

ORIGINAL ARTICLE

Gender-related dimensions of childhood adversities in the general population

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Objective: Childhood adversities (CAs) comprise a group of negative experiences individuals may suffer in their lifetimes. The goal of the present study was to investigate the cluster discrimination of CAs through psychometric determination of the common attributes of such experiences for men and women.

Methods: Parental mental illness, substance misuse, criminality, death, divorce, other parental loss, family violence, physical abuse, sexual abuse, neglect, physical illness, and economic adversity were assessed in a general-population sample (n=5,037). Exploratory and confirmatory factor analysis determined gender-related dimensions of CA. The contribution of each individual adversity was explored through Rasch analysis.

Results: Adversities were reported by 53.6% of the sample. A three-factor model of CA dimensions fit the data better for men, and a two-factor model for women. For both genders, the dimension of family maladjustment – encompassing physical abuse, neglect, parental mental disorders, and family violence – was the core cluster of CAs. Women endorsed more CAs than men. Rasch analysis found that sexual abuse, physical illness, parental criminal behavior, parental divorce, and economic adversity were difficult to report in face-to-face interviews.

Conclusion: CAs embrace sensitive personal information, clustering of which differed by gender. Acknowledging CAs may have an impact on medical and psychiatric outcomes in adulthood.

Keywords: Childhood adversities; social environment; gender differences; factor analysis; dimensionality; psychopathology

Introduction

Childhood adversities (CAs) are a group of negative situations children and adolescents may experience during development. This group of early occurrences includes a multitude of unfavorable events, such as parental psychopathology, physical and sexual abuse, and family violence. Several studies have explored CAs as risk factors for numerous health outcomes.¹⁻³ They are associated with later-life consequences such as adult psychopathology,^{4,5} suicidality,^{3,6} and medical illnesses.⁷ The propensity for occurrence of mental and physical diseases in adulthood might arise through alterations in epigenetic expression,⁸ in stress processing,⁹ in neurogenesis,¹⁰ or in neuroplasticity.¹¹ Although these mechanisms remain to be elucidated,¹² appropriate characterization of core CAs is the very first step of research. However, few methodologically sound studies have investigated the common attributes of such experiences.

Recent literature has reported some gender-dependent differences in the occurrence of early adversities.¹³⁻¹⁷ In general, boys were more exposed to physical violence and neglect than girls. Conversely, girls reported more emotional abuse, household dysfunction, and sexual violence than boys.^{13,18-20} Gender differences in coping styles and in cognitive processing of stressful situations have also been described,²¹ wherein girls presented a greater ruminative coping style²² and greater cognitive vulnerability to negative events²³ than boys. Therefore, it is reasonable to assume that boys and girls experience distinct CA profiles, in terms of exposure liability and coping strategy.

As CAs occur frequently in the general population and do so in a highly comorbid pattern,^{3,24} describing their dimensional structure, i.e., the non-observable clusters of common CAs, can illuminate critical issues on early negative events, as well as elucidate relationships between adversities. For example, environments of family malfunctioning, maltreatment, or neglect may co-occur closely. Also, the differential profile of exposure to such experiences during childhood for men and women needs to be determined. From this perspective, the broad range of such events may cluster into fewer common adversities, whose relationship can be estimated as a common latent structure or dimensions. Hence, reducing the number of

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variables through meaningful statistical methods can ultimately reveal shared pathological mechanisms with potential utility for child welfare, health policy-making and health research.

Among approaches for obtaining latent dimensions from multiple variables, factor analysis stands out as one of the most adopted strategies to reduce data into fewer broad concepts.²⁵ This method has been widely utilized in studies of CAs^{24,26,27} to explore latent dimensions, which can indicate common sets of adversities. However, studies using exploratory factor analysis have proposed different solutions to depict the underlying structural dimensions of CAs, in terms of the number of factors extracted.^{24,26} Previous findings have suggested models with one,²⁴ two,²⁶ and three or more components^{26,27} as acceptable solutions for the core dimensions of CAs in exploratory factor analysis. Divergences in the number of CAs evaluated, dissimilar methods for factor extraction, possible differences in retention criteria used by researchers, and heterogeneous samples seem to account for the variability in the number of factors considered.²⁵ The method of confirmatory factor analysis (CFA) can yield a more stable solution. Therefore, the underlying dimensional structure of CAs remains elusive, and warrants additional examination.

Within this context, the present study sought to examine the latent dimensions of CA reported by a representative sample of the general population in the metropolitan area of São Paulo, Brazil, considering the overall sample and gender subgroups. To disentangle the role of each specific CA within a plausible dimensional structure, this investigation was supplemented with item response theory (IRT) to estimate the probability of endorsing each adversity.

Materials and Methods

This was a multivariate assessment of the underlying structure of early CAs in the general population. Data were collected cross-sectionally and subjected to factor and latent trait analysis.

Sampling

A stratified multistage area probability sampling strategy was used to select a representative sample of 5,037 non-institutionalized residents, aged 18 years or older, from the São Paulo metropolitan area. At the time of the interviews (May 2005 to May 2007), this large, highly urbanized area, composed of the city of São Paulo proper and 38 circumscribed municipalities, was home to a population of approximately 20 million. More in-depth descriptions of sampling, recruitment, and weighting procedures are available elsewhere.²⁸

The sample characteristics are shown in Table 1. Briefly, most participants were women (56.5%), married (64.5%), and currently employed (60.2%). Balanced age brackets, educational level, and socioeconomic distribution characterized the sample as representative of the general population. The weighted prevalence of each CA and proportion of respondents with two or more adversities in the sample are shown in Table 2. More than half

Table 1 Descriptive characteristics of the participants of São Paulo Megacity Mental Health Survey (n=5,037)

Variable	n (%)
Gender	
Male	2,187 (43.42)
Female	2,850 (56.58)
Age (years)	
18-29	1,287 (25.55)
30-39	1,193 (23.68)
40-49	1,090 (21.64)
50 or older	1,467 (29.12)
Education (years of schooling)	
0-4	1,344 (26.68)
5-8	1,262 (25.05)
9-11	1,690 (33.55)
≥ 12	741 (14.71)
Family income*	
Low	1,200 (23.82)
Low-average	1,367 (27.14)
High-average	1,212 (24.06)
High	1,258 (24.98)
Marital status	
Married/cohabiting	3,250 (64.52)
Previously married	894 (17.75)
Never married	893 (17.73)
Employment status	
Employed	3,030 (60.15)
Student	56 (1.11)
Homemaker	836 (16.60)
Retired	494 (9.81)
Unemployed	621 (12.33)

* Family income was defined based on the respondent's household income per family member divided by the median income-per-family-member in the entire sample: low = ratio ≤ 0.5; low-average = ratio 0.5-1.0; high-average = 1.0-2.0; high = > 2.0.

(53.6%) of the sample reported at least one CA, with physical abuse, parental death, and family violence being most prevalent, and sexual abuse, physical illness, and economic adversity being least prevalent. Around half (48.4%) of the sample with CAs reported at least one or more additional CA.

Ethical procedures

The ethics committee of Faculdade de Medicina, Universidade de São Paulo, approved all procedures. Respondents were interviewed only after informed written consent had been obtained, the nature of the procedures had been fully explained, and assurances of total confidentiality had been given. The investigation was carried out in accordance with the latest version of the Declaration of Helsinki.

Assessment tool

A fully structured interview – the World Mental Health Survey version of the Composite International Diagnostic Interview (WMH-CIDI)²⁹ – was translated and adapted into Brazilian Portuguese language³⁰ and administered face-to-face by lay examiners. Childhood experiences

Table 2 Weighted prevalence and distribution of childhood adversities (CA) in the overall sample, in the sample with any adversities, and stratified by gender (n=5,037)

Adversities	Prevalence of adversity			p	% with 2+ adversities among those with any CA	Mean number of CA among those with 2+ adversities
	Overall	Female	Male			
Physical abuse	16.0 (1.1)	17.4 (1.5)	14.4 (1.6)	0.327	73.7 (3.3)	3.0 (0.1)
Sexual abuse	0.7 (0.2)	1.2 (0.3)	0.1 (0.1)	< 0.0001	95.2 (2.7)	3.0 (0.2)
Neglect	11.3 (0.9)	14.1 (1.3)	8.1 (1.1)	< 0.0001	85.8 (2.2)	3.2 (0.1)
Parental death	16.1 (1.0)	16.8 (1.1)	15.3 (1.7)	0.102	47.1 (4.2)	3.2 (0.1)
Parental divorce	9.5 (0.7)	10.8 (0.9)	8.0 (1.2)	0.444	60.7 (4.3)	3.4 (0.1)
Other parent loss	8.4 (0.9)	11.0 (1.3)	5.5 (0.6)	< 0.0001	73.8 (3.0)	3.6 (0.1)
Family violence	12.1 (0.8)	15.5 (1.3)	8.4 (1.0)	< 0.0001	87.5 (2.3)	3.4 (0.1)
Parental mental disorders	11.8 (0.9)	14.4 (1.3)	9.0 (1.0)	< 0.0001	76.9 (2.5)	3.2 (0.1)
Parental substance use	9.7 (0.9)	11.6 (1.3)	7.7 (1.3)	0.090	78.3 (3.5)	3.6 (0.1)
Parental criminal behavior	3.6 (0.4)	4.3 (0.6)	2.7 (0.7)	0.831	89.1 (4.1)	3.4 (0.2)
Physical illness	1.4 (0.4)	0.8 (0.2)	2.1 (0.6)	0.267	62.2 (13.1)	3.0 (0.2)
Economic adversity	1.0 (0.2)	0.9 (0.2)	1.0 (0.3)	0.467	94.4 (2.9)	2.9 (0.2)
Any adversity	53.6 (1.8)	59.0 (1.7)	47.6 (3.2)	< 0.0001	48.4 (1.5)	2.9 (0.1)

Data presented as percentage (standard error) except where noted otherwise. Bold type denotes statistical significance.

and adversities are assessed in the CAs section of the WMH-CIDI, which encompasses 12 dichotomous variables (yes/no), all referring to events occurred before age 18 years.²⁶ These were evaluated retrospectively and consisted of four groups of events: a) parental maladjustment (parent mental illness, parent substance misuse, parent criminality, and family violence); b) maltreatment or abuse/neglect (physical abuse, sexual abuse, neglect); c) biological and non-biological parent loss (parental death, parent divorce, and other parent loss); and d) other CAs (life-threatening physical illness and family economic adversity). All variables were coded on whether or not the respondents had ever experienced one of the corresponding CAs before adulthood, in accordance with the criteria stated by the WMH Initiative.²⁴

The CA section of WMH-CIDI was derived from several instruments, all of which are focused on early events occurring before age 18 years. Twelve CAs were chosen from the following assessment tools or measures created in previous surveys:

1. The family history research diagnostic criteria interview was designed to assess parent mental illness and parent substance misuse.³¹
2. Measures on parental criminality were created for the National Comorbidity Survey (NCS)¹ and used in similar surveys.^{4,24}
3. A modified version of the Conflict Tactics Scale (CTS)³² was used to assess physical abuse and family violence. Experiences included beating, slapping, hitting, pushing, grabbing/shoving/throwing something at the child by the father or mother (biological parents, step-parents, or adoptive parents), and/or by those who nurtured the child or adolescent.
4. Parental neglect was assessed by questions commonly used in child welfare studies.³³ This variable inquired about the frequency of having inadequate supervision, having to do age-inappropriate tasks, jobs, or chores, or having inadequate food, clothing, or medical care.³³
5. Sexual abuse was assessed by questions about repeated fondling, attempted rape, or rape (including complete intercourse, penetration with a finger or object, sexual assault,

Table 3 Design of the analysis (n=5,037)

Method	n
Principal component analysis	2,519
Men	1,105
Women	1,414
Confirmatory factor analysis	2,518
Men	1,082
Women	1,436
Rasch analysis	5,037
Men	2,187
Women	2,850

or molestation), but it was infeasible to identify the perpetrator and whether occurrence was within or outside the family.³⁴

6. Parental loss included parental death, parent divorce, or separation and other parent loss by means of measures created for the NCS¹ and used in similar surveys.^{4,24} Other parental loss considered parental absence for 6 or more months for reasons other than separation/divorce (e.g., due to overseas service in the armed forces, imprisonment, lengthy hospitalization, or attending boarding school).
7. A standard chronic conditions checklist³⁵ assessed life-threatening physical illness in childhood.
8. Economic adversity was assessed by measures created for the NCS.¹

Statistical analysis

Exploratory and confirmatory factor analyses were applied to the whole sample (n=5,037) to determine the latent structure for the data. A cross-validation methodology was used to avoid data overfitting, and subjects were randomly assigned across two half-split subsamples, providing equal distribution of the potential measured and unmeasured covariates (see Table 3). Principal component analysis (PCA) was performed with the first subsample (henceforward, the "exploratory" subsample; n=2,519), while CFA was performed with the second subsample (henceforward,

the “confirmatory” subsample; $n=2,518$). The analyses (exploratory and confirmatory) were calculated separately for the overall sample and by gender.

The factorability of the samples was verified by squared multiple correlations of variables with all other variables, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy,³⁶ correlation matrix determinant, and Bartlett test of sphericity.^{36,37} Strong between-variable correlation (not shown), a high KMO value (0.7359), and significant sphericity (chi-square = 1765.393, $p < 0.0001$) provided evidence in favor of data factorability. Both Kaiser’s rule-of-thumb (eigenvalue > 1.0) and Cattell’s scree plot were examined to decide the number of components to retain. Both varimax and promax rotation were applied to PCA models to aid interpretation of possible solutions. In the confirmatory subsample, the KMO was 0.6675 and the Bartlett test was significant (chi-square = 1339.896, $p < 0.0001$).

Further, CFA was performed in the second subsample through a weighted least squares means and variance (WLSMV) adjusted estimator with standardized coefficients (STDY). The number of components extracted from PCA guided the factors tested in the CFA, starting from four components for the overall sample and for men and five components for women. These iterations determined the most parsimonious model, in accordance to the following model fit indicators: root mean squared error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and weighted root mean squared residual (WRMR).

Finally, we estimated the independent odds of each CA being reported by the subjects, because some adversities presented low communality (h^2) and insufficient factor loading in structural models. For this purpose, the one-parameter logistic (1-PL) model of IRT or Rasch analysis³⁸ calculated the probability that subjects would endorse each CA during a face-to-face encounter. The Rasch model allows measurement of underlying traits of given variables along a latent dimension θ (theta), such as abilities and attitudes, assuming that the difficulty to, or the likelihood of, endorsing some items in a scale increases as the individual’s ability to endorse such items also

increases. These latent trait models are represented by an item response function, i.e., the differential effects of the item’s difficulty to be endorsed by respondents³⁹ in an item characteristic curve (ICC).

Data weighting procedures included conventional methods for variance estimation with complex sample survey data. This allowed consideration of the stratified multi-stage sample design employed. Weights were used to adjust for differences in within-household probability of selection and nonresponse, and to make the sample distribution comparable to the population distribution in the year 2000 Census (post-stratification weight) on a cross-classification of sociodemographic variables (see Viana et al.²⁸ for details).

A two-tailed test at the 0.05 level evaluated statistical significance, and bootstrapping was used to obtain standard errors. All analyses were performed in Stata 14⁴⁰ and Mplus 7⁴¹ for CFA.

Results

Principal component analysis (PCA)

The final PCA models, factor loadings, and communalities for each CA are shown in Table 4. Score and loading plots (Supplementary Figure S1, available online only) allowed visual appraisal of data distribution for the overall subgroup and by gender. The total subsample ($n=2,519$) presented a three-component model as the most plausible solution, explaining 37.1% of data variability. The first component, family violence and parent mental disorders, encompassed physical abuse, neglect, parent mental disorders, parent substance use disorders, and family violence (factor loadings: 0.36 to 0.47), and explained 18.3% of data variability. The second component, encompassing parent divorce and sexual abuse, showed factor loadings of 0.33 and 0.66, respectively. Parent criminal behavior and physical illness presented factor loadings below 0.30. The last component, parental loss and economic adversity, encompassed parent death, other parent loss, and economic adversity (factor loadings: 0.53 to 0.59). Communality among adversities ranged from 0.08 to 0.60, with parent

Table 4 Rotated matrix of factor loadings and communality (h^2) for principal component (C) models for the subsample as a whole ($n=2,519$) and stratified by gender

Childhood adversities	Total exploratory sample				Men’s subsample				Women’s subsample		
	C1	C2	C3	h^2	C1	C2	C3	h^2	C1	C2	h^2
Physical abuse	0.44	0.02	0.01	0.43	0.40	0.02	0.25	0.47	0.46	-0.05	0.44
Sexual abuse	0.10	0.06	-0.33	0.15	-0.10	0.59	0.02	0.06	0.12	0.13	0.45
Neglect	0.42	0.10	0.00	0.41	0.44	-0.10	0.00	0.48	0.44	0.12	0.38
Parent died	-0.01	0.59	-0.42	0.60	-0.15	0.25	0.67	0.35	0.06	0.53	0.61
Parent divorced	0.16	0.16	0.66	0.57	0.31	-0.35	-0.06	0.22	0.18	-0.38	0.30
Other parent loss	0.05	0.53	-0.07	0.34	0.11	-0.15	0.49	0.24	0.06	0.43	0.33
Family violence	0.36	-0.02	0.10	0.49	0.41	0.01	-0.04	0.47	0.36	-0.20	0.48
Parent mental disorders	0.40	-0.10	-0.19	0.29	0.33	0.35	-0.10	0.31	0.37	0.15	0.35
Parent substance use	0.26	-0.03	-0.26	0.41	0.16	0.52	-0.09	0.36	0.21	0.26	0.45
Parent criminal behavior	0.47	-0.02	0.06	0.23	0.44	0.13	0.08	0.20	0.46	-0.01	0.45
Physical illness	0.10	-0.07	0.23	0.08	0.04	0.02	0.20	0.29	0.15	-0.47	0.05
Economic adversity	-0.07	0.57	0.32	0.47	-0.02	-0.14	0.43	0.00	-0.01	-0.04	0.23

The loadings of each adversity were rounded up to two decimal places. Bold indicates the highest eigenvalue for each variable in the model.

mental disorders, parent criminal behavior, sexual abuse, and physical illness presenting the lowest communalities ($h^2 < 0.30$).

For the male subsample ($n=1,105$), the three-component model was the best solution (36.9% of data variance). The first component (family violence and parent mental disorders) encompassed physical abuse, neglect, family violence, and parental mental disorder (factor loadings: 0.40 to 0.44). The second component (parent substance use disorders, parent divorce, and sexual abuse) encompassed parent criminality, parent divorce, parent substance use disorders, and sexual abuse (factor loadings: 0.35 to 0.59). This component is similar to the second component of the overall sample (parental loss and economic adversity), with factor loadings ranging from 0.43 to 0.67. Only physical illness presented an insufficient factor loading (0.20). The h^2 ranged from 0.05 to 0.61, with parental divorce, economic adversities, and physical illness ($h^2 < 0.30$) contributing less to the factorial model.

The best model for women in the exploratory subsample ($n=1,414$) was the two-component solution (28.61% of data variance). The first component encompassed the same adversities that formed the first component of the overall sample (family violence and parent mental disorders). The second component (parental absence and physical illness) encompassed physical illness and the death, loss, or divorce of a parent. Insufficient factor loadings (< 0.30) were observed for sexual abuse, parent criminal behavior, and economic adversity.

Notably, physical illness, other parent loss, parental divorce, parent criminal behavior, sexual abuse, and economic adversities contributed little to the model ($h^2 < 0.30$).

Confirmatory factor analysis (CFA)

In confirmatory models, the same three-factor solution was replicable from the exploratory model for the overall sample, and gender differences were consistently observed (Figure 1). Fit indexes of all possible models are shown in Table 5. For the total confirmatory sample ($n=2,518$), the first factor (family violence and parental maladjustment) encompassed family violence, physical abuse, neglect, parental mental disorders, and parental substance use disorder (coefficients ranging from 0.77 to 0.58). The second factor (parental criminality and sexual abuse) encompassed parental criminal behavior, sexual abuse, parental divorce, and physical illness (coefficients ranging from 0.54 to 0.23). The last factor (parental loss and economic adversity) encompassed other parent loss, parental death, and economic adversity (coefficients ranging from 0.71 to 0.48). The first factor correlated significantly with the second ($r = 0.95$) and third factors ($r = 0.27$).

For the men's subsample ($n=1,082$), the three-factor model was also the best-fit solution. The first factor (family violence and parental maladjustment) encompassed family violence, physical abuse, neglect, and parental mental

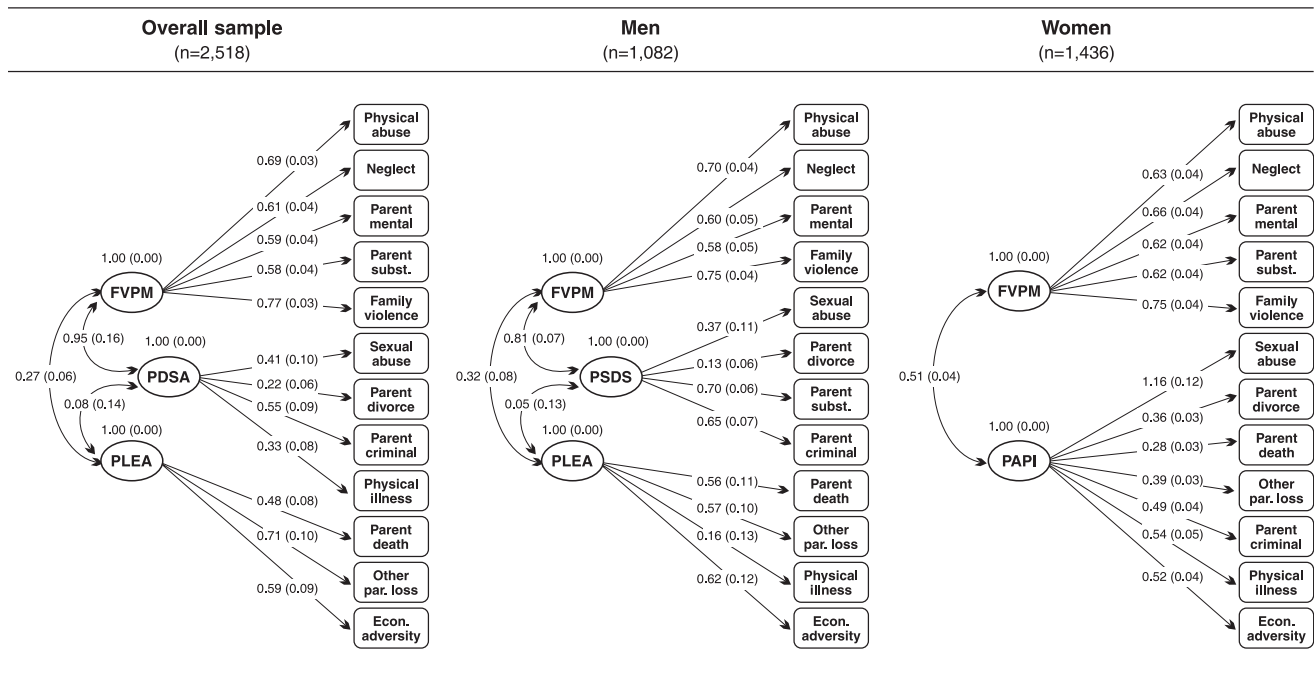


Figure 1 Path diagram of confirmatory factor analysis for childhood adversities in the overall sample and stratified by gender. Econ.adversity = economic adversity; FVPM = family violence and parent mental disorders; Other par.loss = other parental loss; PAPI = parental absence and physical illness; Parent criminal = parental criminal behavior; Parent mental = parental mental disorders; Parent subst.= parental substance use disorders; PSDSA = parent divorce and sexual abuse; PLEA = parental loss and economic adversity; PSDS = parent substance use disorders, parent divorce, and sexual abuse.

Table 5 Model fit indexes for confirmatory factor analysis (n=2,518)

	One-factor	Two-factor	Three-factor	Four-factor
Sample				
χ^2	222.617 (p < 0.0001)	190.652 (p < 0.0001)	147.203 (p < 0.0001)	164.287 (p < 0.0001)
RMSEA	0.035	0.032	0.027	0.031
CFI	0.865	0.890	0.923	0.907
TLI	0.835	0.863	0.900	0.872
WRMR	1.700	1.576	1.372	1.437
Men				
χ^2	181.868 (p < 0.0001)	177.452 (p < 0.0001)	133.133 (p < 0.0001)	115.840 (p < 0.0001)
RMSEA	0.041	0.040	0.033	0.031
CFI	0.805	0.810	0.875	0.897
TLI	0.762	0.764	0.839	0.858
WRMR	1.591	1.588	1.386	1.314
Women				
χ^2	216.975 (p < 0.0001)	109.620 (p < 0.0001)	205.449 (p < 0.0001)	134.229 (p < 0.0001)
RMSEA	0.053	0.031	0.053	0.041
CFI	0.852	0.949	0.860	0.922
TLI	0.820	0.936	0.819	0.893
WRMR	1.728	1.208	1.678	1.326

CFI = comparative fit index; RMSEA = root mean squared error of approximation; TLI = Tucker-Lewis index; WRMR = weighted root mean squared residual.

Bold type indicates the model with the best model-fit.

disorders (coefficients ranging from 0.75 to 0.58). The second factor (substance misuse, criminality, and sexual abuse) encompassed parental substance use disorder, parental criminal behavior, sexual abuse, and parental divorce (coefficients ranging from 0.70 to 0.13). The last factor (economic adversity and parental loss) encompassed economic adversity, other parent loss, and parental death (coefficients ranging from 0.62 to 0.56), as well as physical illness (with a nonsignificant coefficient). The first and second factors ($r = 0.81$) and the first and third factors ($r = 0.32$) were significantly correlated.

For the women's subsample (n=1,436), the two-factor model was the best-fit solution (Figure 1). The first factor (family violence and parental maladjustment) encompassed family violence, neglect, physical abuse, parental mental disorders, and parental substance use disorders (coefficients ranging from 0.75 to 0.62). The second factor (sexual abuse and parental loss) encompassed the seven remaining adversities (coefficients ranging from 1.16 to 0.28). The two factors were significantly correlated ($r = 0.51$).

Rasch analysis

The latent trait for each adversity reported by the subjects was indicated by the difficulty parameter (b) of the IRT. Four infrequent adversities (sexual abuse, physical illness, parental criminal behavior, and economic adversity) were at least 3.6 times more difficult to be reported by the whole sample, showing low endorsement probability. Regarding gender differences, women (b coefficient ranging from 1.89 to 4.74) more easily reported the experienced adversities than men (b ranging from 2.02 to 6.79) and than the total sample (b ranging from 1.94 to 5.07) (Table 6). Five adversities were most difficult to be reported: sexual abuse (b ranging from 4.44 to 5.07), physical illness (b ranging from 4.58 to 6.79), parental criminal behavior

(b ranging from 3.60 to 3.58), parental divorce (b ranging from 2.48 to 2.65), and economic adversity (b coefficient from 4.44 to 4.64). The results of this Rasch analysis provided further understanding for the contribution of each adversity in previous dimensional models.

Discussion

In this large sample of the general population of a megacity, the negative adversities that commonly occur in early childhood were a heterogeneous group of risk factors. Our results suggest that boys and girls present different exposure profiles to negative experiences during their childhood and adolescence. These events must be considered as clusters of risk factors rather than a single group with common characteristics. Despite the fact that some studies^{24,26,27} have already explored the dimensionality of CAs, to our knowledge, this was the first article to look at clustering of early CAs by using both CFA and latent trait analysis. Taking into account the diversity reflected by the group of adversities, interventions for the general population should be designed with a wide-ranging scope, because respondents found some adversities difficult to disclose. Our findings recommend changes in preventive programs to mitigate CAs from the public health perspective, including specific strategies for boys and girls.

In confirmatory models, the dimensions of CA emerged as heterogeneous, and a common group of four adversities co-occurred frequently. This cluster – formed by physical abuse, neglect, parental mental disorders, and family violence – links childhood mistreatment to parental mental disorders, and has already been found across samples.^{5,24} In fact, it has been suggested that living in violent environments and dysfunctional families are the most important characteristics of the home environment during childhood, independently of exposure to a specific adversity.^{5,24,26}

Table 6 Rasch analysis of item response theory model for childhood adversities, stratified by gender

Variable	Women (n=2,850)			Men (n=2,187)			Overall sample (n=5,037)		
	<i>b</i>	SE	95%CI	<i>b</i>	SE	95%CI	<i>b</i>	SE	95%CI
	1.12	0.05	1.03-1.21	1.11	0.04	1.04-1.18	1.12	0.03	1.07-1.18
Parental death	2.02	0.09	1.85-2.19	1.89	0.07	1.75-2.03	1.98	0.06	1.87-2.09
Parental mental disorder	2.03	0.09	1.86-2.21	1.94	0.07	1.80-2.08	2.18	0.06	2.06-2.30
Physical abuse	2.28	0.10	2.09-2.47	1.96	0.07	1.81-2.10	5.07	0.20	4.68-5.45
Neglect	2.41	0.10	2.21-2.62	2.03	0.08	1.89-2.18	1.94	0.05	1.83-2.05
Family violence	2.45	0.10	2.24-2.65	2.07	0.08	1.92-2.22	2.49	0.07	2.36-2.63
Other parental loss	2.51	0.11	2.30-2.72	2.22	0.08	2.06-2.37	2.07	0.06	1.95-2.18
Parental substance use disorder	2.54	0.11	2.31-2.76	2.30	0.08	2.13-2.46	2.38	0.07	2.25-2.50
Parental divorce	2.65	0.11	2.42-2.87	2.48	0.09	2.30-2.65	2.35	0.06	2.22-2.48
Parental criminal behavior	3.60	0.16	3.27-3.92	3.58	0.14	3.31-3.85	3.57	0.11	3.36-3.78
Economic adversity	4.44	0.23	3.99-4.89	4.64	0.21	4.22-5.06	2.24	0.06	2.11-2.36
Sexual abuse	4.44	0.23	3.99-4.89	4.64	0.21	4.22-5.06	4.53	0.16	4.22-4.83
Physical illness	6.79	0.68	5.47-8.12	4.74	0.22	4.30-5.18	4.58	0.16	4.27-4.89

95%CI = 95% confidence interval; *b* = difficulty parameter; SE = standard error.

See Supplementary Figures S2, S3, and S4 (available online only) for Rasch analysis graphs in females, males, and in the overall sample, respectively.

The high correlation between the two factors involving violence (physical and sexual) in the total sample and in men's subsample is notable. However, it is possible to infer that a clinical distinction exists between those individuals exposed to sexual abuse and those with no such exposure.⁴² The third factor, encompassing parental loss and economic adversities, was less strongly correlated with home-related environmental adversities. It also provides a good clinical approximation, since economic difficulties frequently accrue in single-parent households.⁴³ In the women's subsample, the family maladjustment dimension correlated less with the dimension that contained sexual abuse, any parent absence, and parental criminality. Therefore, differences in family organization seem to be related to different types of CAs in terms of vulnerability and profile of parental mental disorders.⁴⁴ For example, the absence of a parent for any reason places girls at a higher risk of sexual abuse.⁴⁵

Regarding gender differences, sexual abuse showed a unique characteristic in the sample, despite its low prevalence and the fact that it is one of the adversities found most difficult to report by subjects. The literature suggests that boys have a lower prevalence of sexual abuse compared to girls, and that they are also less acknowledged as victims, despite experiencing abuse that is both more recurrent and more severe than that suffered by girls.¹⁵ Furthermore, the relatively few chronic offenders are more likely to target boys than girls.¹⁴ In this regard, girls are often abused in the absence of their parents. Although an association between sexual abuse, parental divorce, and parental criminal behavior was found in all groups of the present study, this association was more closely related to parental substance use disorders in the male subgroup. This implies that sexual abuse is related to more disorganized and maladjusted families, and that interventions in preventive programs should be gender-specific. In clinical practice, these findings might explain the complex interplay between genomic, environmental, and cultural aspects of gender, which would reflect a latent vulnerability.¹²

Boys living without their fathers are at the highest risk of sexual abuse, and the literature has shown that most

perpetrators of sexual abuse against this group were acquaintances, but extra-familial to the victim.^{14,46} Two-thirds of these perpetrators were previously convicted for some crime, with a twofold likelihood of having been convicted for non-sexual than for sexual crimes.^{14,47} Taking all of these factors into account, the relationship between sexual abuse, parent divorce, and parent criminal behavior reported herein seems in line with the literature on victimology of abuses occurring during childhood.^{14,46,47} Therefore, it would be clinically recommended to investigate sexual abuse, especially in boys in whom parental substance use disorder is accompanied by parental divorce and parental criminal behavior.

Since CAs are, generally, difficult experiences to disclose, victims rarely reveal the embarrassing experiences they suffered during childhood. Previous studies on early adversities^{48,49} have shown that the type of report used – and the way in which reports were administered – have a differential effect on results when addressing sensitive, shameful, or stigmatized behaviors and experiences. Underreporting is the norm for early abuse and maltreatment among boys, the characteristics of which are distinct from those of abuse occurring in girls.¹⁵ Rasch models confirm this peculiar help-seeking behavior in our data on CA.⁵⁰ Interestingly, a recent study on the Maltreatment and Abuse Chronology of Exposure scale⁵¹ suggested a stepwise methodology on validation and development of the interchangeable component of different kinds of child adversities.

It is important to note that such findings from confirmatory analysis could also accrue from the list of CAs used in classic studies on this topic.^{3-6,24,26,52} In these seminal works, there was no theoretical or epidemiological rationale for the decision to investigate particular adversities.^{1,7} For instance, a high prevalence of CAs was detected among patients with obesity evaluated in a weight reduction program survey.² The set of adversities found in that study was simply replicated in several subsequent papers.^{3-6,24,26,52} The closest process to a systematic selection was implemented by one of the major studies ever to investigate CAs, the Adverse Childhood Experiences⁵³ (ACE) study. A broader group of cross-culturally

sensitive adversities should include different early CAs and generate dissimilar dimensions with different biopsychosocial mechanisms.

The present study used a standardized methodology to disentangle the underlying dimensions of CAs in a large, representative, general-population sample. Nevertheless, our results should be interpreted with some limitations in mind. From a methodological standpoint, two key types of bias must be acknowledged. The first is recall bias, due to the time elapsed from the occurrence of the event until the interview, because exposure was inquired retrospectively.⁵⁴ Furthermore, the list of adversities covered 12 distinctive events, and some experiences suffered in early childhood could have been missed by a different scale, such as the Childhood Trauma Questionnaire.^{55,56} Although information bias may have occurred, a similar methodology was used in analogous population-based samples and resulted in a comparable prevalence of CA.^{52,57}

The second type of bias concerns data collection. The yes-or-no format of probing questions may have made it easier for respondents to omit or overstate some undesirable experiences. Because of reluctance in reporting such traumatic experiences in face-to-face interviews, the magnitude of prevalence of specific types of CA may have been underestimated. Nevertheless, the factor analytical approach provided an opportunity to document core dimensions of previous adversities instead of estimating the proportion of subjects exposed to these negative experiences. Willingness to report unpleasant experiences and memories is hard to document with accuracy, since some respondents will intentionally hide painful, shameful, and/or embarrassing events. The use of Rasch analysis in the present study helped us ascertain the probability that respondents would disclose CAs that are known to be less prevalent and associated with particularly uncomfortable features. By taking advantage of modern analytical methodology, we were able to depict the latent characteristics of CAs as rarely demonstrated before.

In conclusion, dysfunctional families stand as the most important cluster of negative adversities, but the socio-cultural rearing environment may lead to incremental exposure to other hardships. As a result, boys and girls experience different childhood adversity profiles. For instance, some infrequent events such as sexual abuse must be investigated routinely in boys, insofar as these events were linked to parental criminality and substance misuse. These findings have implications for tailoring childhood welfare programs and preventing future unfavorable outcomes in adulthood. Childhood interventions must be designed to take into account these distinct gender profiles of exposure to early negative events.

Continuous improvement in collection of data on CAs should be pursued. Negative and traumatic experiences constitute sensitive personal information, which is rarely reported in face-to-face interviews. In future studies, alternative self-report questionnaires can be used in addition to face-to-face interviews to avoid underreporting of negative events. Furthermore, a wider range of experiences may be included in health surveys to better understand the nature and impact of CAs.

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Disclosure

The authors report no conflicts of interest.

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