisions Scale (P/VDD); Revised Stressful Life Events Screening Questionnaire (R-SLESQ); American College Testing (ACT); The Effort Regulation scale of the Motivated Strategies for Learning Questionnaire (MSLQ); Word Memory Test (WMT); Computerized Assessment of Response Bias (CARB); California Verbal Learning Test (CVLT); Mini-International Neuropsychiatric Interview (M.I.N.I.); Beck Depression Inventory-II (BDI-II); State-Trait Anxiety Inventory (STAI); Adult and Retrospective Measures of Behavioural Inhibition (AMBI/RMBI); Checklist-Military Version PCL-M; Combat Exposure Scale (CES); Wechsler Adult Intelligence Scale IV (WAIS-IV); Wechsler's Adult Intelligence Scale (WB-F2); Trauma Questionnaire (UT-PTSD); Kiddie Schedule for Affective Disorders and Schizophrenia-Present and Lifetime version (K-SADS-PL); Child PTSD Checklist (CPC); Trail Making Test (TMT); Controlled Ora Word Association test (COWAT); Wisconsin Card Sorting Test (WCST); Rey-Osterreith Complex Figure (ROCF); Clinician-Administered PTSD Scale (CAPS); Structured Clinical Interview for DSM-IV (SCID); Beck Depression Inventory (BDI); Wechsler Memory Scale-Revised (WMS-R); functional magnetic resonance imaging (fMRI).



## CONCLUSION

Cognitive function received the most research upon individuals with PTSD, from the 10 articles included in this systematic review. Some investigations differed by addressing the relationship between PTSD and academic performance of college students. Most of the articles show that individuals affected by PTSD have impairment in their academic performance and cognitive function, particularly memory and attention.

In all research there are limitations: a high heterogeneity between studies in socio-demographic profile, culture, inclusion criteria in the selection of participants, comorbidities, test used, and other methods. The reported constraints were: sample size; type and time of the traumatic experience; and the adequacy of instruments chosen to measure neurocognitive performance with symptoms of PTSD. Moreover, most of the articles use only PTSD symptoms and not the diagnosis of PTSD.

Thus, investment in research which relates the influence of PTSD in academic performance and cognitive and executive functions should receive further investigation.

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## 4.2 ARTIGO ORIGINAL

- Resposta do Editor:



Juliana Pereira <julianalaranj@gmail.com>

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1 mensagem

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1 de novembro de 2016 06:54

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**TITLE:** Posttraumatic Stress Disorder and academic performance in a population of university students

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## **ABSTRACT**

The aim of this work is to investigate the association between traumatic experiences and PTSD with the academic performance of university students. A census approach was used and included 2213 students, matriculated at one of seven college institutions in their first or final semesters in all programs, who filled out the self-response questionnaires. From this student population, 14% presented PTSD, where 13.3% were first-semester and 14.9% were final-semester. The category of low academic results had a higher prevalence of PTSD both for first-semester as well as for final-semesters. Thus, we conclude that students affected by PTSD present impaired academic performance. These results indicate the need to pay attention to students who have been through traumatic experiences, and gone on to develop PTSD, in order to ensure their undergraduate success and enable their future performance as professionals.

Key words: PTSD; academic performance; college students.

## **INTRODUCTION**

The beginning of adulthood is a transition period into an independent life, especially when it coincides with entering college often associated with the loss of family support. Leaving home and being away from parents' protection can correspond with greater exposure to violent and traumatic events [1-2]. Newfound independence can also be related with unaccustomed course formats that can be an unsettling experience for first-semester students. These and others changes that occur during the college years promote exposure to diverse situations.

According to Mathews et al [3], children and adolescents who were exposed to community violence had an increased risk to developing PTSD symptoms, leading to poor academic performance and low class attendance, as well as a disturbing their school routines. Dyson [4] has shown that the effects of family violence on children are reflected in a child's academic performance and behavior.

In the Brazilian literature, studies on college students have associated reading and writing performance [5,6,7,8] and the use of drugs and alcohol [9-10]. An association between PTSD and cognitive function has been previously reported [11] in college students. Some authors suggest that this association is mediated by alcohol use [12]. Moreover, the dropout rate was found to be higher [13] and performance to be lower among first-semester students with PTSD [14].

Brazil is a developing country and has high rates of violence. The Northeastern region has among the highest rates of poverty (measures of social indicators, illiteracy, poverty) in the country. And of the 50 most violent cities in the world, 21 cities are in Brazil and 12 are in this region [15]. In spite of the considerable violence in Brazil, the data supporting cognitive impairment in PTSD patients and the high dropout rate among Brazilian college students – 20.5% of students who enter higher education do not complete their program [16] – very little is known about the association between trauma, PTSD, and academic performance among college students.

In this context, the aim of this study is to investigate the association of traumatic experiences and PTSD with the academic performance of college students in three cities in Northeastern Brazil (Salvador, Feira de Santana and Cajazeiras).

## **MATERIALS AND METHODS**

The present study is part of a multicenter research project exploring aspects of traumatic experiences in college students from seven institutions in Northeastern Brazil and has been approved by each of the local Institutional Ethics Review Boards (Bahia - CEP/COM/UFBA- process number 227/2010 and Paraíba - CEP/ Fac. Sta. Maria, 17-02-2011). The recruitment and assessment of students have been previously described [17].

In summary, seven college institutions (three public and four private colleges) were selected, non-randomly, inside three urban areas of Bahia and Paraíba (Brazil). Data was collected from April to July 2011 and included all students matriculated at the university and attending their first or final semesters in all programs from those institutions. Subjects were aged 18 years or older, and consented to participate in this cross-sectional study by signing the consent form. Both students and institutions were protected with identity secrecy.

A total of 2,282 students chose to participate, however some forms were not completed. Thus, 69 students were excluded, leaving a total of 2,213 participants.

## **Procedures**

The instruments used for the data collection were: Sociodemographic Questionnaire; Trauma History Questionnaire (THQ) [18] and PTSD Checklist-CivilianVersion (PCL-C) [19]. The THQ is structured into 24 items such that 23 refer to potentially traumatic events and 1 item allows individuals to describe an experience which is not covered by the other 23 items. The PCL-C is composed of 17 questions based on the diagnostic criteria of the DSM – IV for PTSD. A detailed description of these instruments may be found in Netto et al [17].

Before administering the questionnaires, a pilot test was conducted with 30 students, in order to estimate the time needed to complete the form, as well as to determine any doubts that might come up during administration of the questionnaire. Both the students and the institutions who participated in the survey were guaranteed confidentiality, i.e. the research instrument does not identify the respondent and the names of the universities are not published in articles or reports.

Afterwards contact was established with coordinators of the college courses or with Department Heads and the Provost or Dean of each institution to obtain permission to conduct the study. Once authorized, the professors were contacted to schedule a time and day for the self-application of the questionnaire, lasting 20 to 30 minutes on average. Along with the investigators, other university students, who were not included as study subjects (i.e from another semester or institution), collaborated on collecting the data. They were trained beforehand, to ensure reliability when administering the questionnaire.

## **Study Variables**

To evaluate the association between PTSD (exposure) and academic performance (outcome) of the students in the study, a standardized score was used to identify the students



who received intermediate grades, and those who were above average or below average. Thus, three categories of academic performance were created: high, intermediate and low.

In the process of building the standardized score, the original figures from either the first-semester entrance exam or the grade point average prior to the final-semester, were transformed into standard deviation units, or z scores. The z score is calculated by the distance of each student's grade in relation to the mean grade of the group they were in. The groups were formed by way of combining the seven universities, whether public (three) or private (four), and the three areas of study (Exact Sciences/Technology; Biology/Health; Humanities/Arts).

The theoretical distribution of z score has a mean value of zero and a standard deviation of 1.0. Thus, an original value equal to the average grade of the group is equivalent to  $z=0$ . The estimated scores of the first-semester students were later categorized into three categories of academic performance: high ( $<-1$ ), intermediate ( $-1 - +1$ ), low ( $>+1$ ); and for the final-semester students: high ( $>+1$ ), intermediate ( $-1 - +1$ ), low ( $<+1$ ).

Traumas were gathered into eight typologies, in accordance with THQ: victims of non-sexual violence; victims of sexual violence; witnessed or notified about injuries to or death of a third party; victims of accidents; victims of natural disasters; victims of man-made disasters; victims of life-threatening illnesses; other trauma. For a diagnosis of PTSD, students had to have suffered some kind of trauma, scored  $> 45$  on the PCL and have filled-in 1 symptom from criteria B (recurrence), 3 symptoms from criteria C (avoidance and numbing), and 2 symptoms from D (increased arousal) of the DSM IV.

The variable "Harmful Use of Substances" was created in order to know the relation between harmful use of substances and academic performance. To construct this variable, the questions on the study instrument regarding substance use and their respective consequences were combined. The selected questions were – students who made daily or weekly use of: alcohol and/or cigarettes and/or inhalants and/or marijuana and/or ecstasy and/or cocaine and/or crack; and had consequences such as: got drunk and/or regretted the fact and/or got involved in a physical fight, car accident or in other situations with negative results.

In this study, the independent variables are trauma and harmful use of substances, while PTSD was deemed the mediator variable. The covariables are the sociodemographic data (age, gender, marital status, family income, father's education, mother's education) which had OR (Odds Ratio)  $>1$  in bivariate association with low academic performance. Throughout the study, academic performance was considered the dependent variable.

## Statistical Analysis

Calculations were carried out on the STATA program, version 12.0. A descriptive analysis of the sociodemographic data, traumas and PTSD was conducted, as well as verifying the association between PTSD and academic performance, and between the harmful use of substances and academic performance. All calculations were made according to the semester in progress at the time for first-semester and final-semester students.

Multinomial logistic models were created to verify whether PTSD presented as a mediator between low academic performance and the traumas. The types of trauma included in the models were those that presented OR higher than 1 (one) in the bivariate analysis.

## RESULTS

In the total student population (n=2,213), 14% presented PTSD, with 13.3% in first-semester and 14.9% in final-semester. Women were the majority in both semesters (Table 1). The sociodemographic data presented the same prevalence in both semesters, except for final semester students being older. All the sociodemographic data can be found in *Table 1*. The relationship between demographic variables and academic performance was determined by multivariate analyses.

<< TABLE 1 HERE >>

The prevalence of exposure to trauma for first-semester students was 92.5% and for the final-semester students was 92.6%. The number of traumatic events had high heterogeneity. Its average, respectively, was 5.5 (standard deviation 4.5) and 5.5 (standard deviation 4.2). The distribution of types of trauma in each semester is in Table 2, with the most prevalent being witnessing (or notified of) violence / death / injury to third parties, including family.

<<TABLE 2 HERE>>

To identify their academic performance, the students were distributed into three categories, by way of a standardized score: High, Intermediate and Low. The category of low-scoring students presented a higher prevalence of PTSD for both first-semester and final-semester students.

In the low-scoring category, only the first-semester made greater harmful use of substances. (Table 3). Among the total number of students, 311 (14.05%) made harmful use of substances; 157 (12.46%) were in first-semester and 154 (16.16%) were in final-semester. The group of first-semester who made harmful use of substances had OR (Odds Ratio) of 1.55 for Low performance, whereas the final-semester had OR of 12.66, meaning that making harmful use of substances is associated with low academic performance in this study (Table 3).

<<TABLE 3 HERE>>

Table 4 contains the multinomial models adjusted for the category low academic performance. The types of trauma that presented OR above 1.0, in the bivariate analysis, were included in these models. They were configured in the following manner: Model A – types of trauma; Model B – types of trauma and PTSD; Model C – types of trauma, PTSD and potential confounding variables with OR above 1.0 in the bivariate analysis (sociodemographic data).

<<TABLE 4 HERE>>

In Model A, the results show that non-sexual violence for the first-semester (1.10), and other types of trauma for the final-semester (1.10), present an association with the low

academic performance category. In the other models (B and C), the same types of trauma remained associated. For Model B, it was also found that PTSD presented a strong association with the category low academic performance for the first-semester (1.22) when compared with the final-semester students (1.06). However, when including the sociodemographic data as covariate in the analysis (Model C), these types of traumas showed a lower risk of determining low academic performance in both groups (1.06). Moreover, the association of PTSD with risk of low academic performance become weak for first-semester (1.02) and stronger for the final-semester students (1.20) (Table 4).

## **DISCUSSION**

This study investigated the relation between PTSD and the academic performance of first-semester and final-semester college students from seven Brazilian universities. Our main result was that, of the three categories of academic performance, the category “low” presented a higher rate of students with PTSD, both for first-semester and for final-semester, showing 14.2% and 15.3%, respectively.

These findings are not in accordance with Bachrach and Read [12], which found that only the students who developed PTSD in their first year of college, and not those who previously had PTSD, had a lower overall academic performance.

In the study by Boyraz et al. [14], 12.4% of students (in their first year of college) presented PTSD and the college dropout rate was significantly higher among the participants with PTSD than those who, although exposed to trauma, did not develop PTSD. Also, the academic performance of the students with PTSD was lower.

Of the students in our study, 14% presented PTSD, however the exposure to traumatic events (92%) was much higher. Even so, this rate of PTSD is high for a non-clinical population and is similar to a study with African-american first-semester students in which 74% reported being exposed to traumatic events and 20.6% met the criteria for PTSD [21]. In a study conducted in the two largest cities in Brazil, with non-clinical population, the prevalence of PTSD in the year prior to this survey was 5% in São Paulo and 3.3% in Rio de Janeiro. [23]. The prevalence in our study is more than double.

In the study by Frazier et al. [22], also with university students, 85% of the subjects had experienced some type of trauma over their lifetime. Anders et al. [24] reported poorer results in a wide range of areas, including severity of PTSD symptoms and lower grade point averages (GPAs) in subjects exposed to more traumatic events.

Comparing with the Ribeiro et al. [23] study performed in Rio de Janeiro (RJ) and São Paulo (SP), the two biggest cities in Brazil, our rate of exposure to any trauma was higher (92.6) than those (54.9[RJ], 47.2[SP]). So, although Rio de Janeiro and São Paulo have more media publicity about violence, this data is in accordance with the world ranking of most violent cities in the world showing that the Northeast is even more violent. It is still unknown whether exposure to trauma is more common among college students or the general young adult population in the Northeast region of Brazil. Further studies could answer if attending college is a risk or protective factor for trauma exposure. This rate of PTSD is high for a non-clinical population, which suggests the lack of prevention services and follow-up of subjects after they experience some form of trauma and develop PTSD.

In our study population the most frequent trauma was witnessing (or being notified of) violence / death / harm to a third party, including family; followed by non-sexual violence. This finding was similar to Boyraz et al. [14], Andrade et al. [25] and Frazier et al [22]. We observed that some types of trauma (non-sexual violence for the first-semester group; victims of other types of trauma for the final-semester group) showed an association with the category low academic performance. This association remained even considering PTSD and sociodemographic confounding factors.

But, what happens to the students who remain in college over the following semesters? What is their academic performance like? Previous studies have found that college students exposed to traumatic events and PTSD are at an increased risk of dropping out [13, 14, 21]. Our study did not conduct a follow up of the students, and so a dropout rate could not be measured. Despite the fact that the first-semester students were a distinct population from the final-semester students, we observed that those in final-semester with PTSD also showed poor academic performance.

Considering that there were fewer final-semester (953) than in first-semester participants (1260), and there were far fewer low-performance students in final-semester (189) than in first-semester (756), there is still a question of whether low performance as well as PTSD is a risk factor for dropout. This is a question that could not be answered by this study design and should be investigated further.

The harmful use of substances, including alcohol, also shows an association with low academic performance for first-semester participants. The studies of Bachrach and Read [12] with first-year college students, showed that the use of alcohol after having gone through a traumatic experience comprises a high-risk situation for this group of students, and they agree that involvement with alcohol negatively affects academic performance.

There was a remarkable difference in performance between first-semester and final-semester students with harmful use of substances. The majority of first-semester students with harmful use of substances had low performance while most final-semester students with harmful use of substances had intermediate performance. This study cannot give an explanation for this difference. As the severity of substance use disorder was not measured, it is possible that the heaviest substance users dropped out from their studies or that the severity of substance use by final-semester students was mild compared with their first-semester.

## CONCLUSIONS

With the objective of determining the association between traumatic experiences and PTSD in college students' academic performance, this study reached the conclusion that the students, in both first and final semester, who had experienced some type of trauma (non-sexual violence, victim of man-made disaster, victim of natural disaster, victim of life-threatening illness, and other traumas) and developed PTSD, presented lower academic performance among all. That is, there is functional impairment in the university life.

The harm caused may lead these students to fail subjects, or even the entire semester or year of study. How much does it cost the university when a student needs to repeat the subject matter or even the semester or whole year? It may be prudent and economical for the universities to implement prevention and follow-up programs for students who have experienced trauma, as well as intervention programs for those who already have PTSD or other psychiatric disorders.

Including and involving the students with PTSD or who experienced traumatic events, in psychoeducational programs, as well as in activities such as extension projects, may be alternatives that would help minimize and even eliminate the academic impairment of said students.

## **LIMITATIONS**

Although it is a populational study, the institutions investigated are from a specific region of Brazil, the Northeast. Cultural and social differences between regions might influence the types of traumas that are experienced, the way students deal with trauma and the consequences of PTSD symptoms in their academic life. In Brazil, students take entrance exams and those who achieve better results are eligible to enter college studies. In our research, we did not investigate the candidates who did not enter university.

This is a limitation of our study, as perhaps those who did not achieve a sufficient score in their entrance exams are the ones most jeopardized by PTSD symptoms, since PTSD may contribute to cognitive damage. In other words, among our population of college students, those with PTSD might be more resilient or have less secondary cognitive impairment.

The results of our study showed a relationship between PTSD and academic performance, but we can not quantify the influence of PTSD on income, as other variables have not been evaluated, such as executive functions, cognitive deficits, educational gaps, social difficulties, time dedicated to study, among others.

Another limitation is that the students in first and final semesters were different subjects surveyed at the same time. It would be worthwhile to have more longitudinal studies conducted all the way through college. As studies that associate PTSD and academic performance of college students are still emerging, we stress the need for more research in this area.

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## STATEMENT OF COMPETING INTERESTS

We declare there are no conflicts of interest in relation to authorship and/or publication of this article.

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**TABLE 1: Sociodemographic data of the University Students – First-semester and Final-semester**

Variables		First-semester N=1260 n (%)	Final-semester N=953 n (%)
PTSD		168(13.3)	142(14.9)
No PTSD		1092(86.7)	811(85.1)
Age <22		845(67.1)	293(30.7)
Age >22		415(32.9)	660(69.3)
Gender	Male	432(35.4)	293(32)
	Female	789(64.6)	623(68)
Marital Status	Single	1071(87.4)	718(76.5)
	Married	141(11.5)	201(21.4)
	Others	13(1.1)	19(2)
Family Income*	A+B	639(52.5)	396(42.7)
	C	351(28.8)	363(39.2)
	D+E	228(18.7)	168(18.1)
Father's Education	None	48(3.9)	39(4.2)
	Basic Education	978(79.6)	764(81.6)
	College/Post	202(16.4)	133(14.2)
Mother's Education	None	34(2.8)	31(3.3)
	Basic Education	899(72.9)	717(76.9)
	College/Post	301(24.4)	184(19.7)
University	Public	678(53.8)	684(71.8)
	Private	582(46.2)	269(28.2)

\*The classification of family income is the standard adopted in Brazil, through the Economic Classification Criterion of Brazil (2011) **Class A+B > \$2.113,00 per month; \$2.113,00 > Class C > \$428.00 per month; \$428,00 > Class D+E > \$184.00 per month)**

**TABLE 2: Trauma Experienced by University Students – First-semester and Final-semester**

	First-semester N=1260 n (%)	Final-semester N=953 n (%)
Non-sexual violence	802(63.7)	612(64.2)
Sexual violence	110(8.7)	98(10.3)
Victims of accidents	332(26.3)	275(28.9)
Victims of man-made disasters	118(9.4)	119(12.5)
Victims of natural disasters	73(5.8)	64(6.7)
Witnessed (or notified of) violence / death / injury to third parties, including family	1038(82.4)	770(80.8)
Victims of life-threatening illness	130(10.3)	98(10.3)
Victims of other types of trauma	132(10.5)	100(10.5)

TABLE 3: Academic Performance X PTSD and Academic Performance X Harmful Use of Substances													
Academic Performance	High			Intermediate			Low			High	Intermediate	Low	
	n (%)			n (%)			n (%)			n(%)	n(%)	n(%)	
SEMESTERS	PTSD	NO PTSD	Total	PTSD	NO PTSD	Total	PTSD	NO PTSD	Total	HARMFUL USE OF SUBSTANCES			Total
FIRST-SEMESTER (N=1260)	12 (11.8)	90(88.2)	102	47(12.2)	339(87.8)	386	107(14.2)	49(85.8)	756	10(6.4)	58(37.2)	88(56.4)	156
FINAL-SEMESTER (N=953)	25(14.9)	143(85.1)	168	86(14.8)	497(85.2)	583	29(15.3)	160(84.7)	189	24(15.7)	91(59.5)	38(24.6)	153

**TABLE 3: Academic Performance X PTSD and Academic Performance X Harmful Use of Substances**

**TABLE 4: Odds Ratio of the association of types of trauma and PTSD with the category Low Academic Performance for first-semester and final-semester students**

VARIABLES	ODDS RATIO					
	MODEL A		MODEL B		MODEL C	
	First-semester	Final-semester	First-semester	Final-semester	First-semester	Final-semester
TYPES OF TRAUMA						
Non-sexual violence	1.10		1.08		1.06	
Victims of man-made disasters	0.68	0.94	0.68	0.94	0.84	0.95
Victims of natural disasters		0.91		0.90		0.83
Victims of life-threatening illness		0.75		0.75		0.68
Victims of other types of trauma		1.10		1.09		1.06
PTSD			1.22	1.06	1.02	1.20

Model A: Types of Trauma

Model B: Types of Trauma + PTSD

Model C: Types of Traumas + PTSD + Sociodemographic data (Age; Gender; Marital Status; Family Income; Education Father; Education Mother)

**The category Excellent Academic Performance was the reference.**

## 5. CONCLUSÕES

### - Revisão Sistemática:

- A maioria dos artigos relataram que os indivíduos acometidos por PTSD apresentam comprometimento no seu desempenho acadêmico ou em funções cognitivas, principalmente atenção e memória.

### - Artigo Original:

- Os estudantes, tanto os calouros quanto os concluintes, que vivenciaram alguns tipos de traumas (violência não sexual, vítimas de desastres provocados pelo homem, vítimas de desastres naturais, vítima de doença com risco de vida, outros tipos de traumas) e os que desenvolveram TEPT mais frequentemente apresentaram desempenho acadêmico baixo, ou seja, há um prejuízo funcional na vida universitária desses sujeitos;

- O número de concluintes (953) é inferior ao número de calouros (1260) e a frequência de TEPT é maior em concluintes (15.3%). É possível que parte dos estudantes acometidos com TEPT não chegue a concluir o curso.

- O uso nocivo de álcool ou drogas parece ser um mediador de baixo desempenho nos estudantes submetidos a experiências traumáticas.

## 6. CONSIDERAÇÕES FINAIS

O TEPT tem relação com prejuízos cognitivos heterogêneos, principalmente em memória. Os resultados do artigo original sugerem que os estudantes universitários, calouros e concluintes, que vivenciaram experiências traumáticas e desenvolveram TEPT apresentaram prejuízo no desempenho acadêmico.

A fim de avaliar um grande número de estudantes, abrimos mão do detalhamento dos nossos dados. Com isso, a avaliação de desempenho foi feita apenas com base na classificação do vestibular para os calouros e na média relatada pelos estudantes concluintes. Estes dados não nos permitem uma visão mais abrangente acerca da influência do TEPT sobre o rendimento, uma vez que outras variáveis não foram avaliadas, tais como: funções executivas, déficits cognitivos, defasagens pedagógicas, dificuldades sociais, tempo dedicado para estudo, entre outras.

No entanto, este modelo de estudo nos permitiu ter um panorama sobre o tema, necessário para compor a literatura atual, servindo como ponto inicial para novos questionamentos e estudos futuros.

Os sintomas do TEPT que ocasionam um desempenho acadêmico insuficiente podem promover o trancamento da matrícula ou sucessivas reprovações em disciplinas ou o abandono do curso. Tais situações acarretam custos para as instituições. Assim, questiona-se: se as universidades implementassem programas de acompanhamento e prevenção para os estudantes que vivenciam experiências traumáticas não seria mais prudente e econômico? Como também, programas de intervenção para aqueles que já desenvolveram TEPT ou outro transtorno psiquiátrico.

Nesse contexto, é importante considerar que a maioria desses estudantes encontra-se no início da vida adulta, período de transição, especialmente quando coincide com o ingresso na universidade. A saída de casa, a proteção dos pais, como também a mudança de dinâmica pedagógica assustam os estudantes ingressantes. Essas e as mudanças que ocorrem no percurso dos anos universitários promovem exposição a situações diversas.

Dessa maneira, pensar em estratégias de acolhimento para os estudantes ingressantes e de acompanhamento durante o percurso universitário podem ser alternativas para minimizar as consequências da vivência de experiências traumáticas. Essas estratégias são diversas e



devem considerar os aspectos sociais, culturais e econômicos de cada instituição, assim como o perfil dos estudantes.

Incluir e envolver alunos com TEPT ou que vivenciaram experiências traumáticas em programas psico-educativos, esses dependem da proposta pedagógica e estrutura de cada instituição, como também em atividades como projetos de extensão podem ser alternativas que colaborem para minimizar ou mesmo eliminar os prejuízos acadêmicos desses estudantes.

## 7. PERSPECTIVAS DE ESTUDOS

Após a finalização da pesquisa e a análise dos resultados, iniciamos a escrita de um esboço de um projeto para acompanhar os alunos calouros, das três áreas de conhecimento (Ciências Exatas/Tecnológicas; Biologia/Saúde; Ciências Humanas/Artes), até a conclusão do curso.

Esse estudo terá como objetivo principal investigar a associação entre TEPT e outros transtornos psíquicos com o desempenho acadêmico em estudantes universitários. Nossa hipótese é que os estudantes universitários que sofrem de TEPT e outros transtornos psíquicos tem o desempenho acadêmico prejudicado.

Assim, construímos a seguinte questão de pesquisa: qual a repercussão no desempenho acadêmico dos estudantes universitários acometidos por TEPT e outros transtornos psiquiátricos?

### 1. Método – Estudo Longitudinal

2. Participantes – estudantes universitários, das três áreas de conhecimento (Ciências Exatas/Tecnológicas; Biologia/Saúde; Ciências Humanas/Artes), que serão acompanhados no momento do ingresso até a conclusão do curso de graduação.

- Em cada área de conhecimento será sorteado um curso de graduação;

### 3. Variáveis de estudo:

- dados sócio-demográficos: idade; sexo; estado civil; renda familiar; cidade de origem; classificação no vestibular;

- tipos de traumas mais prevalentes vivenciados durante o período universitário;

- avaliar diagnóstico de TEPT, e outros transtornos psíquicos (serão definidos), no início do ingresso na instituição e durante os anos universitários;

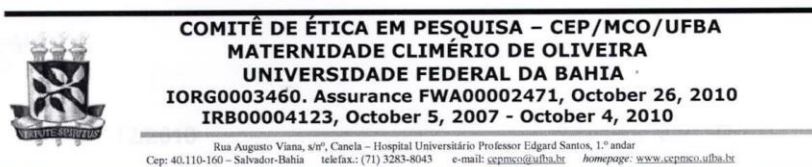
- média de notas no ensino médio através do histórico escolar;

- média de notas de cada semestre letivo cursado;

- acompanhar trancamento e abandono dos estudantes inclusos na pesquisa; (critérios de inclusão e exclusão serão definidos).

## 8. ANEXOS

## 8.1 ANEXO A – Parecer do Comitê de Ética – Bahia e Paraíba




## PARECER/RESOLUÇÃO ADITIVA N.º 227/2010

Para análise e deliberação deste Institucional o Doutor **Lucas de Castro Quarantini**, Pesquisador Responsável pelo Projeto de Pesquisa “**Características clínicas e socio-demográficas de universitários da região nordeste do Brasil expostos a experiências traumáticas**”, posto sob pendência em 04 de novembro de 2010 pelo Parecer/Resolução nº 056/2010 deste Colegiado, apresentou, em 22 de novembro de 2010, os **esclarecimentos satisfatórios**, bem como o novo “**Termo de Consentimento Livre e Esclarecido**” (TCLE). Ademais, notificou a este CEP que o referido Projeto foi contemplado com o Edital CNPq.

Inexistindo nos esclarecimentos prestados, assim como no “**TCLE**” conflito administrativo, processual e ético que contra-indiquem a conseqüente continuidade da pesquisa, ficam as mesmas **aprovadas** por esta Instância.

Salvador, 02 de dezembro de 2010

  
 Professor, Doutor, Eduardo Martins Netto  
 Coordenador – CEP/MCO/UFBA

**Observações importantes.** Toda a documentação anexa ao Protocolo proposto e rubricada pelo (a) Pesquisador (a), arquivada neste CEP, e também a outra devolvida com a rubrica da Secretária deste ao (à) mesmo (a), faz parte intrínseca deste Parecer/Resolução Aditiva e nas “Recomendações Adicionais” apensa, **bem como a impostergável entrega de relatórios parciais e final como consta nesta liberação** (Modelo de Redação para Relatório de Pesquisa, anexo).



FACULDADE SANTA MARIA  
COMITÊ DE ÉTICA EM PESQUISA  
BR. 230, KM 504, Cristo Rei, CEP 58900-000  
Cajazeiras – PB

### CERTIDÃO

Certificamos que o Projeto de Pesquisa intitulado *Características clínicas e sócio-demográficas de estudantes universitários da região Nordeste do Brasil expostos a experiências traumáticas*, do pesquisador Lucas de Castro Quarantini, foi aprovado, em reunião realizada no dia 16 de fevereiro de 2011, pelo Comitê de Ética em Pesquisa da Faculdade Santa Maria.

Cajazeiras – PB, 17 de fevereiro de 2011.

  
Josélio Santos

Coord. do Comitê de Ética em Pesquisa



## 8.2 ANEXO B – Termo de Consentimento Livre e Esclarecido



# UNIVERSIDADE FEDERAL DA BAHIA

## CURSO DE PÓS-GRADUAÇÃO EM MEDICINA E SAÚDE

Rua Augusto Viana, s/nº, 5º andar, Canela Cep.: 40110-160 Salvador, Bahia

### COLABORADORES



Universidade Federal  
de Campina Grande

### TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

#### CARACTERÍSTICAS CLÍNICAS E SOCIO-DEMOGRÁFICAS DE UNIVERSITÁRIOS DA REGIÃO NORDESTE DO BRASIL EXPOSTOS A EXPERIÊNCIAS TRAUMÁTICAS

Você está sendo convidado (a) a participar como voluntário em uma pesquisa que avalia a exposição a eventos traumáticos em estudantes universitários. Após ser esclarecido(a) sobre as informações a seguir, no caso de aceitar fazer parte do estudo, assine ao final deste documento, que está em duas vias. Uma delas é sua e a outra é do pesquisador responsável. Em caso de recusa você não será penalizado(a) de forma alguma e pode desistir a qualquer momento.

#### **1. Qual o objetivo desta pesquisa?**

Investigar uma possível mediação da impulsividade e dos fatores de resiliência entre a exposição a eventos traumáticos e o desenvolvimento de depressão e estresse pós-traumático, bem como a sua influência no rendimento acadêmico de estudantes universitários da Região Nordeste do Brasil.

#### **2. Quais os critérios para participar?**

Você deve ter idade igual ou maior que 18 anos e precisa ser aluno matriculado em um curso de graduação desta Instituição.

#### **3. O que acontecerá neste estudo?**

As avaliações, citadas acima, serão realizadas através da aplicação de questionários auto-aplicáveis com duração aproximada de 20 minutos. Os mesmos serão entregues a você e, depois de respondido, deverá ser devolvido e lacrado em um envelope, sem identificação.

#### **4. Quais as implicações em participar deste estudo?**

Este Projeto não oferece qualquer tipo de risco para os participantes. A sua colaboração neste estudo poderá proporcionar, no âmbito pessoal e no âmbito coletivo, a compreensão das vivências traumáticas no ser humano, permitindo benefícios futuros para si e para as outras pessoas.

Se posteriormente você desejar receber um atendimento clínico com base nas questões tratadas nos questionários, você pode nos procurar no endereço descrito ao final deste termo.

Todas as instituições, abaixo listadas, integram o Sistema Único de Saúde e, portanto, garantem a gratuidade do atendimento clínico, respeitando, contudo, regras e disponibilidade interna.

### **5. Quais os inconvenientes em participar deste estudo?**

Este projeto não acarretará gastos para você, nem haverá qualquer tipo de benefício financeiro para que você participe dele. Os Pesquisadores envolvidos também não serão remunerados.

### **6. Quais as garantias ao participar deste Estudo?**

Suas informações serão tratadas confidencialmente e o consentimento, contendo seu nome, será arquivado de maneira independente dos seus dados gerais. Os resultados deste estudo poderão ser enviados para publicação em jornais científicos, mas você não será identificado por nome.

### **7. Esclarecimentos.**

Em caso de dúvidas você pode falar com qualquer um dos Pesquisadores: Juliana Laranjeira, Liana Netto e Lucas Quarantini no Ambulatório Magalhães Neto, anexo do Complexo Hospitalar Universitário Professor Edgard Santos pelo tel.: (71) 3283-8381, todas as segundas-feiras, à tarde. Se houver dúvidas quanto aos seus direitos como participante, você deve contatar o Coordenador do Comitê de Ética em Pesquisa da Maternidade Climério de Oliveira pelo tel.: (71) 3283-8043 ou no endereço: Rua Augusto Viana, s/nº, no 1º andar do Complexo Hospitalar Universitário Professor Edgard Santos.

### **CONSENTIMENTO**

Eu \_\_\_\_\_ (nome completo)

RG \_\_\_\_\_, abaixo assinado, maior de 18 anos, concordo em participar do presente estudo como sujeito. Fui devidamente informado e esclarecido pelo Pesquisador \_\_\_\_\_ sobre a pesquisa e os procedimentos nela envolvidos.

Assinatura do participante: \_\_\_\_\_

Local e data: \_\_\_\_\_

Assinatura do Pesquisador: \_\_\_\_\_

Local e data: \_\_\_\_\_

### **Instituições e Serviços públicos de Saúde Mental:**

Águas Claras	CAPS II	(71) 3395-1876 / 3309-9641
Rio Vermelho	CAPS II	(71) 3611-3916
Eng. Velho de Brotas	CAPS II	(71) 3611-2956 / 3611-2952

Caminho de Areia	CAPS II	(71) 3611-6584 / 3611-6585
Alto de Coutos	CAPS I	(71) 3521- 4706 / 3521-4707
Hospital Universitário Edgard Santos	Prof.	(71) 3283-8381
Pernambués	CAPSad	(71) 3116-4699 / 3116-4617
Feira de Santana	CAPS CAPSad	(75) 3614-6595 (75) 3625-3378

## 8.3 ANEXO C – Instrumento de Pesquisa

**Características clínicas e sociodemográficas de estudantes universitários  
da Região Nordeste do Brasil expostos a experiências traumáticas**

*Suas informações serão mantidas em sigilo absoluto;*

*durante a análise dos dados nem você e nem a sua instituição poderão ser identificados.*

Somos gratos por sua participação!

**SE VOCÊ NÃO TIVER CERTEZA DE ALGUMA RESPOSTA, RESPONDA O MAIS APROXIMADAMENTE POSSÍVEL.**

1 - Cidade onde morava antes de entrar na faculdade:		UF:
2 - Data de nascimento: ____/____/____	3 - Sexo: ( ) Feminino ( ) Masculino	
4 - Estado civil: ( ) Solteiro(a) ( ) Casado(a) ( ) Divorciado(a) ( ) Viúvo(a)		
5 - Curso para o qual foi aprovado:		6 - Semestre que está cursando:
7 - Qual sua classificação neste vestibular?		
8 - Repetiu algum ano durante a escola? ( ) Não ( ) Sim <i>Se sim, quantas vezes?</i>		
9 - Nível educacional dos pais: <i>Pai:</i> ( ) 1º Grau ( ) 2º Grau ( ) Graduado ( ) Pós-graduado <i>Mãe:</i> ( ) 1º Grau ( ) 2º Grau ( ) Graduado ( ) Pós-graduado		
10 - Qual o valor que mais se aproxima da sua renda familiar? ( ) +R\$ 13.680,00 ( ) R\$ 8.930,00 ( ) R\$ 4.408,00 ( ) R\$ 912,00 ( ) R\$ 608,00 ( ) R\$ 342,00 ( ) não sei/ não quero informar		
11 - Seus pais são separados? ( ) Não ( ) Sim		<i>Em caso afirmativo, há quanto tempo?</i>
12 - No seu curso de graduação, qual sua média de notas recebida no semestre anterior? Obs: O mais aproximado possível. ( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( ) 6 ( ) 7 ( ) 8 ( ) 9 ( ) 10 ( ) Não se aplica		

**AS PERGUNTAS A SEGUIR (13 A 42) REFEREM-SE ÀS FORMAS DE AGIR E PENSAR. NÃO EXISTE RESPOSTA CERTA OU ERRADA, POIS CADA PESSOA TEM SUAS PRÓPRIAS MANEIRAS. MARQUE APENAS UMA ALTERNATIVA PARA CADA QUESTÃO: AQUELA QUE ESTIVER MAIS FORTE EM SEU PENSAMENTO.**

FORMAS DE AGIR E PENSAR	Raramente/ nunca	Às vezes	Frequen- temente	Sempre ou quase sempre
13 - Eu planejo tarefas cuidadosamente	( )	( )	( )	( )
14 - Eu faço coisas sem pensar	( )	( )	( )	( )
15 - Eu tomo decisões rapidamente	( )	( )	( )	( )
16 - Eu sou despreocupado (confio na sorte, "desencanado")	( )	( )	( )	( )
17 - Eu não presto atenção	( )	( )	( )	( )
18 - Eu tenho pensamentos que se atropelam	( )	( )	( )	( )
19 - Eu planejo viagens com bastante antecedência	( )	( )	( )	( )
20 - Eu tenho autocontrole	( )	( )	( )	( )
21 - Eu me concentro facilmente	( )	( )	( )	( )
22 - Eu economizo (poupo) regularmente	( )	( )	( )	( )
23 - Eu fico me contorcendo na cadeira em peças de teatro ou palestras	( )	( )	( )	( )
24 - Eu penso nas coisas com cuidado	( )	( )	( )	( )
25 - Eu faço planos para me manter no emprego (eu cuido para não perder meu emprego)	( )	( )	( )	( )
26 - Eu falo coisas sem pensar	( )	( )	( )	( )
27 - Eu gosto de pensar em problemas complexos	( )	( )	( )	( )
28 - Eu troco de emprego	( )	( )	( )	( )
29 - Eu ajo por impulso	( )	( )	( )	( )
30 - Eu fico entediado com facilidade quando estou resolvendo problemas mentalmente	( )	( )	( )	( )
31 - Eu ajo no "calor" do momento	( )	( )	( )	( )
32 - Eu mantenho a linha de raciocínio ("não perco o fio da meada")	( )	( )	( )	( )
33 - Eu troco de casa (residência)	( )	( )	( )	( )
34 - Eu compro coisas por impulso	( )	( )	( )	( )



<b>FORMAS DE AGIR E PENSAR</b>	<i>Raramente/ nunca</i>	<i>Às vezes</i>	<i>Frequen- temente</i>	<i>Sempre ou quase sempre</i>
35 - Eu só consigo pensar em uma coisa de cada vez	( )	( )	( )	( )
36 - Eu troco de interesses e passatempos ("hobby")	( )	( )	( )	( )
37 - Eu gasto ou compro a prestação mais do que ganho	( )	( )	( )	( )
38 - Enquanto estou pensando em uma coisa, é comum que outras idéias me venham à cabeça ou ao mesmo tempo	( )	( )	( )	( )
39 - Eu tenho mais interesse no presente do que no futuro	( )	( )	( )	( )
40 - Eu me sinto inquieto em palestras ou aulas	( )	( )	( )	( )
41 - Eu gosto de jogos e desafios mentais	( )	( )	( )	( )
42 - Eu me preparo para o futuro	( )	( )	( )	( )

**A SÉRIE DE PERGUNTAS A SEGUIR (43 A 66) DIZ RESPEITO A EVENTOS GRAVES OU TRAUMÁTICOS DURANTE A VIDA. PARA CADA EVENTO QUE VOCÊ RESPONDER "SIM", POR FAVOR, PREENCHA OS QUADROS À DIREITA. LEMBRE-SE: SE NÃO TIVER CERTEZA DE ALGUMA RESPOSTA, RESPONDA O MAIS APROXIMADAMENTE POSSÍVEL.**

<b>EVENTOS RELACIONADOS A CRIME</b>		<b>Em caso afirmativo</b>	
		<b>nº de vezes</b>	<b>Idade Aproximada</b>
43 - Alguém já tentou tirar alguma coisa diretamente de você usando força ou ameaça de força, tal como assalto a mão armada ou furto?	<b>Não Sim</b> ( ) ( )		
44 - Alguém já tentou roubá-lo (a) ou de fato o (a) roubou (i.e. furtou seus objetos pessoais)?	<b>Não Sim</b> ( ) ( )		
45 - Alguém já tentou invadir ou de fato invadiu sua casa quando você não estava lá?	<b>Não Sim</b> ( ) ( )		
46 - Alguém já tentou invadir ou de fato invadiu sua casa enquanto você estava lá?	<b>Não Sim</b> ( ) ( )		
<b>DESASTRES EM GERAL E TRAUMA</b>		<b>Em caso afirmativo</b>	
		<b>especificar</b>	<b>nº de vezes</b>
47 - Você já sofreu algum acidente grave no trabalho, num carro ou em qualquer outro lugar?	<b>Não Sim</b> ( ) ( )	acidente:	
48 - Você já passou por algum desastre natural, do tipo deslizamento de terra, enchente, tempestade, terremoto, etc., durante o qual você ou pessoas queridas corriam perigo de vida ou ferimento?	<b>Não Sim</b> ( ) ( )	desastre:	
49 - Você já passou por algum desastre causado pelo homem, tal como choque de um trem, desmoronamento de um prédio, assalto a banco, incêndio, etc., durante o qual você percebeu que você ou pessoas queridas corriam perigo de vida ou ferimento?	<b>Não Sim</b> ( ) ( )	desastre:	
50 - Você já foi exposto(a) a radioatividade ou a agentes químicos perigosos que pudessem ameaçar a sua saúde?	<b>Não Sim</b> ( ) ( )	tipo:	
51 - Você já esteve em qualquer outra situação na qual você foi gravemente ferido(a)?	<b>Não Sim</b> ( ) ( )	tipo:	
<b>DESASTRES EM GERAL E TRAUMA</b>		<b>Em caso afirmativo</b>	
		<b>especificar</b>	<b>nº de vezes</b>
52 - Você já esteve em qualquer outra situação na qual você teve medo porque poderia ter sido morto(a) ou gravemente ferido(a)?	<b>Não Sim</b> ( ) ( )	tipo:	
53 - Você já viu alguém ser gravemente machucado ou morto?	<b>Não Sim</b> ( ) ( )	quem:	
54 - Você já viu cadáveres (excluindo em funerais) ou teve que tocar em cadáveres por qualquer motivo?	<b>Não Sim</b> ( ) ( )	quem:	

DESASTRES EM GERAL E TRAUMA		Em caso afirmativo			
		especificar	nº de vezes	Idade Aproximada	
55 - Você já teve algum amigo próximo ou membro da sua família assassinado ou morto por um motorista bêbado?	Não Sim ( ) ( )	quem:			
56 - Você já perdeu (por morte) um cônjuge, companheiro(a) (namorado(a) ou filh(a))?	Não Sim ( ) ( )	quem:			
57 - Você já sofreu de uma doença grave ou que pusesse em risco sua vida?	Não Sim ( ) ( )	qual:			
58 - Você já recebeu a notícia de que alguém próximo a você foi gravemente ferido, teve doença que ameaçou a vida ou morreu de forma inesperada?	Não Sim ( ) ( )	quem:			
59 - Você já teve que tomar parte num combate quando estava no serviço militar num território de guerra oficial ou não oficial?	Não Sim ( ) ( )	tipo:			
EXPERIÊNCIAS FÍSICAS E SEXUAIS		Em caso afirmativo			
		Quem foi a pessoa? (ex. abaixo)	Esta experiência repetiu-se?	Quantas vezes	Idade(s) Aproxim.(s)
60 - Alguém já o(a) abrigou a ter relações sexuais ou sexo anal ou oral contra a sua vontade?	Não Sim ( ) ( )		Não Sim ( ) ( )		
61 - Alguém já tocou em partes íntimas do seu corpo ou o(a) obrigou a tocar nas dele(a), sob força ou ameaça?	Não Sim ( ) ( )		Não Sim ( ) ( )		
62 - Além dos incidentes mencionados nas questões 60 e 61, já houve outras situações nas quais outra pessoa tentou forçá-lo(a) a ter contato sexual contra a sua vontade?	Não Sim ( ) ( )		Não Sim ( ) ( )		
63 - Alguém, incluindo membros da sua família ou amigos, já o(a) atacou usando um revólver, uma faca ou qualquer outra arma?	Não Sim ( ) ( )		Não Sim ( ) ( )		
64 - Alguém, incluindo membros da sua família ou amigos, já o(a) atacou desarmado e o(a) feriu gravemente?	Não Sim ( ) ( )		Não Sim ( ) ( )		
65 - Alguém da sua família já lhe bateu, espancou ou empurrou com força suficiente para causar ferimento?	Não Sim ( ) ( )		Não Sim ( ) ( )		

(*Quem foi a pessoa?* Exemplo: estranho, amigo, parente, pai ou mãe, irmão ou outro)

OUTROS EVENTOS		Em caso afirmativo			
		Qual o tipo de evento?	Esta experiência repetiu-se?	Quantas vezes	Idade(s) Aproxim.(s)
66 - Você já passou por alguma outra situação ou evento extraordinariamente traumáticos que não foram abordados nas questões acima?	Não Sim ( ) ( )		Não Sim ( ) ( )		

**DENTRE AS PERGUNTAS ANTERIORES (43 A 66), CIRCULE A EXPERIÊNCIA QUE VOCÊ CONSIDERA DE MAIOR GRAVIDADE. CIRCULE O NÚMERO.**

ABAIXO, HÁ UMA LISTA DE PROBLEMAS E DE QUEIXAS QUE AS PESSOAS ÀS VEZES APRESENTAM COMO UMA REAÇÃO A SITUAÇÕES DE VIDA TRAUMÁTICAS. CONSIDERANDO O ITEM QUE VOCÊ CIRCULOU ANTERIORMENTE COMO SENDO O DE MAIOR GRAVIDADE, NA SÉRIE DE PERGUNTAS A SEGUIR (67 a 83), INDIQUE O QUANTO VOCÊ FOI INCOMODADO NO ÚLTIMO MÊS.

Por favor, marque: (1 para 'nada'), (2 para 'um pouco'), (3 para 'médio'), (4 para 'bastante') e (5 para 'muito').

PROBLEMAS/QUEIXAS	Nada	Um pouco	Médio	Bastante	Muito
67 - <i>Memória, pensamentos e imagens</i> repetitivos e perturbadores referentes a uma experiência estressante do passado?	1	2	3	4	5
68 - <i>Sonhos</i> repetitivos e perturbadores referentes a uma experiência estressante no passado?	1	2	3	4	5
69 - De repente, <i>agir</i> ou <i>sentir</i> como se uma experiência estressante do passado estivesse acontecendo de novo (como se você a estivesse revivendo)?	1	2	3	4	5
70 - Sentir-se <i>muito chateado</i> ou <i>preocupado</i> quando alguma coisa lembra você de uma experiência estressante do passado?	1	2	3	4	5
71 - Sentir <i>sintomas físicos</i> (por exemplo, coração batendo forte, dificuldade de respirar, suores) quando alguma coisa lembra você de uma experiência estressante do passado?	1	2	3	4	5
72 - Evitar <i>pensar</i> ou <i>falar sobre</i> uma experiência estressante do passado ou evitar <i>ter sentimentos</i> relacionados a esta experiência?	1	2	3	4	5
73 - Evitar <i>atividades</i> ou <i>situações</i> porque <i>elas lembram</i> uma experiência estressante do passado?	1	2	3	4	5
74 - Dificuldades para <i>lembrar-se de partes importantes</i> de uma experiência estressante do passado?	1	2	3	4	5
75 - <i>Perda de interesse</i> nas atividades que você antes costumava gostar?	1	2	3	4	5
76 - Sentir-se <i>distante</i> ou <i>afastado</i> das outras pessoas?	1	2	3	4	5
77 - Sentir-se <i>emocionalmente entorpecido</i> ou <i>incapaz</i> de ter sentimentos amorosos pelas pessoas que lhe são próximas?	1	2	3	4	5
78 - Sentir-se como se você <i>não tivesse expectativas para o futuro?</i>	1	2	3	4	5
79 - Ter problemas para <i>pegar no sono</i> ou para <i>continuar dormindo?</i>	1	2	3	4	5
80 - Sentir-se <i>irritável</i> ou ter <i>explosões de raiva?</i>	1	2	3	4	5
81 - Ter <i>dificuldades</i> para se <i>concentrar?</i>	1	2	3	4	5
82 - Estar <i>'superalerta', vigilante</i> ou <i>'em guarda'?</i>	1	2	3	4	5
83 - Sentir-se <i>tenso</i> ou facilmente <i>sobressaltado?</i>	1	2	3	4	5

**VOCÊ LEMBRA COM FREQUÊNCIA, DE ALGUM(S) DOS EVENTOS LISTADOS A SEGUIR (PERGUNTAS 84 A 86) OCORRIDOS EM SUA CASA, DURANTE A SUA INFÂNCIA, PUBERDADE OU ADOLESCÊNCIA? PARA CADA RESPOSTA AFIRMATIVA, COMPLETE OS QUADROS À DIREITA.**

EVENTOS		Grau de parentesco	nº de vezes	Idade(s) Aproxim.(s)
84 - Alguém costumava lhe tratar com expressões que faziam você se sentir desprezado ou humilhado?	Não Sim ( ) ( )			
85 - Alguém costumava exigir que você executasse tarefas, as quais você achava que estavam além das suas condições de realizá-las?	Não Sim ( ) ( )			
86 - Alguém costumava ameaça-lo(a) dizendo que poderia abandona-lo(a) ou mata-lo(a)?	Não Sim ( ) ( )			

**POR FAVOR, RESPONDA AS QUESTÕES ABAIXO, E COMPLETAS AS RESPOSTAS DA QUESTÃO 87, CASO TENHA ASSINALADO ALGUM ITEM.**

<b>87 - Dentre as substâncias listadas abaixo, assinale quais as que você usou ou faz uso atualmente. Para cada item assinalado, complete as respostas que seguem:</b>	
( ) <b>Álcool</b>	Qual a idade (aproximada) que usou pela primeira vez? (Não simplesmente provar do copo de alguém) ____ anos Qual a frequência de uso: ( ) diário ( ) semanal ( ) mensal ( ) às vezes
( ) <b>Cigarro</b>	Qual a idade (aproximada) que usou pela primeira vez? ____ anos Qual a frequência de uso: ( ) diário ( ) semanal ( ) mensal ( ) às vezes
( ) <b>Inalantes (lança-perfume)</b>	Qual a idade (aproximada) que usou pela primeira vez? ____ anos Qual a frequência de uso: ( ) diário ( ) semanal ( ) mensal ( ) às vezes
( ) <b>Maconha</b>	Qual a idade (aproximada) que usou pela primeira vez? ____ anos Qual a frequência de uso: ( ) diário ( ) semanal ( ) mensal ( ) às vezes
( ) <b>Ecstasy/LSD</b>	Qual a idade (aproximada) que usou pela primeira vez? ____ anos Qual a frequência de uso: ( ) diário ( ) semanal ( ) mensal ( ) às vezes
( ) <b>Cocaína</b>	Qual a idade (aproximada) que usou pela primeira vez? ____ anos Qual a frequência de uso: ( ) diário ( ) semanal ( ) mensal ( ) às vezes
( ) <b>Crack</b>	Qual a idade (aproximada) que usou pela primeira vez? ____ anos Qual a frequência de uso: ( ) diário ( ) semanal ( ) mensal ( ) às vezes
<b>88 - Pense em todas as vezes que você usou bebida alcoólica nos últimos 12 meses. Quantos copos em média você bebeu nessas ocasiões? _____</b>	
<b>89 - Nos últimos 12 meses quantas vezes você ficou bêbado ou "muito alto" por álcool?</b>	
( ) Nenhuma ( ) 1 ou 2 vezes ( ) Entre 2 e 11 vezes ( ) 1 vez por mês ( ) 2 a 3 vezes por mês ( ) 1 ou 2 vezes por semana ( ) 3 a 5 vezes por semana ( ) Todos ou quase todos os dias ( ) Não sei ( ) Me recuso a responder	
<b>90 - Você já fez algo por estar bebendo que se arrependeu depois? ( ) Não ( ) Sim</b> Se sim, quantas vezes? ( ) 01 ( ) 02 ( ) 03 a 04 ( ) 05 ou + ( ) não sei ( ) me recuso a responder	
<b>91 - Você já se envolveu em luta física, acidente de carro, ou outras situações com conseqüências negativas por estar bebendo? ( ) Não ( ) Sim</b> Se sim, quantas vezes? ( ) 01 ( ) 02 ( ) 03 a 04 ( ) 05 ou + ( ) não sei ( ) me recuso a responder	
<b>92 - Você já transou sem camisinha (preservativo) em relações sexuais com parceiros não estáveis (que você tenha conhecido recentemente)? ( ) Não ( ) Sim</b>	
<b>93 - Ao longo da sua vida, você já pensou seriamente alguma vez em cometer suicídio?</b> ( ) Não ( ) Sim ( ) não sei ( ) me recuso a responder	
<b>94 - Ao longo da sua vida, quantas vezes você já tentou, de fato, cometer suicídio?</b> ( ) nenhuma ( ) 01 ( ) 02 ( ) 03 a 04 ( ) 05 ou + ( ) não sei ( ) me recuso a responder	

#### 8.4 ANEXO D - Resumos Publicados em Anais de Congressos

**IX Congresso Brasileiro de Psicopedagogia – ABPP e I Simpósio Internacional de Neurociências, Saúde Mental e Educação – CEPP. De 05 a 08 de julho de 2012. São Paulo – SP**

**Tema:** Trabalho psicopedagógico:  
contribuições, releituras e autorias

**Título: O projeto pedagógico como estratégia  
para prevenção das dificuldades de  
aprendizagem**

**Autor:** Juliana Laranjeira Pereira dos Santos

#### **RESUMO**

O estudo em pauta é referente a uma Dissertação de Mestrado, já defendida, que teve como objetivo investigar a proposta de prevenção das dificuldades de aprendizagem no projeto pedagógico de uma escola pública municipal de Salvador. Para investigar a problemática, foram utilizados, como aporte teórico, fundamentos e conceitos de estudiosos da gestão escolar democrática: Lima (2000); Paro (2000) e, no campo da aprendizagem humana: Visca e Visca (1999); Piaget (1983 e 1995) e Fonseca (1995). Para trilhar o percurso investigativo, consideramos a abordagem metodológica qualitativa do estudo de caso como pertinente para investigar o fenômeno educacional enfocado. Para obtenção dos dados, foram aplicados: entrevista semi-estruturada e a análise documental do Projeto Político Pedagógico (2002) e do Regimento Escolar (2005). Além do diário de campo, espaço para

**IX Congresso Brasileiro de Psicopedagogia – ABPP e I Simpósio Internacional de Neurociências, Saúde Mental e Educação – CEPP. De 05 a 08 de julho de 2012. São Paulo – SP**

**Tema: Saúde Mental e Escola**

**Título: Impacto de experiências traumáticas e do transtorno do estresse pós-traumático (TEPT) no desempenho acadêmico de estudantes universitários da Região Nordeste do Brasil**

**Autor:** Juliana Laranjeira Pereira dos Santos

**Coautores:** Liana R. Netto; José Rômulo Feitosa;  
Deivson F. Mundim; Rejane C. Santana;  
Lilian Verena S. Carvalho; Susan Carvalho;  
Reinilza Nunes; Wesley Batista;  
Lucas C. Quarantini

**RESUMO**

Estudos voltados para a investigação de experiências traumáticas em alunos universitários ainda são escassos no Brasil, assim como a consequente repercussão que a violência pode ter no desempenho acadêmico desses indivíduos. Dessa maneira, surgiu o interesse em se realizar uma pesquisa com a referida população, avaliando a exposição a eventos traumáticos durante a graduação, mas, principalmente, objetivando mensurar o impacto que tais eventos, prévios e durante o curso universitário terão no desempenho acadêmico formal. Os trabalhos identificados na literatura investigando estudantes universitários conduzidos no Brasil são, em sua grande maioria, relacionados ao desempenho da leitura e escrita. Identificamos, entretanto, farta literatura referente ao tema em outros países, não somente com as temáticas citadas anteriormente, como também,

## XXI European Congress of Psychiatry 2013 – 06 a 09 de abril 2013 – Nice, França.

Article: 2017

Topic: 48 - Epidemiology and Social Psychiatry

**CLINICAL AND SOCIO-DEMOGRAPHIC CHARACTERISTICS OF COLLEGE STUDENTS IN THE NORTHEAST OF BRAZIL EXPOSED TO TRAUMATIC EXPERIENCES: A PREVALENCE CENSUS STUDY PROTOCOL**

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<sup>1</sup>Federal University of Bahia, Salvador, <sup>2</sup>Federal University of Campina Grande, Cajazeiras, Brazil

**Background:** Adolescence and early adulthood are the most vulnerable period of life for exposure to traumatic experiences (70% of their deaths are due to external causes). The Post Traumatic Stress Disorder (PTSD) is characterized by dysfunctional symptoms that cause distress or social, academic and occupational impairment, and results from exposure to a traumatic stressor. There is no consensus in the literature about why some individuals experience PTSD after traumatic events and not others. The aim of this multicentre study is to describe clinical and socio-demographic characteristics and academic performance in college student's population in the Northeast of Brazil, identifying traumatic experiences exposure patterns, and investigating the impulsivity's influence in the development of PTSD, as well as the impact of early traumatic experiences in vulnerability or resilience in this population.

**Methods/design:** 2282 subjects completed the protocol between April and July 2011 in a sample census of seven (public and private) college institutions in three metropolitan regions of the Brazilian Northeast, aiming to cover different academic areas (exact, biological, humanities /arts). All students aged 18 or older, enrolled and attending to the first and last theoretical period were eligible, and assessed by previously trained researchers. The self applied protocol consisted of socio-demographic questionnaire and validated scales of: Impulsivity (BIS-11), PTSD (PCL-C) and Trauma History Questionnaire (THQ). Data were entered into SPSS 15.0. Prevalence Ratio and Logistic Regression technique will be used to analyze the association between dependent and independent variables of the study, that was approved by Bahia and Paraíba's ethics committees.

XXX ISTSS Annual Meeting (Resumo 1) – 06 a 08 de novembro, 2014 – Miami, Florida, EUA.

THU 254

Impulsivity Pattern of College Students of the Brazilian Northeast: a Census Study  
(Abstract #1914)

Poster #THU 254 (Practice, Anx, Assess Dx, Adult) A • Latin Amer & Carib Mezzanine East/West/South

*Netto, Liama, Doctoral Student<sup>1</sup>, Cavalcanti-Ribeiro, Patricia, MD<sup>1</sup>, Pereira, Juliana, MSc<sup>2</sup>, Mundim, Deivson, MD<sup>1</sup>, Santana, Rejane, MA<sup>3</sup>, Quarantini, Lucas, MD, PhD<sup>4</sup>*

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Background: Impulsivity is a relevant construct to explaining both normal individual differences in personality and more extreme personality pathology, and is usually investigated among clinical population. This study aims to explore the impulsivity pattern and to investigate the association between levels of impulsivity with trauma exposure and subsequent PTSD development in a non-clinical population. Methods: census study; 2213 subjects from 7 college institutions of 3 metropolitan Northeastern Brazilian regions. Instruments used: Socio-demographic questionnaire; THQ; PCL-C; BIS-11. Results: 308 (14%) individuals presented lower level of impulsivity (BIS-11 < 52), 348 (15.9%) presented higher impulsivity (BIS-11 > 71), and 1531 (70.1%) presented normal limit for impulsivity (BIS-11 total scores between 52-71). The median for frequency of trauma exposure was 4 events for low and normal impulsive people, and 6 for high impulsive ones. Individuals with higher impulsivity presented earlier exposition, and worst outcome (12.4% with PTSD, against 8.4% and 2.3% for normal and low impulsive ones). Individuals with lower impulsivity presented high frequency of non-sexual violence. Conclusion: Results suggest that impulsivity is a relevant trait also in a non-clinical population and is associated with trauma exposure and PTSD. Strategies aiming to manage impulsivity are a crucial need.



XXX ISTSS Annual Meeting (Resumo 2) – 06 a 08 de novembro, 2014 – Miami, Florida, EUA.

THU 344

The Impact of Parental Educational Level on Development of Post-Traumatic Stress Disorder (PTSD) in Offspring: A Census Study in College Students of the Brazilian Northeast  
(Abstract #1885)

Poster #THU 344 (CulDiv, Cul Div, Pub Health, Social, Adult) A - Latin Amer & Mezzanine  
Carib East/West/South

*Netto, Liana, Doctoral Student<sup>1</sup>, Pereira, Juliana, MSc<sup>2</sup>, Cavalcanti-Ribeiro, Patricia, MD<sup>1</sup>, Nogueira, Jose Romulo, PhD<sup>3</sup>, Santos, Lene, MA<sup>4</sup>, Quarantini, Lucas, PhD<sup>1</sup>*

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**Background:** There is consistent evidence regarding the role that parents have on the mental health of their offspring; however, little has been studied about the relationship between parental educational level and its effect on their children's exposure to traumatic situations and subsequent development of PTSD. This study intends to investigate the impact of parental educational level on PTSD development in their offspring. **Methods:** cross-sectional population-based study; 2213 subjects from 7 college institutions of 3 metropolitan Northeastern Brazilian regions completed the protocol. All students aged 18 or older, attending the first and last semesters were eligible, and assessed through a self-applied protocol. Data were entered into SPSS 17.0. Prevalence was determined using crosstabulation. **Results:** The educational level of the students' parents was predominantly basic elementary, directly proportional to the experiencing of traumatic events by their offspring, and inversely proportional to the probability of their offspring having PTSD. Mothers presented a higher level of education, but a lower education level of the father was associated with higher prevalence of PTSD. **Conclusion:** The study highlights the importance of effective public health actions in relation to primary prevention of PTSD, with parent inclusion for increasing of parentification resources.

XXX ISTSS Annual Meeting (Resumo 3) – 06 a 08 de novembro, 2014 – Miami, Florida, EUA.

**FRI 310**

**Life-Threatening Illness as a Traumatic Experience to the Development of PTSD: A Census Study in College Students of the Brazilian Northeast**  
(Abstract #1400)

Poster #FRI 310 (Assess Dx, Assess Dx, Clinical Practice, Illness, Adult) M • Latin Mezzanine  
Amer & Carib East/West/South

*Cavalcanti-Ribeiro, Patrícia, MD<sup>1</sup>, Netto, Liana, Doctoral Student<sup>1</sup>, Pereira, Juliana, MSc<sup>2</sup>, Braga, Carolina, MD<sup>1</sup>, Freitas, Lucas, MD<sup>1</sup>, Quarantini, Lucas, PhD<sup>1</sup>*

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**Background:** A variety of life-threatening illnesses are recognized as traumatic events that can induce PTSD, such as acute coronary syndrome, cancer, HIV and asthma. However, most previous studies related to this subject were performed in clinical samples. The aim of this study is to describe clinical and socio-demographic characteristics of college students exposed to life-threatening illness. **Methods:** A population of 2213 students from seven college institutions was assessed through a socio-demographic questionnaire, the Trauma History Questionnaire (THQ) and the PTSD symptoms scale (PCL-C). All students aged 18 or older, attending the first and last academic period, were eligible. **Results:** Approximately 10.3% of the students perceived life-threatening illness as a traumatic experience; they were mostly women (58.5%), single (76.4%) with a mean age of 24.6 (SD 7.1). The prevalence of life-threatening illness-induced PTSD was 26.2%, lower than sexual violence-induced PTSD (34.1%) and natural disaster-induced PTSD (29.2%), but higher than all other kinds of traumatic experience, according to THQ. **Conclusion:** The high prevalence of life-threatening illness-induced PTSD suggests the importance of more studies about this type of traumatic event in different settings.

**XXX ISTSS Annual Meeting (Resumo 4) – 06 a 08 de novembro, 2014 – Miami, Florida, EUA.**

**FRI 309**

**HCV as a Traumatic Experience: PTSD and Impact on the Quality of Life**  
(Abstract #927)

**Poster #FRI 309 (Assess Dx, Illness, QoL, Adult) M - Latin Amer & Carib      Mezzanine East/West/South**

*Morais-de-Jesus, Mychelle, Doctoral Student<sup>1</sup>, Cavalcanti-Ribeiro, Patricia, MD<sup>1</sup>, Netto, Liana, Doctoral Student<sup>1</sup>, Pereira, Juliana, MSc<sup>2</sup>, Freitas, Lucas, MD<sup>1</sup>, Quarantini, Lucas, PhD<sup>1</sup>*

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**Background:** The Hepatitis C virus (HCV) has been associated with psychiatric comorbidities and significant impairment of quality of life (QoL). However, despite also significantly affecting the QoL of individuals, Post-Traumatic Stress Disorder (PTSD) has not been well studied in this population. The purpose of this study was to evaluate whether individuals perceive their liver disease as a potentially traumatic experience. Additionally, we investigated the impact of PTSD diagnosis on health-related QoL in HCV-infected subjects. **Methods:** We conducted a cross-sectional survey of 127 consecutive HCV-infected outpatients recruited at a University Hospital in Salvador, Brazil. All subjects were assessed throughout a socio-demographic questionnaire, the Trauma History Questionnaire, the Mini International Neuropsychiatric Interview-Brazilian Version 5.0.0 and Short-Form 36. **Results:** Approximately 38.6% of the patients perceived HCV as a traumatic experience. Of these, 60.7% had PTSD diagnosis. PTSD was associated with significant impairment in QoL of individuals in seven of the eight SF-36 domains as shown by bivariate and multivariate analysis. This difference remained significant after adjustment for covariates such as major depressive disorder comorbidity. **Conclusion:** The results suggest a high prevalence of PTSD diagnosis in HCV infected patients and impairment of their QoL.

**XXX ISTSS Annual Meeting (Resumo 5) – 06 a 08 de novembro, 2014 – Miami, Florida, EUA.**

**FRI 311**

**Age of First Drink, PTSD and Alcohol Use and other Substance Use among College Students from Seven Institutions in Northeastern Brazil**

(Abstract #1835)

Poster #FRI 311 (Assess Dx, CSA, DV, Prevent, Sub/Abuse, Adult) M - Latin Amer & Carib

Mezzanine East/West/South

*Santos, Lene, MA<sup>1</sup>, Netto, Liana, Doctoral Student<sup>2</sup>, Pereira, Juliana, MSc<sup>3</sup>, Santana, Rejane, MA<sup>1</sup>, Quarantini, Lucas, PhD<sup>2</sup>*

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The early onset of alcohol use can insert the individual in contexts that promote and sustain dysfunctional behavioral patterns, leading to exposure to trauma and PTSD. In addition, it may be the first step in the use of other harmful substances. The relationship between these important variables is still not established. This study aimed to evaluate the association between PTSD and age at first drink (IPD) in 2213 college students of Northeastern Brazil. Data were collected through a socio-demographic questionnaire, the trauma history questionnaire (THQ) and Checklist-Civilian Version (PCL - C). The IPD showed a significant and strong correlation with the harmful use of alcohol ( $p < 0.05$ ). Of those who had PTSD, 19 % of men had very early IPD (<13 years), while 13 % had late IPD. In conclusion, subjects with earlier IPD are more likely to be associated with PTSD, specifically among males, and more likely to perform harmful use of alcohol in adulthood.

**XXX ISTSS Annual Meeting (Resumo 6) – 06 a 08 de novembro, 2014 – Miami, Florida, EUA.**

**THU 272**

**Prevalence of Post-Traumatic Stress Disorder in a College Student Population in Different Academic Areas of Study, in Northeastern Brazil**

(Abstract #1072)

**Poster #THU 272 (Prevent, Acc/Inj, Nat/Dis, Surv/Hist, Adult) A - Latin Amer & Mezzanine East/West/South**

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Several studies showed a higher prevalence of PTSD among college students from Human Sciences/Arts courses. Objective: To identify types of trauma and PTSD prevalence in a university student population in different fields of study (Exact Sciences/Technology; Biology/Health; Human Sciences/Arts) in Northeastern Brazil. Method: A census study was conducted in three metropolitan areas in Northeastern Brazil, with students aged 18 or older from seven universities. The students were registered in college courses, in the first and last semesters, and attended lecture halls. The instruments used were: Socio-demographic questionnaire; Trauma History Questionnaire (THQ)

and; a PTSD symptoms scale (PCL-C). The data were entered in the SPSS, version 17.0. The total number of protocols filled out was 2213. About 14% of the students presented PTSD diagnosis (PCL > 45): Exact Sciences/Technology 14.9%, Human Sciences/Arts (14.5%), and Biology/Health (12%). These data showed that PTSD prevalence was quite similar among students from different academic areas in Northeastern Brazil, the most violent place of this country. Consequently, mental health professionals must be vigilant to detect PTSD in all college students.

XXXI ISTSS Annual Meeting (Resumo 1) – 05 a 07 de novembro, 2015 – New Orleans, Louisiana, EUA

Program Preview

**Barratt Impulsivity Factors and PTSD Risk in College Students**

Netto Liana<sup>1</sup>, Pereira Juliana<sup>2</sup>, Cavalcanti-Ribeiro Patricia<sup>1</sup>, LIRA SIDNEI<sup>3</sup>, Santos Lene<sup>4</sup>, Quarantini Lucas<sup>5</sup>

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**Abstract Body:** Barratt proposed one of the most influential models in the explanation of impulsive behavior, and the first and most widely self-report measure of impulsiveness. The BIS scale was designed to measure 3 theoretical subtraits of impulsivity: Attentional, Motor, Non-Planning (NP). The majority of studies using BIS-11 have ignored the second-order subscale, leading to a less accurate perspective in the characterization of an individual impulsiveness, and its relationship with different disorders. We investigated the association between impulsivity factors and risk for PTSD in a non-clinical population: 2213 subjects from 7 college institutions of 3 metropolitan Brazilian regions. Instruments: Socio-demographic questionnaire; THQ; PCL-C; BIS-11. Among the three factors of impulsivity, the Attentional presented the highest vulnerability for PTSD development (OR: 2.27; 95% CI 1.60 - 3.21); 48% of the students who were classified as more attentionally impulsive presented PTSD. Higher levels of the NP factor did not show a considerable risk for PTSD. A lower Motor impulsivity level was frequent and was associated with lower prevalence of PTSD. Attentional factor could be a general process underlying personality trait of impulsiveness. Strategies to improve the Attentional system in young adults could be helpful to manage impulsivity and prevent mental illness.

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XXXI ISTSS Annual Meeting (Resumo 2) – 05 a 07 de novembro, 2015 – New Orleans, Louisiana, EUA.

Program Preview

**Impulsivity, Risk Taking Behaviors and PTSD in a College Population**

**Netto Liana**<sup>1</sup>, Pereira Juliana<sup>2</sup>, Cavalcanti-Ribeiro Patricia<sup>1</sup>, Guedes Gisela<sup>3</sup>, Nogueira Jose Romulo<sup>4</sup>, Quarantini Lucas<sup>5</sup>

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**Abstract Body:** Individual differences in the tendency to restrain impulses, due to different aspects of impulsivity, underlie a wide range of psychiatric disorders such as substance abuse, suicide, eating disorders, personality disorders, bipolar disorder, anti-social behavior (Links et al, 1999) as well as other potentially risky behavior, as get in fight, break the law, engage in sexual risky behavior (Krueger et al, 2007). The aim of this study is to investigate the association between Impulsivity patterns based on BIS-11 cut-off with risk-take behaviors and PTSD. Methods: census study; 2213 subjects from 7 college institutions of 3 metropolitan Northeastern Brazilian regions. Instruments used: Clinical and Socio-demographic questionnaire; THQ; PCL-C; BIS-11. Results: Students with high impulsivity had about six times more PTSD than students with low impulsivity (12.4% to 2.3%). Among higher impulsivity subjects was also observed increased attempted suicide (14.8% to 2.9%), sexual risk behavior (26.7% to 7.1%) and alcohol daily use (1.6% to 0%) in comparison with normal impulsive ones. Conclusion: Results suggest that impulsivity is a relevant trait also in a non-clinical population, increasing the prevalence of PTSD and risky behaviors. Screening for impulsivity could be important strategy to prevent PTSD and deleterious consequences of it in the student's life span.

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XXXI ISTSS Annual Meeting (Resumo 4) – 05 a 07 de novembro, 2015 – New Orleans, Louisiana, EUA

Program Preview

**Life-threatening illness-related Posttraumatic Stress Disorder: a case-control study**

Cavalcanti-Ribeiro Patricia<sup>1</sup>, Netto Liana<sup>2</sup>, Pereira Juliana<sup>3</sup>, Nogueira Jose Romulo<sup>4</sup>, Morais-de-Jesus Mychelle<sup>2</sup>, Quarantini Lucas<sup>5</sup>

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**Abstract Body:** The aim of this study enrolling college students is to identify significant socio-demographic and clinical features associated with Posttraumatic Stress Disorder (PTSD) for those subjects who have had life-threatening illness (LTI) as a traumatic event (TE). We performed a population-based matched case-control study. 58 students who had experienced LTI with PTSD were individually matched to 58 students without PTSD according to other TE. Bivariate and Multivariate Conditional Logistic Regression was applied for data analysis. The prevalence of PTSD among the students that experienced LTI as a traumatic event was 25.9%. Female gender (OR 3.53; 95%CI 1.24–10.06) and a past of poor school performance (OR 6.34; CI 1.69–23.7) were associated to PTSD, even after multivariate analysis. The association between PTSD and attempted suicide was significant in bivariate analysis (OR 3.89; 95%CI 1.26–12.01) and when adjusted for gender (OR 3.89; 95%CI 1.26–12.01). The high prevalence of PTSD suggests that strong consideration should be given to LTI as a qualifying TE to development of PTSD. In addition, patients need be carefully screened for suicidal behavior. The findings about school performance indicate the importance of investigating cognitive processes in a person's responses to traumatic experience.

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## 8.5 ANEXO E – Artigos Publicados Durante a Pós-graduação

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PLOS ONE

## Clinical and Socio-Demographic Characteristics of College Students Exposed to Traumatic Experiences: A Census of Seven College Institutions in Northeastern Brazil

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### Abstract

**Background:** Epidemiological studies show that most of the adult population will be exposed to at least one potentially traumatic event in the course of his/her life; adolescence and early adulthood are the most vulnerable periods of life for exposure to traumatic experiences (70% of their deaths are due to external causes). Posttraumatic Stress Disorder is characterized by the development of dysfunctional symptoms that cause distress or social, academic, or occupational impairment, as result of exposure to a traumatic event. The aim of this multicentric study is to establish the proportion of college students, within seven institutions in Northeastern Brazil, who were exposed to traumatic experience and met PTSD criteria.

**Methods/Design:** A one-phase census protocol of seven college institutions in three metropolitan regions in Northeastern Brazil was performed (April to July 2011). All students aged 18 years or older, matriculated and attending their first or final semester were eligible. The self-applied protocol consisted of a socio-demographic questionnaire and the following scales adjusted to Brazilian Portuguese standards Trauma History Questionnaire (THQ), PTSD Checklist-Civilian (PCL-C), Impulsivity Scale (BIS-11). Data were entered into SPSS 17.0.

**Results:** 2213 (85.5%) students consented to participate, and completely filled in the protocols. Of these, 66.1% were woman, mean age 23.9 (SD 6.3), 82.7% were single, and 57.3% attended university outside their native cities. The total PTSD prevalence was 14%, and the median for frequency of trauma exposure was 5 events.

**Conclusion:** A high frequency of exposure to violence, as well as a high rate of PTSD, suicide attempts, and high-risk sexual behavior was found in Brazilian college students. This highlights the importance of effective public health actions in relation to the prevention and treatment of PTSD and other dysfunctional behaviors resulting from traumatic exposure in young individuals, usually an at risk population for violence and traumatic situations.

**Citation:** Netto LR, Cavalcanti-Ribeiro P, Pereira JL, Nogueira JF, Santos LL, et al. (2013) Clinical and Socio-Demographic Characteristics of College Students Exposed to Traumatic Experiences: A Census of Seven College Institutions in Northeastern Brazil. PLoS ONE 8(11): e78677. doi:10.1371/journal.pone.0078677

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**Competing Interests:** The authors have declared that no competing interests exist.

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<sup>†</sup> Members of the Trauma and Anxiety Disorders Study Group can be found in the acknowledgments.

### Introduction

Epidemiological studies show that most members of the adult population will be subject to at least one potentially traumatic event in the course of their lives [1,2]. Among all stages of life, adolescence and early adulthood are the greatest periods of vulnerability for exposure to traumatic experiences, whereas 70% of adolescent deaths are due to external causes (68.43% between

the ages of 10 and 19 years), and likewise for young adults (70.41% between 20 and 29 years) [3].

Greater impulsiveness and assuming of high-risk behavior, due to an imbalance in neurofunctional regulation between late prefrontal cortex development (responsible for executive function and inhibitory control) and increased responsiveness in the *nucleus accumbens* (responsible for novelty seeking and immediate gratification), occurs in the beginning of adult life [4], and may

contribute to members of this age group exposing themselves to interpersonal violence.

The vulnerability of college students to exposure to traumatic experiences may also be seen as a result of the abrupt transition to independent living. This is often associated with isolation and the loss of support from home [5], which has been demonstrated by previous research regarding involvement in violent situations [6], and can be even more dramatic where the setting favors exposure to violence: rates of violence are particularly high in the Americas, where the average homicide rates for the years 2000–2004, estimated at 17.8 homicides per 100,000 inhabitants, were the highest in the world [7]. In many international comparisons, performed using data from the World Health Organization, Brazil has always occupied one of the top positions among Latin American countries in terms of high homicide rates [2].

In 2000, violent deaths were predominantly caused by homicides [8,9], with the risk 12 times higher for males (53/100,000) than for females (4/100,000) [10]. Ninety percent of these deaths were perpetrated with firearms in urban areas [11], and since 1998 (when the first official survey was made to map violence in Brazil) to the present day, the youth population retains a high prevalence among homicide cases representing a major unresolved problem for the country's policies.

In spite of the history of violence in Brazil, there are no previous local population data about the prevalence of PTSD, including among college students. The aim of this study is to describe clinical and socio-demographic characteristics of college students at seven college institutions in Northeastern Brazil who have been exposed to traumatic experiences.

## Methods/Design

### Ethical Aspects

This study has been approved by the Ethics Review Board of Bahia (CEP/COM/UFBA- process number 227/2010) and Paraíba (CEP/Fac. Sta. Maria, 17-02-2011). Participants were informed about research procedures and risks. They signed an informed consent form and received a copy of it. The informed consent form included a list of addresses and phone numbers of public institutions and services supporting mental health – psychiatric and psychological – that could handle any demands which the questionnaire may provoke. All questions were answered and any points of uncertainty were clarified. If the potential subject did not provide informed consent, he/she was excluded from the study.

### Study Design

This study constitutes a one-phase research project that aims to explore key aspects of traumatic experiences in college students from seven institutions in Northeastern Brazil.

### Setting

Northeastern Brazil contains 27.8% of the Brazilian population, totaling 53,081,950 inhabitants and became, in 2010, the region with the second-highest concentration of undergraduate students in the country (19.3% of all Brazilian students) [12]. Of these, 31.8% are matriculated at federal universities, 31.4% at state universities and 36.8% at private institutions [12].

The majority of the population is concentrated in urban areas (73.1%), and 80.9% are 29 years or younger [13]. Data from the Brazilian Institute of Geography and Statistics (IBGE) showed that in 2010 the Brazilian average annual income was US\$ 3,808,28, while the average annual income in Southeastern Brazil was US\$

4,683,72 and the average annual income in Northeastern Brazil was US\$ 2,277,12 [13].

### Sampling Procedure

Seven college institutions were selected for reasons of convenience in three urban areas of Bahia and Paraíba. In order to select representative college institutions, we sought to include three public (2 federal and 1 state) and four private colleges in Northeastern Brazil; thereby capturing a broad geographic profile of Northeastern college students, considering that students, very often, attend university outside their native cities [14].

The study included all students matriculated at the university and attending their first or final semesters in all coursework from the 7 college institutions, aged 18 years or older, and who consented to participate in the study by signing the consent form.

### Measurements

The self-applied protocol included a fully structured socio-demographic questionnaire along with three scales which have been widely applied in epidemiological surveys. All of the scales had been previously translated and adapted to Brazilian Portuguese. All participants answered the full assessment anonymously, which lasted approximately 20–30 minutes.

**Socio-demographics.** The socio-demographic questionnaire included gender, age, marital status, employment status, parents' educational level, annual family income, migration history, and parents' marital status.

**Mental health.** psychiatric symptoms assessed in the study are:

- a) PTSD (assessed through the PTSD Checklist- PCL-C [15]): the instrument is comprised of 17 items based on the diagnostic criteria of the DSM-IV for PTSD. Thus, the first 5 items refer to the re-experience symptoms group (criterion B), the next 7 items refer to the emotional avoidance/numbing group (criterion C), and the last 5 items address the hyperarousal group (criterion D). In the instructions on how to fill-in the PCL-C, the subject was instructed to anchor their answers to the worst trauma he/she had experienced according to the Trauma History Questionnaire, and was asked to report how much he/she has been troubled by the listed problems and complaints in the past month (not at all, a little bit, moderately, quite a bit, or extremely). The Brazilian version of the PTSD Scale (PCL-C) has received a transcultural adaptation [15–17] which has become widely accepted. The diagnosis was made by combining two methods, in order to improve accuracy and ensure that an individual has the necessary pattern of symptoms with sufficient severity as required by the DSM-IV: the first method requires that the individual matches at least one B item (questions 1–5), at least three C items (questions 6–12) and at least two D items from the DSM-IV (questions 13–17). Symptoms rated as “moderately” severe or greater are considered clinically meaningful [18]. The second method determines whether the total severity score equals or exceeds a given cut-off point. A total symptom severity score (range = 17–85) can be obtained by taking the sum of the scores from each of the 17 items.

Based on Adkins et al. (2008) [19], which used a similar setting (civilian trauma-exposed undergraduates) to explore and compare the psychometric properties of seven self-reported measures of PTSD, the adopted cut-off point for PCL-C was  $\geq 45$ . According to the authors, this was the

optimally efficient cut-off score previously found for this population, which yields a sensitivity of .78 and specificity of .92, positive predictive value of .54, negative predictive value of .97, efficiency of .91, quality of sensitivity of .49, quality of efficiency .59, and quality of specificity .74.

- b) Impulsivity (assessed through BIS 11 [20]): this 30-item self-administered scale assesses the presence of impulsive behaviors from the theoretical model proposed by Ernst Barratt through 3 factors: motor, attentional and lack of planning [21], it being the most widely used scale for clinical and research propose. The three factors are randomly distributed throughout the scale, and the answers are given according to 4 options: 1. rarely/never, 2. sometimes, 3. often, 4. almost always/always
- c) Alcohol, tobacco and illicit psychoactive substance use, assessed through five questions which aim to investigate the substance use pattern: first use, current use, frequency, quantity, interpersonal consequences (fights, accidents or other high-risk situations that occurred during substance use).
- d) Sexual risk behaviors (assessed through a single Yes/No question about condom use during any sexual relationship with a non-stable partner).
- e) Suicide (assessed through the question of how many times one has attempted to commit suicide).

**Exposure to traumatic events.** Assessed through the Trauma History Questionnaire (THQ) [22], which is a list of 24-items, including 23 events that could be considered potentially traumatic and 1 item that allows subjects to report on any personal experiences that were not captured in the other 23 items. Information on the frequency and age(s) at the time(s) of exposure was also obtained. At the end, participants are asked to select, from the items identified on the THQ, the event they found the most distressing. The Brazilian version of THQ has received a transcultural adaptation [23] which is widely accepted.

#### Procedures

The preparative procedures for the collection began in October 2010. Data was collected from April 2011 until July 2011. For a more complete explanation of the investigation flow, see Figure S1.

Efforts were made to reach all students in their first or final semester, matriculated at the university and attending coursework from the 7 college institutions, such as: revisiting classrooms, awaiting students' arrival, and rescheduling visits.

Data regarding the profile of absent students (25.4% of students matriculated at the university and not encountered in classes) were acquired in order to compare with those active students enrolled in the study.

The training course for researchers consisted of a 10-hour theoretical module, followed by a field application conducted by the authors. Regular meetings with supervisors were carried out in order to give clarifications and standardize the interview procedures.

#### Data Analyses

1. Description of participants' characteristics by means of univariate analyses: age, gender, marital status, academic performance, parental educational level, origin (being local or from another city), attending semester and family income.
2. The prevalence of estimated PTSD, alcohol misuse and other illicit psychoactive substance use, suicide attempts, high-risk

sexual behavior and exposure to other traumatic life experiences were made using crosstabulation.

#### Results

The analyses were conducted among a population of 2213 subjects (56.9% matriculated at the university in their first semester, and 43.1% in their final one), of whom 57.3% were attending university outside their native cities. The students were mostly woman (66.1%), mean age 23.9 (SD 6.3), and single (82.7%). (Table 1) The total PTSD prevalence was 14%, among which the most impulsive were the most affected (56.1% of PTSD subjects).

The education level of the students' parents is predominantly at basic school level (elementary and middle school), and is inversely proportional to the probability of their offspring having PTSD. On the other hand, family annual income was in the majority at or below US\$ 5,472 (59.4%), and was not clearly associated with PTSD levels.

The majority of students' parents are married (74.2%), and PTSD is more common among divorced parents' offspring (15.5% compared to 13.3% of the married parents' offspring).

Students in federal institutions showed a higher prevalence of PTSD (17%), followed by private institutions (with 14.4% of their students presenting PTSD) and state institutions (with 11.8% presenting), as seen in Table 1.

The median for frequency of trauma exposure was 5 events. The events listed by THQ were grouped into 8 categories: victims of non-sexual violence, sexual violence, accidents, natural disasters, man-made disasters, disease, to witness or receive news of the death or injury of others and other traumas (Table 2). While to witness or receive news of death, acute disease or severe injury of close friends, including family, appeared as the most frequent type of traumatic event (81.7% of the students had experienced this), followed by non-sexual violence (63.9%), and accidents (27.4%), sexual violence was the type of event that most frequently resulted in PTSD (34.1% of the victims developed PTSD).

PTSD prevalence had a strong association with attempted suicide (21.1% of PTSD subjects had already attempted suicide one or more times, compared with 5.4% of non-PTSD subjects). An association between PTSD and high-risk sexual behavior was also found (26.3% of PTSD subjects did not regularly use a condom with non-stable partners). However, substance misuse was not clearly associated with PTSD (Table 3).

From a total of 3701 students matriculated at the university, 937 (25.4%) were not included due to absence, and 175 (4.8%) were not included because they were younger than 18.

Data regarding 331 (35.3%) of the 937 absent students (matriculated at the university and not encountered in classes), from five of the seven college institutions studied, showed that 56.8% of absent students were matriculated in their first semester, 52.2% were female, 59.2% were 22 years or older, and 84.2% were not local students (Table 4).

Of those 331 absent students, 122 (36.9%) were not present at the time of collection, but there were records of their presence in other classes, 197 of the absent students (59.5%) were matriculated, but there were no records of their presence, and only 12 of the absent students (3.6%) had officially interrupted the semester in progress.

#### Discussion

The existing literature has certainly shown progress in understanding the effects of traumatic experiences on mental

**Table 1.** Socio-demographic characteristics of college students exposed to traumatic experiences in Northeastern Brazil.

Socio-Demographic Variables		Total N (%)	Without PTSD N (%)	With PTSD N (%)
Gender	Female	1412 (66.1)	1183 (83.8)	229 (16.2)
	Male	725 (33.9)	653 (90.1)	72 (9.9)
Age	≤22 years	1138 (51.4)	993 (87.3)	145 (12.7)
	>22 years	1075 (48.6)	910 (84.7)	165 (15.3)
Marital status	Single	1789 (82.7)	1548 (86.5)	241 (13.5)
	Married	342 (15.8)	290 (84.8)	52 (15.2)
	Divorced	27 (1.2)	18 (66.7)	9 (33.3)
Origin	Local	844 (42.7)	732 (86.7)	112 (13.3)
	Non-local	1131 (57.3)	970 (85.8)	161 (14.2)
Annual family income	≤ U\$ 5,472	1282 (59.4)	1095 (85.4)	187 (14.6)
	≥ U\$ 26,448	876 (40.6)	752 (85.8)	124 (14.2)
Semester	First	1260 (56.9)	1092 (86.7)	168 (13.3)
	Final	953 (43.1)	811 (85.1)	142 (14.9)
Type of institution	Federal	554 (25)	463 (83.6)	91 (16.4)
	State	808 (36.5)	713 (88.2)	95 (11.8)
	Private	851 (38.5)	727 (85.4)	124 (14.6)
Father's education level	None	87 (4)	71 (81.6)	16 (18.4)
	Elementary	1047 (48.4)	890 (85)	157 (15)
	Middle School	695 (32.1)	608 (87.5)	87 (12.5)
	College	235 (10.9)	204 (86.8)	31 (13.2)
	Postgraduate	100 (4.6)	89 (89)	11 (11)
Mother's education level	None	65 (3)	55 (84.6)	10 (15.4)
	Elementary	829 (38.3)	704 (84.9)	125 (15.1)
	Middle School	787 (36.3)	680 (86.4)	107 (13.6)
	College	301 (13.9)	262 (87)	39 (13)
	Postgraduate	184 (8.5)	161 (87.5)	23 (12.5)
Parents' marital status	Married	1559 (74.2)	1352 (86.7)	207 (13.3)
	Divorced	543 (25.8)	459 (84.5)	84 (15.5)

PTSD: Posttraumatic Stress Disorder.  
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health, although the issue remains under-researched in low and middle income countries. In Brazil there are just a few studies about PTSD prevalence in selected samples [24], and only two recent, large studies from a general population, both in Southeastern Brazil, the most developed region in Brazil [25,26]. To our knowledge, this is the first population-based study to investigate trauma exposure and PTSD in Brazilian college students and the first in the Northeastern region of the country. It is plausible that the chosen population is representative of Northeastern college students given that 57.3% were attending university outside of their native cities, which reinforces the idea that migration is an intense phenomenon in this region.

In accordance with previous literature [1,27], women were more likely to develop PTSD than men (16.2% of woman presented PTSD, compared to 9.9% of men).

The prevalence of PTSD found in this research (14%) is comparable with very high rates found in other studies conducted in low income countries, where people have experienced war, conflict or mass violence (15.8% in Ethiopia, 17.8% in Gaza Strip, 28.4% in Cambodia, and 37.4% in Algeria) [28]. Unsurprisingly, 63.9% of the students reported that they had been exposed to non-

sexual violence, and 9.4% of them had been exposed to sexual violence.

It is noteworthy that variation in family annual income was not associated with different PTSD rates, but the educational level of the students' parents has an inversely proportional association with the students' PTSD frequency. There is consistent evidence about the role that parents have on the mental health of their offspring [29], and previous studies have already established that a low education level of the victim is a vulnerability factor for PTSD [30]. However, little has been studied about the relationship between parental education level and its effect on the exposure of their offspring to potentially traumatic situations and the subsequent development of PTSD. In the present study, mothers presented a higher level of education (22.4% of them have graduated from college or better), but a lower education level of the father was associated with higher prevalence of PTSD (fathers with no formal education had 18.4% of their offspring presenting PTSD, while fathers with postgraduate degrees had 11% of their offspring with PTSD). One possible hypothesis is that fathers with a low education level may inflict punishment through violence more often and/or with more physical injury than mothers.

**Table 2.** Exposure to traumatic events of college students in Northeastern Brazil.

Traumatic Events	Total N (%)	Without PTSD N (%)	With PTSD N (%)
<b>Victims of non-sexual violence</b>	1414 (63.9)	1176 (83.2)	238 (16.8)
Someone tried to take something directly from the subject by using force or the threat of force	785 (35.5)	648 (82.5)	137 (17.5)
Attempted or actually robbed	583 (26.3)	477 (81.8)	106 (18.2)
Attempted or actually had home broken when the subject wasn't there	356 (16.1)	294 (82.6)	62 (17.4)
Attempted or actually had home broken when the subject was there	255 (11.5)	205 (80.4)	50 (19.6)
Was attacked with a gun, knife or some other weapon.	122 (5.5)	89 (73)	33 (27)
Was someone ever attacked without a weapon and was seriously injured	55 (2.5)	35 (63.6)	20 (36.4)
Someone in subject's family was ever beaten, struck or pushed hard enough to cause injury	291 (13.1)	203 (69.8)	88 (30.2)
<b>Victims of sexual violence</b>	208 (9.4)	137 (65.9)	71 (34.1)
Was ever forced to have intercourse, oral or anal sex against will	59 (2.7)	35 (59.3)	24 (40.7)
Someone ever touched the private parts of the body, or made the subject touch his/hers, under force or threat	120 (5.4)	79 (65.8)	41 (34.2)
Any other situation in which another person tried to force the subject to have unwanted sexual contact	84 (3.8)	53 (63.1)	31 (36.9)
<b>To witness or receive news of death or injury of others</b>	1808 (81.7)	1519 (84)	289 (16)
Witnessed someone seriously injured or killed	833 (37.6)	681 (81.8)	152 (18.2)
Exposed to dead bodies	638 (30.6)	556 (82)	122 (18)
Close friend or family member was murdered, or killed by a drunk driver	254 (11.5)	204 (80.3)	50 (19.7)
Death of a spouse, romantic partner, or child	35 (1.6)	21 (60)	14 (40)
Received news of a serious injury, life-threatening illness or unexpected death of someone close	1489 (67.3)	1248 (83.8)	241 (16.2)
<b>Victims of accidents</b>	607 (27.4)	492 (81.1)	115 (18.9)
<b>Victims of natural disaster</b>	137 (6.2)	97 (70.8)	40 (29.2)
<b>Victims of man-made disaster</b>	237 (10.7)	191 (80.6)	46 (19.4)
Exposed to dangerous chemicals or radioactivity	86 (3.9)	65 (75.6)	21 (24.4)
Combat while in military service	17 (0.8)	17 (100)	0
Other man-made disaster	147 (6.6)	121 (82.3)	26 (17.7)
<b>Victims of disease</b>	228 (10.3)	169 (74.1)	59 (25.9)
<b>Victims of other traumas</b>	232 (10.5)	190 (81.9)	42 (18.1)

PTSD: Posttraumatic Stress Disorder.  
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A propos, Bordin et al. (2006) [31], executed the first population-based study in Brazil regarding the connection between severe physical punishment and mental health problems in children and adolescents in low income areas, usually associated with low levels of formal education. The research showed that severe punishment is common in this population (10.1%), and that traumatic experiences of infants lead to permanent deficits in the regulation of behavioral, cognitive and emotional processes. This could be a factor that contributes to the intergenerational transmission of violent behaviors, which may in turn be helping to perpetuate the epidemic level of violence.

While to witness or to receive news of death, acute disease or severe injury of close friends, including family, appeared as the most frequent event, its victims presented the lowest rate of PTSD (16%). One hypothesis is that this kind of etiologic event can generate what is known as Partial PTSD [32]. In their investigative study about the concept of Partial PTSD, Breslau et al (2004) [32] demonstrated that while 68.4% of Full PTSD subjects were victims of interpersonal violence, only 46.2% of Partial PTSD subjects were victims of the same type of event, concluding that

Partial PTSD is normally due to an etiologic event of lesser magnitude, with different presentation and duration of symptoms.

The present study demonstrated that 21.1% of subjects among the PTSD group have attempted suicide (AS), while the rate in the group without PTSD was almost four-fold lower (5.4%). This is critical information since previous AS is a predictor of additional attempts and of death from a completed suicide [33–35]. Therefore, AS has been pointed out as one of the expected consequences of PTSD [36].

BIS-11 demonstrated that increased impulsive behaviors were directly associated with a higher prevalence of PTSD and substance misuse, which is well established by previous studies. [37,38]. However, we did not observe an association between PTSD and substance misuse. This finding is not in accordance with previous reports in the literature [1]. More studies are necessary to better explore this finding and to better understand which other factors could be interfering, such as sub notification of cases or report bias.

High-risk sexual behavior was more frequent among PTSD subjects, as well as among the more impulsive participants: 49.5% of the most impulsive subjects of the study did not regularly use a

**Table 3.** Clinical characteristics of college students with PTSD in Northeastern Brazil.

Clinical Variables	Total N (%)	Without PTSD N (%)	With PTSD N (%)
PTSD	2213 (100)	1903 (86)	310 (14)
Attempted Suicide	167 (7.6)	102 (5.4)	65 (21.1)
Alcohol Use			
Sporadic use	999 (50)	849 (49.2)	150 (55.4)
Weekly use	282 (14.2)	241 (14.1)	41 (15.1)
Daily use	9 (0.5)	8 (0.5)	1 (0.4)
Cigarette Use			
Sporadic use	175 (8)	143 (7.6)	32 (10.6)
Weekly use	28 (1.3)	22 (1.2)	6 (2)
Daily use	47 (2.2)	35 (1.9)	12 (4)
Marijuana Use			
Sporadic use	93 (4.2)	76 (4)	17 (5.5)
Weekly use	9 (0.4)	9 (0.5)	0 (0)
Daily use	10 (0.5)	7 (0.4)	3 (1)
Ecstasy Use			
Sporadic use	29 (1.3)	25 (1.3)	4 (1.3)
Weekly use	0 (0)	0 (0)	0 (0)
Daily use	1 (0)	1 (0.1)	0 (0)
Cocaine Use			
Sporadic use	41 (1.9)	32 (1.7)	9 (2.9)
Weekly use	5 (0.2)	4 (0.2)	1 (0.3)
Daily use	2 (0.1)	2 (0.1)	0 (0)
Crack Use			
Sporadic use	2 (0.1)	2 (0.1)	0 (0)
Weekly use	0 (0)	0 (0)	0 (0)
Daily use	1 (0)	1 (0.1)	0 (0)
Condom non-use (non-stable partners)	363 (16.7)	283 (15.1)	80 (26.1)
BIS 11			
Less impulsive	722 (32.6)	661 (34.7)	61 (19.7)
Averagely impulsive	704 (31.8)	629 (33.1)	75 (24.2)
More impulsive	787 (35.6)	613 (32.2)	174 (56.1)

PTSD: Posttraumatic Stress Disorder.  
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condom with non-stable sexual partners (compared to 18.9% of the less impulsive ones, when BIS-11 is divided in tertiles). Both outcomes are in accordance with previous literature [39,40].

Data regarding the absent students (those matriculated at the university and not encountered in class) showed that both present and absent students have a similar profile based on current semester, gender and area of study. An important difference

between present and absent students is shown by the variable *origm*, and there is some difference with regard to the *age* variable. Neither of these two variables in the enrolled group was associated with a clinically meaningful elevation of PTSD rates.

No records were found regarding the reasons for interrupting the semester or for absenteeism. One possible reason for the age variation between groups is increased absence due to a conflicting

**Table 4.** Comparison between present and absent college students.

Socio-Demographic Variables	Present Students N (%)	Absent Students N (%)
Semester		
First	1260 (56.9)	188 (56.8)
Final	953 (43.1)	143 (43.2)
Gender		
Female	1412 (66.1)	109 (52.2)
Male	725 (33.9)	100 (47.8)
Area		
Exact Sciences	278 (12.9)	34 (10.3)
Health Sciences	503 (22.7)	115 (34.7)
Human Sciences	1412 (64.4)	182 (55)
Origin		
Local	844 (42.7)	33 (15.8)
Non-local	1131 (57.3)	176 (84.2)
Age		
≤22 years	1138 (51.4)	135 (40.8)
>22 years	1075 (48.6)	196 (59.2)

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employment, especially for those older students who no longer have any parental support. Another possible reason is the missing of classes due to difficulties with public transportation (especially those who live in surrounding areas), as well as frequent trips, especially by non-local students whose parents live outside the metropolitan area. Matriculation at multiple college institutions, for first semester students is another possible explanation. This is a common phenomenon in Brazilian universities, where students compete in several exams (potentially in multiple states), with results being released at different times, and matriculate in each one to keep their options open.

### Limitations

The non-inclusion of absentee and non-consenting students in the analyses may have resulted in the loss of the most impulsive and/or most severely affected individuals. Also, other outcomes of trauma exposure that can act as confounders were not investigated, such as depressive or other symptoms of anxiety and thus were not controlled for. On the other hand, avoidance is a well-known phenomenon in PTSD, indeed being one of its diagnosis criteria [41], and may result in less accurate reports. It is assumed that self-applied scales can reduce the report bias. In addition, memory bias can also occur, resulting in less reliable reports, given that some events may have occurred in the early life of respondents.

### Conclusions

To the best of our knowledge, this is the first study to investigate trauma exposure and PTSD prevalence in Brazilian college students, a non-clinical population. It shows a high frequency of exposure to violence, as well as a high rate of PTSD conversion, suicide attempts, and high-risk sexual behavior. This highlights the importance of effective public health actions in relation to primary

and secondary prevention and treatment of PTSD and other dysfunctional behaviors resulting from traumatic exposure among Brazilian youth, usually an at-risk population for violence and traumatic situations.

It is also very important that the primary service professionals receive adequate training to screen and identify traumatic life events. Since traumatized patients tend to manifest avoidance behavior, they may underreport traumatic experiences if not interrogated. The delay in proper diagnosis of PTSD may contribute to increased distress and symptoms, which can be a risk factor for the development of comorbidities or death.

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### Supporting Information

**Figure S1 Flowchart of data collection.** (TIFF)

### Author Contributions

Conceived and designed the experiments: LCO KCK LRN PCR CAT JLP JFN. Performed the experiments: LRN JLP JFN TADSG - UFBA LCO. Analyzed the data: LRN PCR CAT LCO. Contributed reagents/materials/analysis tools: LRN CAT. Wrote the paper: LRN PCR LCO. Interpretation and discussion of results: LRN PCR LLS SBL GMG CAT LCO KCK.

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## Impulsivity is relevant for trauma exposure and PTSD symptoms in a non-clinical population



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BIS-11

Young adults

### ABSTRACT

Impulsivity is a relevant construct for explaining both normal individual differences in personality and more extreme personality disorder, and is often investigated within clinical populations. This study aims to explore the college students' impulsivity patterns and to investigate the association across levels of impulsivity with trauma exposure and PTSD development in a non-clinical population. A one-phase census survey of seven college institutions assessed 2213 students in three metropolitan regions of Northeastern Brazil. All subjects anonymously completed a self-applied protocol consisting of: a socio-demographic questionnaire, Trauma History Questionnaire (THQ), PTSD Checklist (PCL-C), and Barratt Impulsiveness Scale (BIS-11). The median for frequency of trauma exposure was 4 events for people with low and normal impulsivity, and 6 for highly impulsive ones. Individuals with higher impulsivity presented earlier exposition than non-impulsive ones, and worst outcome: 12.4% with PTSD, against 8.4% and 2.3% (normal and low impulsivity). Of the three factors of impulsivity, the Attentional factor conferred the strongest association with PTSD development. Results suggest that impulsivity is also a relevant trait in a non-clinical population and is associated with trauma exposure and PTSD. Strategies to promote mental health in adolescents may be pertinent, especially with the aim of managing impulsivity.

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### 1. Introduction

Since the inception of PTSD as a concept, impulsive behavior has been recognized as an associated feature (American Psychiatric Association, 1980). Some researchers have even asserted that PTSD could be characterized in terms of generalized impulsivity (Goodwin and Guze, 1984; Helzer et al., 1987). Nevertheless, the association between impulsivity and PTSD is still underexplored; when present, it has usually been in a clinical sample, and mostly comorbid with other psychiatric disorders (Stanford et al., 2009).

Impulsivity is an essential trait of personality, relevant to explaining normal individual differences—not always with negative consequences (Cloninger, 1987; Costa and McCrae, 1985; Eysenck and Eysenck, 1977; Zuckerman, 1979)—as well as a wide range of

psychiatric disorders such as substance abuse, suicide, personality disorders, bipolar disorder, antisocial behavior, attention-deficit/hyperactivity disorder (American Psychiatric Association, 1994; Barratt et al., 1997; de Wit, 2009; Links et al., 1999; Nigg, 2003; Swann et al., 2008).

Difficulty restraining impulses also increases potentially risky behavior, such as overspending, getting into fights, self-harming behavior, breaking the law, engaging in risky sexual behavior (Jenkins et al., 2015; Krueger et al., 2007). It means that impulsivity increases the risk of exposure to potentially traumatic stimuli, as well as for PTSD development, creating a complex contribution among neurobiological factors, as well as personality traits, and social environment (Braquehais et al., 2010).

In relation to specific psychological traits and neurobiological functions, impulsivity is associated with a tendency to respond to internal or external stimuli without forethought and without regard to the negative consequences (Caci et al., 2003; Moeller et al., 2001); difficulty persisting in tasks or a diminished ability to focus

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(Lejuez et al., 2010); increased sensitivity to reward and punishment and a diminished ability to delay gratification (Ainslie, 1975; Gray, 1987); a tendency to act on the spur of the moment, with poor future planning (Patton et al., 1995; Whiteside and Lynam, 2001); and a diminished ability to regulate emotion (Whiteside and Lynam, 2001).

One of the most influential models in the explanation of impulsive behavior was proposed by Barratt and Stanford (1995), involving biological, psychological and behavioral aspects. Barratt also created the first self-report measure of impulsiveness, which became the gold-standard measure, and the most widely used self-report impulsiveness scale on psychiatric in both research and clinical settings (Barratt, 1959; Reise et al., 2013; Vasconcelos et al., 2012).

The Barratt Impulsiveness Scale (BIS-11) is a 30 item self-report instrument, designed to measure 3 theoretical subtraits of impulsivity: Attentional (lack of focus on the ongoing task), Motor (acting without thinking), and Non-Planning (lack of "futuring" or forethought) (Patton et al., 1995). According to Stanford et al. (2009) in their review of the BIS usage, although many researchers agree with Barratt's conclusion that impulsivity is a multi-faceted construct, the majority of studies using the BIS-11 have reported only the total score, ignoring the second-order subscale. This leads to a less accurate perspective in the characterization of an individual's impulsiveness, and its relationship with different clinical syndromes. Stanford et al. (2009) also suggests that a BIS-11 total score has as normal limit for impulsiveness, with a good concurrent validity.

In spite of Post-traumatic Stress Disorder (PTSD) being a particularly interesting disorder for increasing the understanding of impulsivity, PTSD studies using BIS-11 are rare. Also, the scale has been used mostly within clinical populations, rarely reporting the second-order subscale scores (Malloy-Diniz et al., 2010).

We are unaware of any existing research that studies impulsivity among college students in a population-based design, although these young, and naturally more impulsive group, were shown to be at-risk for exposure to violence and other traumatic situations (Netto et al., 2010; Rigotti et al., 2004; Wechsler and Nelson, 2008), as well as for developing PTSD (Netto et al., 2013). The aim of this study was to explore the impulsivity pattern of Brazilian college students and to investigate the association across levels of impulsivity with trauma exposure and PTSD development in this non-clinical population.

## 2. Methods/Design

### 2.1. Study design

A one-phase census survey of seven college institutions in three metropolitan regions in Northeastern Brazil.

### 2.2. Setting

Brazil has 27 states, of which 9 belong to the Northeastern region and represent 6 of the 10 most violent states in the country (Waiselfisz, 2012). Also, among the 50 cities ranked most violent in the world, 19 are in Brazil; among the 20 most violent cities in the world, 6 are in Northeastern Brazil (Sanchez, 2015). According to census data on college education, the Northeastern region of the country has become the region with the second-highest concentration of undergraduate students (INEP, 2011). This represents a significant segment of Brazilian society that has been poorly investigated.

### 2.3. Sampling procedure

Seven college institutions were selected for reasons of convenience in three urban areas of Bahia and Paraíba states. In order to select representative college institutions, we sought to include three public (2 federal and 1 state) and four private colleges in Northeastern Brazil. Since students very often attend university outside their native city, efforts were made to capture a broad profile of Northeastern college students by selecting colleges with student high migration rates (Fonaprace, 2011). Due to budget limitations, we also selected universities according to their accessibility in terms of distance from our work location.

The preparatory procedures for the collection began in October 2010, with a pilot application in 30 undergraduate students. From February to April 2011, 18 college students were trained to work as investigators together with the three main researchers (LRN, JLP, JRFN). The training course comprised a 10-h theoretical module, followed by a field application conducted by the authors and regular subsequent supervision meetings.

On March 2011, classes from all academic departments of the 7 institutions were chosen for each program. From April to July 2011 the data were collected. The inclusion criteria were: all students from their first and final semester in all academic areas, matriculated at the university and attending classes, aged 18 years or older.

From the 2589 eligible students, 2213 were included (85.5%); 307 declined to participate (11.8%), and 69 (2.7%) did not conclude the questionnaires.

### 2.4. Measurements

The self-applied protocol included a fully structured socio-demographic questionnaire along with three scales, which had been previously translated and adapted to Brazilian Portuguese. All participants answered the full assessment anonymously, which lasted approximately 20–30 min.

#### 2.4.1. Socio-demographics

Included gender, age, marital status, employment status, parents' educational level, annual family income, migration history, and parents' marital status.

#### 2.4.2. Exposure to traumatic events

Assessed through the Trauma History Questionnaire (THQ) (Fizman et al., 2005), which is a list of 23-items that examines experiences with potentially traumatic events using a yes/no format, and includes 1 item that allows subjects to report on any personal experiences that were not captured in the other items. Information on the frequency and age(s) at the time(s) of exposure was also obtained. At the end, participants are asked to select, from the items identified on the THQ, the event they found the most distressing. The Brazilian version of THQ has received a transcultural adaptation (Fizman et al., 2005) which is widely accepted.

#### 2.4.3. Mental health

a) PTSD (assessed through the PTSD Checklist-PCL-Civilian): the instrument is comprised of 17 items based on the diagnostic criteria of the DSM-IV for PTSD. The Brazilian version of PCL-C received a transcultural adaptation (Berger et al., 2004; Brighenti et al., 2010; Wilkins et al., 2011), considered satisfactory. In this study the diagnosis was made combining two methods to improve accuracy, ensuring that an individual has sufficient severity as well as the necessary pattern of symptoms required by the DSM-IV. The first method requires

that the individual meet at least one B item, at least three C items and at least two D items, each from DSM-IV. Symptoms rated as "Moderately" or greater are considered clinically meaningful (National Center of PTSD, 2012). The second method determines whether the total severity score exceeds a given cut-off point. Based on Adkins et al. (2008), which used civilian trauma-exposed undergraduates to explore and compare the psychometric properties of seven self-reported measures of PTSD, the adopted cut-off point for PCL-C was  $\geq 45$ . According to the authors, this optimally efficient cut-off score, previously found for this population, yields a sensitivity of 0.78 and specificity of 0.92, positive predictive value of 0.54, negative predictive value of 0.97. In the instructions on how to fill-in the PCL-C, the subject was instructed to anchor their answers to the worst trauma he/she had experienced according to the Trauma History Questionnaire, and was asked to report how much he/she has been troubled by the listed problems and complaints in the past month. The PCL being anchored to a specific trauma may be more likely to capture PTSD, increasing its discriminant validity from depression, social phobia and anxiety (Wilkins et al., 2011).

- b) Impulsivity (assessed through BIS-11 (von Diemen et al., 2007)); this 30-item self-administered scale assesses the presence of impulsive manifestations from the theoretical model proposed by Ernst Barratt, through 3 factors: Motor, Attentional and Lack of Planning (Patton et al., 1995). It is the most widely used scale for clinical and research purposes. The internal consistency coefficient of BIS Total (Patton et al., 1995) differed among populations: for college students the Cronbach's coefficient alpha was 0.82 (mean  $63.82 \pm 10.17$ ). The internal consistency coefficient of BIS Sub-factors (Miller et al., 2004) for Motor impulsivity was 0.70 (mean  $22.4 \pm 4.46$ ), for Non-Planning was 0.72 ( $24.23 \pm 4.49$ ), and for Attentional was 0.61 ( $16.53 \pm 3.30$ ).
- c) A socio-demographic questionnaire to disclose at-risk behaviors, based on Rigotti et al. (2004) and Wechsler and Nelson (2008), included:
- Questions about Alcohol, tobacco and other illicit psychoactive substance consumption (aiming to investigate the substance use pattern: first use, current use, frequency, quantity, interpersonal consequences).
  - Sexual risk behaviors and Suicide (assessed through Yes/No questions).

## 2.5. Data analyses

2.5.1. Description of participants' characteristics by means of univariate analyses: age, gender, parental educational level, origin (being local or from another city), attending semester, and family income.

2.5.2. Total score of BIS-11 was divided through a given cut-off (Stanford et al., 2009), and was associated with clinical and demographic characteristics through crosstabulation. Each of the three-component factors of BIS-11 (second-order subscale) were divided into tertiles and associated with clinical and demographic characteristics through crosstabulation as well.

2.5.3. Impulsivity was explored as an independent variable through hierarchical multivariate analysis, and adjusted for age and gender, to obtain Odds Ratio (Santos et al., 2011). Two models were created in order to investigate the causal pathway for the effect of impulsivity on PTSD outcome, decomposing its total effect (not mediated) and its direct effect as a risk factor for PTSD. In both models, annual familial income and parents' education level were variables included as distals. This construct is based on Ludermir

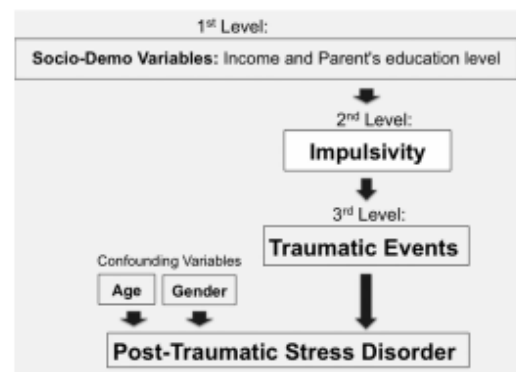


Fig. 1. Hierarchical conceptual Model A: impulsivity as intermediate variable.

and Lewis (2001) which observed that disadvantages in social condition, such as education and income are the most powerful indicators related to common mental disorders. From the perspective of Gerard and Higley (2002), this suggests an adaptive role of impulsivity in the context of high levels of environmental adversity. In MODEL A: Impulsivity was analyzed as intermediate variable from the outcome (Fig. 1) according to a neurobiological perspective that comprehends impulsivity as a trait usually formed in an early phase of human development. Previous studies have shown that an increased manifestation of this trait can mediate risk behaviors and higher exposure to potentially traumatic events (Araújo et al., 2009; Malkoy-Diniz et al., 2010).

In MODEL B: Impulsivity was analyzed as proximal variable from PTSD (Fig. 2), as defined on the basis of a biopsychosocial approach, considering that impulsive behavior is a result of several different and independent factors, which interact to better adapt to the environmental cues (Dickman, 1990; Evenden, 1999). Age and gender were controlled as confounding variables in both models.

## 3. Results

The analyses were conducted within a population of 2213 subjects, of whom 308 (14%) had low impulsivity based on BIS total score, 1537 (70.1%) had normal range of impulsivity, and 348 (15.9%) presented high impulsivity. Women had higher impulsivity

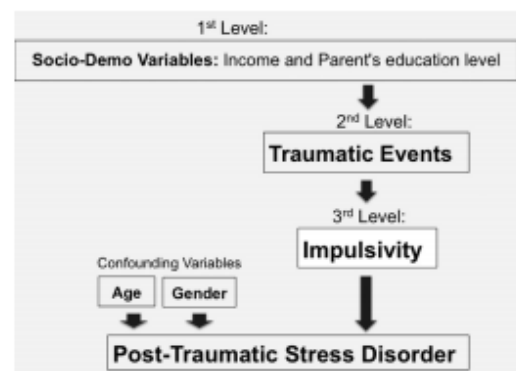


Fig. 2. Hierarchical conceptual Model B: impulsivity as proximal variable.

**Table 1**  
Socio-demographic characteristics of college students in Northeastern Brazil and impulsivity patterns.

Socio-demo variables		Total N (%)	Low impulsivity 308 (14%)	Normal impulsivity 1537 (70.1%)	High impulsivity 348 (15.9%)
Gender	Female	1463 (66.1)	187 (12.8)	1020 (69.7)	256 (17.5)
	Male	750 (33.9)	125 (16.6)	522 (69.6)	103 (13.8)
Age	≤ 22 Years	1138 (51.4)	164 (14.4)	779 (68.5)	195 (17.2)
	> 22 Years	1075 (48.6)	147 (13.7)	768 (71.4)	160 (14.9)
Marital status <sup>a</sup>	Single	1789 (80.8)	252 (13.7)	1283 (69.5)	311 (16.8)
	Married	352 (15.5)	56 (15.9)	252 (71.6)	44 (12.5)
	Divorced	28 (1.2)	2 (7.1)	22 (78.6)	4 (14.3)
Origin <sup>a</sup>	Local	879 (43.2)	145 (16.5)	610 (69.4)	124 (14.1)
	Non-local	1158 (56.8)	142 (12.3)	814 (70.3)	202 (17.4)
Annual fam. income <sup>a</sup>	≤ US 5,472	1282 (59.4)	141 (14.2)	699 (70.5)	152 (15.3)
	≥ US 26,448	676 (40.6)	96 (14.3)	467 (69.4)	110 (16.3)
Semester	First	1260 (56.9)	169 (13.4)	876 (69.5)	215 (17.1)
	Final	953 (43.1)	142 (14.9)	671 (70.4)	140 (14.8)
Father's educ. level <sup>a</sup>	None	91 (4.2)	10 (10.6)	65 (71.3)	16 (18.1)
	Elementary	1047 (48.4)	149 (14.2)	743 (71)	155 (14.8)
	Middle school	690 (31.9)	93 (13.5)	486 (70.4)	111 (16.2)
	College	236 (10.9)	32 (13.5)	158 (66.8)	46 (19.7)
	Postgraduate	100 (4.6)	18 (17.6)	64 (63.7)	19 (18.6)
Mother's educ. level <sup>a</sup>	None	71 (3.3)	7 (9.6)	52 (72.6)	12 (17.8)
	Elementary	825 (38.1)	126 (15.3)	591 (71.6)	108 (13.1)
	Middle school	786 (36.3)	101 (12.8)	557 (70.9)	128 (16.3)
	College	299 (13.8)	48 (15.9)	189 (63.3)	62 (20.8)
	Postgraduate	206 (8.5)	25 (12.1)	140 (67.9)	41 (20)
Academic area	Exact sciences	285 (12.9)	44 (15.3)	205 (71.9)	36 (12.9)
	Biological sciences	502 (22.7)	73 (14.5)	357 (71.2)	72 (14.3)
	Human sciences	1426 (64.4)	194 (13.6)	984 (69)	248 (17.4)

<sup>a</sup> Frequency and percentage over the valid answers.

scores than men, with BIS total mean score of 62.1 and 60.6 respectively. The mean score for the second-order subscales had small differences between genders.

Students from first semester presented higher impulsivity scores (mean of 62 and 61 respectively), as well as non-local students (mean of 62.2 and 60.7 respectively), and younger students (mean of 61.9 for students with age ≤ 22 years and 61.1 for those who were older than 22 years). The mean score for the second-order subscales (Motor, Attentional and Non-Planning) presented minor differences among the variables semester, origin and age.

Students from the Exact Sciences presented the highest prevalence of low impulsivity (15.3%), and students from Human Science/Arts presented the highest prevalence of high impulsivity (17.4%) (Table 1).

The total PTSD prevalence in the study was 14%, among which the most impulsive were the most affected (51.4% of PTSD subjects, with OR: 2.90; 95% CI 2.16–3.90 for the high impulsive group). Of the three factors of impulsivity, the Attentional factor conferred

the strongest association with PTSD development (OR: 2.27; 95% CI 1.60–3.21), and 48% of the students who were classified as more attentionally impulsive presented PTSD. On the other hand, higher levels of the Lack of Planning factor did not show a considerable association with PTSD: the ORs of the less impulsive group (1.21; 95% CI 0.84–1.75) and the more impulsive one (1.36; 95% CI 1.01–1.82) are included in each other CI. Lower Motor impulsivity levels were frequent (43% of the students were concentrated in the first tertile) and were associated with lower prevalence of PTSD. A lower Non-Planning impulsivity level was also frequent (with 39.7% of the students concentrated in the first tertile), but both lower and higher levels of this factor were associated with an increased prevalence of PTSD (Table 2).

The median for frequency of trauma exposure was 4 events for low and normal impulsive people, and 6 for high impulsive ones. Individuals with higher impulsivity presented earlier exposition and worse outcomes (12.4% with PTSD, against 8.4% and 2.3% for normal and low impulsive ones). In terms of categories of trauma, high impulsivity was associated with greater exposure to all of

**Table 2**  
Impulsivity and its factors in association and odds ratio for Post-Traumatic Stress Disorder in Northeastern Brazilian college students.

Impulsivity factors	Impulsivity levels	Odds ratio	95% CI	Students with PTSD N (%)	Total of students N (%)
BIS Total ( $\mu=61.5$ )	Low impulsivity	0.68	0.43–1.09	7 (2.3)	308 (14)
	Normal impulsivity			129 (8.4)	1537 (70.1)
	High impulsivity	2.90	2.16–3.90	43 (12.8)	348 (15.9)
Motor impulsivity ( $\mu=19.6$ )	Less impulsivity	0.91	0.63–1.31	50 (27.9)	944 (43)
	Average impulsivity			59 (33)	620 (28.3)
	More impulsivity	1.76	1.25–2.47	70 (39.1)	629 (28.7)
Attentional impulsivity ( $\mu=17.2$ )	Less impulsivity	0.62	0.42–0.92	26 (14.5)	728 (33.2)
	Average impulsivity			67 (37.4)	750 (34.2)
	More impulsivity	2.27	1.60–3.21	86 (48)	715 (32.6)
Lack of Planning impulsivity ( $\mu=24.7$ )	Less impulsivity	1.21	0.84–1.75	63 (35.2)	871 (39.7)
	Average impulsivity			39 (21.8)	597 (27.2)
	More impulsivity	1.36	1.01–1.82	77 (43)	725 (33.1)

PTSD: Post-Traumatic Stress Disorder; CI: Confidence Interval; BIS: Barratt Impulsivity Scale. Normal impulsivity was used as reference to calculate odds ratio.

them, except Natural Disaster. Lower impulsivity individuals presented higher frequency on the categories of Non-sexual Violence, Witness to Death or Serious Injury, and Accidents.

When impulsivity was explored through hierarchical multivariate analysis and considered as intermediate variable (Model A), the chance of PTSD increased for all categories of trauma but Sexual Violence and Witness to Death. In these two categories, high levels of impulsivity modestly diminished the PTSD odds. An impulsivity effect may be observed due to a reduction in the OR when the proximal variable (type of trauma) was introduced (direct effect).

When impulsivity was explored as proximal variable (Model B), it acted as a protection factor in relation to Man-Made Disasters, Violence-associated Trauma, Witness to Death or Serious Injury, Accidents, and Other Traumas. An impulsivity effect may be observed in Model B due to an increase in the OR when it was introduced (direct effect). The chance of PTSD increased when faced with Natural Disasters, and made no difference for Life-Threatening Illness (Table 3).

Students with high impulsivity had about six times more PTSD than students with low impulsivity (12.4–2.3%). Among higher impulsivity subjects, there was also observed increased attempted suicide (14.8–2.9%), sexual risk behavior (26.7–7.1%) and daily use of alcohol (1.6–0%) in comparison with those of normal or low impulsivity (Table 4).

#### 4. Discussion

To our knowledge, this is the first population-based study to investigate the association between patterns of impulsivity and PTSD. We found that increased impulsive behaviors were highly associated with a greater prevalence of PTSD, attempted suicide, sexual risk behavior and daily use of alcohol, which is in agreement with previous clinical studies (Shin et al., 2012; Swann et al., 2002). Therefore, for all at-risk behavior, low impulsivity acted as a protection factor.

When explored through hierarchical multivariate analysis and considered as intermediate variable, impulsivity showed an increased association with almost all categories of trauma, with greater OR for PTSD, which is well established in the literature (Braquehais et al., 2010). This suggests that impulsivity increases the odds of exposure to potentially traumatic stimuli, as well as the chance of PTSD development in this young population. The two exceptions were Sexual Violence and Witness to Death, categories for which impulsiveness appeared as protective. It could mean that an important part in the development of PTSD is due to the nature of the event itself. Another hypothesis is that impulsive individuals may make more accurate decisions than reflective ones in situations requiring rapid action (Caci et al., 2003).

When explored as a proximal variable, impulsivity reduced the OR for PTSD prevalence for all traumas except Life-Threatening Illness and Natural Disaster. This is an interesting outcome, wherein impulsivity can be comprehended as a protection factor, with not only negative consequences.

One possible reflection upon this result is that while peritraumatic dissociation is considered a risk factor for PTSD development (Fullerton et al., 2000), the 'drive disinhibition' associated with a prefrontal-hypothalamic-amygdaloid complex (Bruckowski, 1965) in the face of traumatic cues could constitute a protective response. This would be due to greater motor activation, considered one of the three basic components of impulsivity (Patton et al., 1995), which is probably not adaptive for dealing with Life-Threatening Illness needs for recovery. Another hypothesis for the protective effect of the impulsivity is that it can provoke some kind of habituation in the face of frequent exposure – which did not happen with the category of Natural Disaster in our population (only 6.2% of the students experienced this kind of event, while 29.2% of them presented PTSD).

Our attention was drawn to the high prevalence of low impulsivity individuals that had experienced violence-related events, reinforcing that this is an at-risk population for exposure to violence.

When the mean total score of the BIS-11 scale in our population is compared with results from other non-clinical samples (Fossati et al., 2002; Leshem and Glicksohn, 2007; Patton et al., 1995; Soeiro-De-Souza et al., 2013), we observed a relatively low mean for BIS total score in our subjects. None of the previous studies using BIS-11 in PTSD subjects adopted a cut-off (Ariga et al., 2010; Depue et al., 2014; Oquendo et al., 2005; Moeller et al., 2001; Nelson et al., 2013; Swick et al., 2013), which results in the absence of previous parameters for comparison. Our result (15.9% of the population presented high impulsivity, and 14% presented low impulsivity) seems to be coherent with the clinical background.

The Attentional factor in this study, in comparison with the other sub-scale factors, presented greater odd of developing PTSD (OR 2.27; 95% CI 1.60–3.21). Bardeen and Orcutt (2011) have suggested that Attentional processes are a factor leading to maintenance and exacerbation of posttraumatic stress symptoms, such as intrusive thoughts, flashbacks, physiological reactivity, avoidance behaviors and heightened arousal. Also it has been suggested that the Attentional factor could be a general process underlying the personality trait of impulsiveness as a whole (Sonuga-Barke,

**Table 3**  
Prevalence of trauma exposition according to impulsivity pattern and Odds Ratio for Post-Traumatic Stress Disorder in Northeastern Brazilian College Students.

BIS	Life-threatening illness N (%)	Witness to death/injury N (%)	Non-sexual violence N (%)	Sexual violence N (%)	Natural disaster N (%)	Accidents N (%)	Man-made disaster N (%)	Other trauma N (%)
Low impulsivity	30 (9.7)	247 (77.2)	208 (65)	20 (6.3)	22 (6.9)	85 (26.6)	21 (6.6)	28 (8.8)
Normal impuls.	156 (10.2)	1303 (81.7)	1002 (62.8)	144 (9)	104 (6.5)	473 (29.7)	99 (6.2)	139 (8.7)
High impulsivity	42 (12)	315 (85.8)	256 (69.8)	48 (13.1)	24 (6.5)	119 (32.4)	32 (8.7)	40 (10.9)
Total	228 (10.4)	1865 (81.7)	1466 (64.2)	212 (9.3)	150 (6.5)	677 (29.7)	152 (6.7)	207 (9.1)
Model A: OR (dir. effect)	2.41	3.52	2.12	3.47	2.74	1.79	1.40	1.48
(95% CI)	(1.69–3.45)	(2.14–5.81)	(1.56–2.87)	(2.44–4.92)	(1.79–4.20)	(1.36–2.36)	(0.95–2.07)	(1.01–2.17)
Model B: OR (total effect)	2.40	3.67	2.20	3.67	2.59	1.83	1.54	1.55
(95% CI)	(1.69–3.40)	(2.23–6.01)	(1.63–2.97)	(2.60–5.17)	(1.70–3.93)	(1.39–2.39)	(1.05–2.26)	(1.06–2.26)
Model B: OR (dir. effect)	2.41	3.52	2.09	3.47	2.74	1.72	1.41	1.43
(95% CI)	(1.69–3.46)	(2.14–5.81)	(1.54–2.82)	(2.44–4.92)	(1.79–4.21)	(1.31–2.25)	(0.95–2.07)	(0.98–2.08)

Model A: OR obtained through hierarchical conceptual analysis, having impulsivity as an intermediate variable. Odds ratio for comparison with the total effect: 2.90.  
Model B: OR obtained through hierarchical conceptual analysis, having impulsivity as a proximal variable.  
In both models: Annual Familial Income and Parents' Education Level were included as distal variables; Age and Gender were variables controlled as confounders.  
CI: confidence interval; OR: odds ratio.

**Table 4**  
Prevalence of impulsivity, Post-Traumatic Stress Disorder and dysfunctional behaviors, based on BIS cut-off in Northeastern Brazilian College Students.

	N (%)	PTSD	Attempted suicide	Sexual risk behavior	Daily use of alcohol
Low impulsivity	308 (14)	7 (2.3)	9 (2.9)	22 (7.1)	0 (0)
Normal impulsivity	1537 (70.1)	129 (8.4)	105 (6.6)	257 (16.4)	4 (0.3)
High impulsivity	348 (15.9)	43 (12.4)	54 (14.8)	97 (26.7)	5 (1.6)
Total	2213 (100)	310 (14)	168 (7.4)	376 (16.8)	9 (0.4)

BIS: Barratt Impulsivity Scale; PTSD: Post-Traumatic Stress Disorder.

2002; Vasconcelos et al., 2012).

Previous studies have demonstrated an association among high levels of Lack of Planning impulsivity factor and cognitive distortions (de Wit et al., 2007; Mobini et al., 2007). Despite this, Lack of Planning presented the lowest and a negligible association with PTSD compared with the other factors, possibly due to a tertile based analysis. A lack of cut-point resulted in 39.7% of the students concentrated in the first tertile with both lower and higher levels of Lack of Planning being associated with an increased prevalence of PTSD.

Several limitations need to be considered in interpreting these data. The PCL-C version used for the data collection was based on DSM-IV criteria. The cross-sectional design of the study prevents conclusions about the directionality of the impulsivity-trauma exposure-PTSD relationship. Furthermore, the small differences found in the OR between the direct effect and the total effect of impulsivity, together with a lack of prior references in the literature, prohibit us from reaching a final conclusion about the clinical interpretation of the data.

The non-inclusion of absentee and non-consenting students in the analyses may have resulted in the loss of the most impulsive and/or most severely affected individuals. In addition, memory bias can also occur, resulting in less reliable reports, given that some events may have occurred in the early life of respondents.

As a conclusion, these results suggest that impulsivity is also a relevant trait in a non-clinical population. Through hierarchical multivariate analysis, it was speculated that impulsivity was associated both with some kind of trauma exposure and PTSD development, making direct and indirect contributions to the psychopathological findings.

Strategies to prevent mental disorders and their negative

consequences over a lifetime, and to promote mental health in college students, are an important suggestion. Actions could specially aim to introduce to the primary care level: facilities to routinely screen for impulsiveness; educational skills to teach stress and impulsiveness management techniques in crisis situations and to help improving the Attentional system and; pharmacological information to reduce impulsivity and violent or risky behaviors.

Impulsivity gave modest protection in the face of some types of trauma, in both models of hierarchical multivariate analysis. The difference in the OR between the direct effect and the total effect of impulsivity, both as distal and proximal variable, was mostly less than 5%. The prior literature does not provide parameters about which difference would be clinically relevant, but the small differences found in this article can at least identify some tendencies to be investigated in different populations.

Further research would be important to better understand impulsivity as a multifaceted construct, and its effects, integrating data from clinical and non-clinical population.

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