Stressful Experiences in Children and Adolescents: Initial Report from the PSEI-NCPV Honolulu Study

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Abstract

As part of a federal study on the biology of stress and resilience, a comprehensive, structured stress-history interview (PSEI-NCPV) was administered to 307 participants recruited in Honolulu. A moderate correlation between childhood stress and current depression was found. A relatively high rate of "severe bullying/hazing," and a high mean stress-intensity rating for "blood-drawing induced anxiety" call for further research.

Introduction

This is the initial report from a large ongoing study in which the aim is to develop objective biological markers for quantifying cumulative experienced (Selyean) stress during early brain development as well as early predictors of stress resilience and hardiness.(for a review see Bracha et al. 2003; 1) In brief, the stress histomarkers being studied are rings in enamel of permanent dentition and are conceptually akin to tree rings which are markers of environmental adversity during the course of a tree's development. These rings are also akin to Harris Lines in bones, a pediatric stress marker, and Beau's Lines in nails, a stress marker in dermatology.[2] Dental enamel may have promise as an accessible repository of indelible information of Allostatic Load during early brain development in humans from birth through approximately 10 years.[1,2]

As part of the psychological component of this larger research project, the team was able to also examine stressful experiences that current Honolulu residents reported encountering during childhood and adolescence. This part of the study is discussed in this report. Several hypotheses were examined based on the existing literature regarding childhood and adolescent experiences. First, male participants would be more likely to report physical-trauma stress experiences, such as serious accidents or injuries, than female participants. Second, female participants would be more likely to report stressful experiences in the form of sexual assault. Third, socioeconomic status (SES) during childhood and adolescence would be inversely related to stressful life events experienced as a child and adolescent and reported as an adult. Fourth, we hypothesized that depression would only be moderately associated with self-reported early life stress.

To study the hypotheses, the team analyzed data yielded from the administration of the "Potential Stressful Events Interview – National Center for PTSD Version" (PSEI-NCPV) and the Reynolds Depression Screening Inventory (RDSI) to 307 research participants in the larger study. A portion of the data collected and some preliminary findings are presented in this paper.

Method

Sample

A total of 307 non-treatment seeking participants, 180 males and 127 females, were recruited from eight dental clinics in the Honolulu area. The Department of Veterans Affairs human subjects committee approved the research protocol. Dental patients were approached by dental staff if they were primarily English-speaking, between the ages of 18 and 65, and undergoing a routine 3rd molar extraction.

The mean (± standard deviation) age of male and female participants was 24.0 (±8.7) and 24.1 (±7.9), respectively. The age range for both males and females was 18 to 60 years. Nine percent of the sample was active duty military personnel. Socioeconomic status was determined by having participants subjectively rate the income level of their household during their childhood and adolescence. Based upon participant answers to this question, the SES distribution of the sample was: 8% Low, 19% Low-middle, 45% Middle, 23% Middle-high, and 4% High (1% refused to answer this question). The ethnic distribution, as determined by self-identification, of the sample was: 28% Caucasian, 23% Japanese, 12% Filipino, 11% Hawaiian, 7% Chinese, 2% Latino, 2% Black, 5% Other Ethnicity, and 9% Not Sure.

Procedure

All participants signed an informed consent prior to commencing participation in the study. Dental clinic patients who met the preliminary criteria for inclusion were briefly informed about the study and told they would be reimbursed $100 after complete

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participation in the project. If a patient expressed interest in participation, their name and contact information were forwarded to the laboratory, while their extracted 3rd molars were placed in a labeled bottle and held aside by the oral surgeon for pick up by the project coordinator. Each individual was then called to schedule an in-person interview, geared toward the assessment of stress-history. Participants were interviewed by one of two trained clinicians (a PhD psychologist and a MA level psychologist) at a downtown office. Following completion of the interview, participants were debriefed and given the opportunity to provide feedback or concerns.

Instruments

PSEI-NCPV

The PSEI-NCPV[3] is a revised, shortened version of the Potential Stressful Events Interview,[PSEI; 4,5,6] and includes questions specific to 25 different categories of stress. Participants were asked to report whether they experienced stress of each type between the ages of 3 and 21 (inclusive). For every positive response, participants identified their age in years at the time of occurrence. In order to facilitate recall, participants were given an age-calendar on which they recorded major life events and transitions. Previous research has demonstrated that use of such a childhood timeline significantly increases the reliability of event recall.[7,8]

PAAS-40

For each stressful experience reported, participants were asked a series of 10 questions regarding the intensity of the experience. These 10 items, also taken and modified from the PSEI, make up the Peritraumatic Autonomic Activation Scale (PAAS-40). The first three questions focused on the participant's psychological response at the time of the experience (e.g., "Did you feel that you or a significant other would be seriously injured or killed?"). The novel component of the PAAS-40 are seven items that query an individual's sympathetic reaction, specifically focusing on the physical signs of autonomic activation at the time of the experience (e.g., "Did you experience a choking sensation or very dry mouth?"). Each item was scored from 0 (none at all) to 4 (an extreme amount). Thus, for each stressful experience reported, there was a total PAAS-40 score (ranging from 0-40), and two sub-scale scores: Sympathetic Autonomic Reaction (0-28) and Psychological Reaction (0-12). A higher score on the PAAS-40, presumably reflected a more stressful experience.

RDSI

Following the PSEI-NCPV, each participant was asked to complete the Reynolds Depression Screening Inventory.[RDSI; 9] The RDSI is a brief, pencil-and-paper questionnaire, comprised of 19 questions that assess for current depressive symptoms. A total score (range 0 to 63) is obtained by summing the responses to each question; scores of 16 or higher suggest clinically relevant levels of depressive symptoms.

Results

Stressful Experiences

Participants reported, on average, five stressful incidents that took place during their childhood and adolescence (ages 3-21) during the course of the PSEI-NCPV interview. A total of 1,555 experiences were reported by the entire sample. The mean age at the time of occurrence for these stressors was similar for males (13.3±4.2) and females (13.2±4.4). Figure 1 displays the mean number of experiences recalled by both males and females at each yearly age (the time-range between 18 and 21 is not included, as 102 males and 62 females in this study were between the ages of 18 and 21 at the time of their interview). Only twelve of the 307 participants (3.91%) in this study did not report any stressful experiences.

Table 1 ranks the different stress categories by traumatic intensity, as determined by mean PAAS-40 scores. The most traumatic stress category, as defined by both intensity of sympathetic reaction and mean overall PAAS-40 score, was "sexual assault, physical coercion" (i.e. rape). Participants also rated incidents in which they experienced "serious fear of injury or death" as highly traumatic. The most common event subsumed under this category was near-drowning (44%); other examples included drug-overdoses and being in the proximity of a gun-shooting. While 20% of the participants reported experiencing a "parental separation/divorce" during their childhood or adolescence (mean PAAS-40=4.9), 38% of the sample reported stressful occasions of "parental conflict" (mean PAAS-40=8.1). The mean PAAS-40 score for all 1,555 events reported in this study was 9.5 (±7.7), with a mean Psychological Reaction sub-score of 5.6 (±3.5) and a mean Sympathetic Reaction sub-score of 3.8 (±5.5).

Table 2 summarizes the number of participants who reported a particular stressful experience for each stress-category. The most commonly reported incident was "natural death of close friend or family member," with 51% of males and 56% of females reporting this item. This category comprised approximately 14% of the 1,555 experiences reported. Other common stressors were "parental conflict" and "serious relationship stress," each with an overall report rate of 38%.

Table 2 indicates that males and females differ in their reported experience of particular types of stress. As hypothesized, male subjects reported more physical-trauma experiences, such as serious accidents or injuries, while females report a greater incidence of prior sexual-trauma. A series of Pearson Chi-square analyses were conducted to test these hypotheses. A significantly greater percentage of males over females did, in fact, report three out of the five categories dealing with physical trauma: "serious car accident" (χ^2=4.51, p=0.034), "serious accident/injury (non-vehicular)" (χ^2=9.26, p=0.002), and "fear of serious injury/death" (χ^2=14.1, p<0.001). There was no significant difference in report rates for the two remaining physical-trauma categories: "broken bone requiring a cast" and "physical assault." In accordance with the hypotheses, a significantly greater percentage of females than males reported both primary sexual-trauma categories: "sexual assault" (χ^2=8.37, p=0.004) and "sexual contact prior to age 13" (χ^2=6.76, p=0.009). Ethnic variations in self-reported stressful experiences were found to be generally minor and will be presented in a subsequent publication.

Table 1.—Relative Rankings of Stressfull Experiences by Traumatic Intensity

Table 1 displays the mean traumatic intensity ratings for each stress category of the PSEI-NCPV. The first column lists the mean total PAAS-40 score (possible range: 0-40) for all experiences falling in each particular stress category. The second and third columns provide the mean sub-scale scores of the PAAS-40, Sympathetic Reaction (range: 0-28) and Psychological Reaction (range: 0-12). Categories are organized, from top to bottom, by highest total PAAS-40 score.

	PAAS-40	*Sympathetic 0-28*	*Psychological 0-12*
1. Fear of serious injury/death	18.6	8.9	9.7
2. Serious illness	16.2	9.4	6.8
3. Physical assault w/ weapon w/o weapon	15.2 17.2 11.3	7.4 8.6 5.0	7.8 8.6 6.3
4. Sexual assault physical coercion nonphysical coercion	15.1 21.0 11.1	7.3 3.9 12.5	7.7 7.2 8.5
5. Natural disaster	14.7	6.3	8.4
6. Blood-drawing induced anxiety	13.4	5.9	7.5
7. Serious car accident	12.8	5.4	7.4
8. Serious accident/injury (non-vehicular)	11.8	6.1	5.6
9. Sexual contact prior to age 13	11.3	5.2	6.1
10. Personal combat/warzone	10.0	2.5	7.5
11. Surgery	9.9	4.6	5.3
12. Illness/Injury of close friend/family	9.8	2.3	7.6
13. Close friend/family killed	9.3	4.5	4.8
14. Severe bullying/hazing	9.2	3.7	5.4
15. Witness serious injury/death/corpse	8.8	3.1	5.6
16. Parental conflict	8.1	2.0	6.1
17. Serious relationship stress	7.9	3.7	4.2
18. Sudden separation from caregiver	7.7	2.8	4.9
19. Natural death of close friend/family	7.7	2.9	4.7
20. Close friend/family deployed to warzone	7.0	1.0	6.0
21. Broken bone w/ cast	6.8	2.6	4.2
22. Personal separation/divorce	6.4	2.3	4.1
23. Household financial difficulties	6.1	2.1	4.1
24. Parental separation/divorce	4.9	1.8	3.0

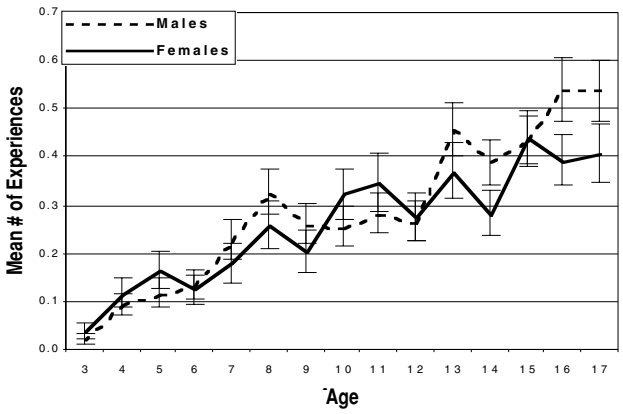
Table 2.—Self-Report Rates of Stressful Experiences

Table 2 displays the self-report rates for all 25 major categories of stressful experience covered by the PSEI-NCPV. The first column lists male self-report rates, the second lists female rates, and the third lists the total rates for the entire sample. Categories are organized, from top to bottom, by highest total self-report rates.

	Men (N=180)	*Women (N=127)*	*Total (N=307)*
1. Natural death of close friend/family	50.6%	55.9%	52.8%
2. Parental conflict	39.4%	35.4%	37.8%
3. Serious relationship stress	33.9%	42.5%	37.5%
4. Illness/Injury of close friend/family	27.2%	40.2%	32.6%
5. Other "extraordinary stressful incident"	27.8%	29.1%	28.3%
6. Household financial difficulties	27.2%	27.6%	27.4%
7. Severe bullying/hazing	26.7%	18.1%	23.1%
8. Sudden separation from caregiver	22.2%	21.3%	21.8%
9. Parental separation/divorce	21.1%	18.1%	19.9%
10. Broken bone w/ cast	18.9%	15.0%	17.3%
11. Physical assault w/ weapon w/o weapon	20.0% 14.4% 6.7%	13.4% 6.3% 7.1%	17.3% 11.1% 6.8%
12. Serious car accident	21.1%	11.8%	17.3%
13. Witness serious injury/death/corpse	18.9%	15.0%	17.3%
14. Serious accident/injury (non-vehicular)	22.8%	9.4%	17.3%
15. Serious illness	15.0%	10.2%	13.0%
16. Surgery	13.3%	8.7%	11.4%
17. Natural disaster	8.9%	10.2%	9.4%
18. Fear of serious injury/death	13.9%	1.6%	8.8%
19. Sexual contact prior to age 13	5.0%	13.4%	8.5%
20. Sexual assault nonphysical coercion physical coercion	1.7% 1.7% 0.0%	8.7% 3.9% 4.7%	4.6% 2.6% 2.0%
21. Close friend/family killed	4.4%	3.1%	3.9%
22. Blood-drawing induced anxiety	5.0%	2.4%	3.9%
24. Close friend/family deployed to warzone	2.8%	3.1%	2.9%
24. Parental separation/divorce	2.8%	2.4%	2.6%
25. Personal combat/warzone experience	0.0%	0.8%	0.3%

Figure 1.— Mean Number of Self-Reported Stressful Experiences by Age

Figure 1 displays the mean number of experiences recalled by both male and female participants, by age of occurrence. In general, participants recall a greater number of stressful experiences from middle to late adolescence, compared to early childhood.



Stress and Depression

The mean RDSI score of all 307 participants in the sample was 7.3 (±6.5), with males and females scoring similarly (7.0±6.3 and 7.7±6.8, respectively). Thirty subjects (10%) scored 16 or greater, an amount consistent with what the psychiatric literature has previously reported for non-clinical samples.

Prior to statistical analysis, a logarithmic transformation was applied to RDSI scores to reduce skew and increase normality. Subsequent analysis revealed that participant RDSI scores were only moderately correlated with past stress history (PAAS-40 scores). Specifically, Pearson-product correlation coefficients were calculated for the following relationships: RDSI and number of experiences reported and RDSI and total PAAS-40 score (sum of all PAAS's). These two values were r=0.33 and r=0.36 respectively. Thus, previous stress history accounts for approximately 12% of the variance in self-reported depression within the sample.

SES, Stress, and Depression

A series of one-way ANOVA's comparing SES group means on several stress variables and depression scores was conducted. There was a significant main effect of SES on the total number of stressful incidents reported by participants, $F(4,300)=4.89$, $p=0.001$, as well as on total PAAS-40 scores reported, $F(4,300)=5.39$, $p<0.001$. Post-hoc analyses, utilizing two-sample *t*-tests (with Bonferroni adjustment) to compare group means revealed that "Low" SES subjects reported significantly more stressful events than "Middle" ($t=1.86$, $p=0.05$) or "Middle-high" subjects ($t=2.30$, $p=0.01$). There was no significant effect of SES level on depression (RDSI) scores.

Discussion

A number of findings emerged from this initial analysis of the Honolulu data. First, less than 4% of the participants in this study did not report any stressful experiences. A mean PAAS-40 score of 9.5, out of a possible 40, for all 1,555 events reported is fairly low. However, as we have pointed out elsewhere,[1,10,11] recalling the intensity level of a particular event several years in the past, especially with regard to sympathetic autonomic activation, is a difficult task. This observation is consistent with the literature and emphasizes the need for other, more reliable markers of past autonomic activation in psychobiological research. Objective markers of sympathetic activations, such as the ones we are developing, may address this problem in the future.[1]

Among the specific stress categories examined, episodes of "blood-drawing induced anxiety" provided strikingly high stress intensity ratings (ranked #6 out of 24 categories on Table1). Also notable, the relatively high report rate of "severe bullying/hazing" stands out as an interesting finding (ranked #7 out of 25 categories on Table2). "Severe bullying/hazing" is often ignored in stress and social research, and one perhaps deserving of more empirical attention. Interestingly, the least traumatic category as determined by total PAAS-40 score, was "parental separation/divorce". In contrast, "parental conflict" incidents were rated as more traumatic. These findings suggest that parental conflict (either verbal or physical) may have a greater negative psychological effect on children than divorce or separation. One may speculate that divorce or separation may sometimes resolve the chronic stress often experienced by children in dysfunctional families in some cases.

The finding that males in Hawaii were much more likely to have been involved in serious accidents and other life-threatening situations when compared to females concurs with prior research.[12,13,14] These results support previous research findings that male adolescents, in particular, engage in higher risk activities than their female cohorts.[15,16] Sexual assault and abuse, however, were more common experiences among the females in the sample; the rates reported here are comparable to previous epidemiological findings.[17,18]

Lastly, the moderate correlation between past stress history and current depressive symptoms noted in this study (accounting for only 12% of the variance) highlights the multi-faceted etiological nature of clinical depression. There is consensus in the literature that while childhood stressors may play some role in the development of this disorder, other factors are likely to be much more important, particularly genetic predispositions (as estimated by family history of depression) and recent stress (particularly within the last three months). This is in marked contrast to posttraumatic stress disorder which is characterized by low genetic contributions,[28% of the variance; 19] the central importance of severe exogenous stress,[20] and pronounced and prolonged initial sympathetic activation which as we have documented here, is not well-recalled by individuals.

These findings represent a small portion of the data the team gathered from a sample of local, Honolulu residents utilizing a newly developed structured interview, the PSEI-NCPV including the PAAS-40. It is of note that no externally validated (independently corroborated) stress-history interviews are currently available in psychological research. The team is now comparing self-report of stressors to events recorded in pediatric medical records, with the aim of making the PSEI-NCPV the first stress-history interview with criterion-related validity. Finally, it is noteworthy that the number of stressful experiences reported is lowest for early childhood and highest for late adolescence. This trend is most likely due to diminished recall for earlier life experiences. This diminished recall further emphasizes the need for objective markers of stressful early life experiences such as the ones that are being developed by this team.[1]

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