Childhood Origins of Depression: Evidence from Native and Nonnative Women in Alaska and the Russian Far East

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ABSTRACT

Explanations for depression usually implicate contemporaneous stressors, although biologic predispositions and childhood violence may also serve as precursors. This study evaluates the relative influence of contemporaneous stressors and both intrafamilial and interethnic violence experienced in childhood. Logistic regression is applied to data collected from a random sample of 355 women aged 20–89 in 1993 who lived in Chukotka and Kamchatka in the Russian Far East and in the Aleutians and the Northwest Alaskan Native Association region of Alaska. Although two contemporaneous stressors influence the likelihood of depression, intrafamilial violence experienced in childhood and, for natives of both Alaska and the Russian Far East, childhood emotional abuse by nonnatives exhibit dramatically more important effects that do not decay with time. These findings point to a violence-induced biologic mechanism for depression in adulthood. They also warrant interventions that extend their focus to the subtle forms of emotional violence that members of one ethnic group may inflict on another and to the social power relationships that may give these forms of violence a lifelong impact.

INTRODUCTION

DEPRESSION APPEARS LINKED TO and a possible precursor of a singular number of women's health problems, including suicide and other violence-related mortality and morbidity,\textsuperscript{1-4} the use of alcohol and illicit drugs,\textsuperscript{5,6} cigarette smoking,\textsuperscript{7,8} and a wide variety of disabling physical symptoms, including chronic and incapacitating pain, fatigue, and headaches.\textsuperscript{9-12} Studies suggest that depression, through suppressed immunologic function or other biologic mechanisms,\textsuperscript{13} may also precede diverse forms of physical illness, including cancer, stroke, and human immunodeficiency syndrome/acquired immunodeficiency syndrome (HIV/AIDS).\textsuperscript{11} During the last half of the 20th century, depressive disorders have shown up at increasingly younger ages and with greater frequency.\textsuperscript{12,13} The direct cost of depression, estimated at $44 billion for the United States in 1990,\textsuperscript{14} probably significantly underestimates the indirect costs that accrue through its sequelae, which include reduced national productivity. An accumulated body of research suggests that, globally, women experience mood disorders far more commonly than men.\textsuperscript{11} Although some studies suggest an inherited predisposition for depression\textsuperscript{15,16} or other biologic mechanism as

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precipitating factor, most link the high rates of depression among women to oppressive current life circumstances: poverty, domestic isolation, powerlessness, and patriarchal oppression. Some evidence points to childhood sexual abuse as a precursor to depression in adulthood, although other forms of violence in childhood may also contribute. This study evaluates the relative influence of oppressive current life circumstances and both intrafamilial and interethnic violence experienced in childhood as predictors of depression in adulthood. Findings point to a biologic mechanism for depression in adulthood activated by the experience of violence in childhood.

SUBJECTS AND METHODS

Sample

Data come from a random sample of 355 women aged 18–89 in 1993 who lived in Chukotka and Kamchatka in the Russian Far East and in the Aleutians and the Northwest Alaskan Native Association (NANA) region of Alaska. These data represent a subset of a total sample of 720 men and women collected in hub towns and affiliated villages in the four study regions as part of an extensive study of social, cultural, and health transition in the North (see Acknowledgments). Research participants in Alaska included Aleut and Inupiat Eskimo natives and Euro-American immigrants. Research participants in the Russian Far East included Chukchee, Yupik Eskimo, Koryak, Itelmens, Kamchadal, and Even natives and Euro-Russian immigrants.

Variables

All scales used in analysis exhibit excellent construct validity and good to excellent reliability (Cronbach’s α ranges from .75 to .91, except for the personal health scale, where α = .69). Evidence of current depressive symptoms was defined as a score of 3 or higher from four items for depression (0 = never, 1 = sometimes, 2 = often) adapted from the Mental Health Screening Test, a scale for both depressive and anxiety disorders that also exhibits excellent criterion validity. We measured five different dimensions of current oppressive life circumstances: (1) binary variable self-reports of being subject to violent acts during the previous year (score of 1) or not (score of 0), (2) a scale constructed from self-reports of degree of affection received from current husband or boyfriend, (3) a scale constructed from self-reports of degree of current family cohesion and support, (4) a scale constructed from self-reports about perceived current health status, and (5) a binary variable measuring whether the respondent lives in Alaska (score of 1) or the Russian Far East (score of 0), where people currently experience extreme isolation, deteriorating physical infrastructure, political turmoil, unpaid wages, and low and uncertain supplies of food.

We measured both intrafamilial and interethnic forms of childhood violence and affection. Violence scale items included: beat you (slap or hit you repeatedly), demean or belittle you, treat you as an inferior, block your attempts to achieve, and make you feel bad about yourself. Affection scale items included: spent free time with you, made decisions with you, treated you as an equal, hugged or touched you in loving ways, talked with you and respected what you said, encouraged you to do special things with your life, actively helped you do these things, and said things that made you feel special and important. The affection scale thus consists of items asking about both physically and emotionally supportive and encouraging experiences.

The intrafamilial violence scale similarly consists of items asking about both physically and emotionally painful experiences. The interethnic violence scale consisted solely of the items asking about emotionally painful experiences. Examples of the latter include overhearing or hearing directed at oneself comments about “ignorant,” “dirty,” or “drunken” natives and experiencing being denied employment or educational opportunities offered to nonnatives. These scales have been reported in detail elsewhere, consist of nonjudgmental behavioral reports, and have been shown to be valid, reliable measures for people who live otherwise extraordinarily diverse lives, ranging from the descendants of slaves who make a living in the tourist economies of the West Indies to Arctic foragers and reindeer herders. The measure of intrafamilial violence used in the following analysis consists of a 4-point (0,1,2,3) index constructed by adding dummy variable indices of having experienced as a child (1) emotional and physical violence by a father or other adult male caregiver, (2) emotional and physical violence by a mother or other adult female caregiver, (3) witness to emotional and
physical violence directed at a mother or other adult female caregiver, and (4) sexual violence. By these criteria, 32.8% of the sample reported one or another form of intrafamilial violence experiences. The measure of interethnic violence used in the following analysis consists of a dummy variable coded 1 if, during childhood, native respondents reported evidence of having been subject ("regularly" or more often) to emotional violence by nonnatives and 0 otherwise. By this criterion, 26.7% of the sample reported interethnic violence experiences.

The following analysis controls for the potential existence of decay in the effects of childhood violence experiences with a variable defined as 0 for respondents who experienced no childhood violence and, for respondents who experienced childhood violence, as the difference between a respondent's age at interview and 10, which was the approximate median age of exposure (range 6–16).

**Statistical procedures**

Variables measured qualitatively elicit such questions as: What is the likelihood that a person will experience a violent (affectionate) relationship (the dependent variable) under different sets of conditions (independent variables)? Ordinary least squares (OLS) solutions for questions like these almost invariably produce impossible likelihood estimates (> 1 and < 0) and invariably generate correlated residuals, which invalidates classic statistical tests. The following analysis uses logistic regression procedures, which constrain model estimates to the probability range (0,1) and directly address the pertinent analytic question.²⁸ Output comes from SYSTAT’s logistic regression module,²⁹ and solutions come from White’s quasi-maximum likelihood method,³⁰ which guards against erroneous standard errors arising from model misspecification. Odds ratios show how much the odds that Y = 1 change for each unit change in an independent variable. Two events equally likely (a 50/50 split), such as the presence or absence of depression, produce an odds ratio of 1.00. One event more likely to occur than another (a 75/25 split) produces odds ratios > 1.00. One event less likely to occur than another (a 25/75 split) produces odds ratio < 1.00. The t-statistics test the null hypothesis that individual independent variables have no influence on the dependent variable. With Logit models, a log-likelihood Chi-squared test substitutes for an F-test of the null hypothesis that no independent variable influences the dependent variable. Like the analysis of variance for all independent variables in OLS regression, this test is superfluous when one or more t-statistics are high. However, post hoc tests of the null hypothesis that β = 0.00 for control variables, albeit using a log-likelihood test rather than an F-test, help assess which variables may be usefully discarded. In the present case, control variables were entered one by one to guard against multicollinearity-induced errors of inference. The Hosmer-Lemeshow statistic tests the null hypothesis that model estimates of the number of cases that exhibit given probabilities of depression correspond with the number of cases actually found in the data. High probabilities warrant the inference that the model yields valid probability estimates. Step-smoothed simulation plots based on model estimates provide a tool for understanding the model’s implications.

**RESULTS**

Zero-order relationships in the data from Alaska and the Russian Far East are consistent with literature that reports that women exhibit a higher likelihood of depression than do men and that depressive symptoms among women are linked to current oppressive life circumstances. Thirty-eight percent of women exhibit depressive symptoms, compared with 23% of the men (Fisher’s exact test 2-tailed, p < 0.001). Fifty-one percent of women subject to violence in the previous year exhibit depressive symptoms, compared with 35% of women who were not subject to violence (Fisher’s exact test, 2-tailed, p = 0.010). Forty-seven percent of the women living in the Russian Far East exhibit depressive symptoms, compared with 25% of the women living in Alaska (Fisher’s exact test, 2-tailed, p < 0.001). Finally, the personal health scale (r = −.267, p < 0.001), the family cohesion/support scale (r = −.122, p = 0.030), and the affection from partner scale (r = −.200, p < 0.001) exhibit weak but non-chance correlations with the full depressive symptom scale.

Logistic regression findings presented in Table 1, however, show that only two current life circumstance variables exhibit relationships with depressive symptoms that cannot best be explained by chance, once we control for variables
<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio</th>
<th>Upper 95% bound</th>
<th>Lower 95% bound</th>
<th>t Ratio</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrafamilial violence experiences (3,2,1,0)</td>
<td>2.007</td>
<td>2.873</td>
<td>1.402</td>
<td>3.805</td>
<td>0.000</td>
</tr>
<tr>
<td>Interethnic violence experiences (1,0)</td>
<td>2.610</td>
<td>4.466</td>
<td>1.526</td>
<td>3.507</td>
<td>0.000</td>
</tr>
<tr>
<td>Living in Alaska (1) rather than Russia (0)</td>
<td>0.420</td>
<td>0.751</td>
<td>0.235</td>
<td>-2.914</td>
<td>0.003</td>
</tr>
<tr>
<td>Perceived current personal health (range 1–14)</td>
<td>0.882</td>
<td>0.975</td>
<td>0.797</td>
<td>-2.458</td>
<td>0.014</td>
</tr>
</tbody>
</table>

Diagnostic test of model fit (Hosmer-Lemeshow statistic = 2.031, 7 DOF, p = 0.958)

Current oppressive life circumstances variables
- Family cohesion/support scale
  - Family cohesion/support scale
  - Subject to violence in the last year
  - Degree of affection from partner
  - Control for decay in effects of childhood experiences
    - Time since exposure
    - Time since exposure + intrafamilial and interethnic childhood violence
    - Time since exposure * intrafamilial childhood violence
    - Time since exposure * interethnic childhood violence

measuring childhood violence experiences: (1) a woman’s perceived state of health (p = 0.014) and
(2) whether she lives in Alaska or the Russian Far East (p = 0.003). To avoid ambiguity introduced
by possible multicollinearity, other variables that measured current life circumstances were entered
into the model with childhood violence experiences, perceived state of health, and residence location,
one by one. Observed relationships between depressive symptoms and family cohesion/
support (p = 0.199), being subject to violence in the previous year (p = 0.280), and degree of affection
received from partner (p = 0.614) cannot be distinguished from chance associations.

Potential decay in the effects of childhood violence was assessed through four tests: (1) entering
the time since exposure variable into the model with childhood violence experiences, perceived
state of health, and residence location (p = 0.199), (2) entering the time since exposure variable
into a model that included only the childhood violence experiences (p = 0.361), (3) entering the interaction between the time since exposure variable and intrafamilial childhood violence into a model that included only the intrafamilial violence variable (p = 0.299), and (4) entering the interaction between the time since exposure variable and intraethnic childhood violence into a model that included only the intraethnic violence variable (p = 0.971). The effects of childhood violence experiences may decay with time (all coefficients are negative), but the effect is so weak that it cannot be distin-
guished from a chance association in the present study.

By contrast, childhood violence experiences exhibit clear and strong relationships with current
symptoms of depression, regardless of the time since exposure—up to 83 years in the present
study. Analysis of diagnostic statistics reveals that no case unduly influences model findings,
and the Hosmer-Lemeshow test shows that the model fits the data well. The modeled probabili-
ties of depressive symptoms shown in Figure 1 reveal that oppressive current life circumstances
exhibit minor effects compared with exploitative childhood experiences. For women in good
health (score of 12 of 14 on the personal health scale), living in Russia increases the likelihood
of depressive symptoms by 12%, but childhood violence experiences add up to 63% in Russia and
61% in Alaska. For women in poor health (score of 6 on the personal health scale), living in Rus-

DISCUSSION

The linkage between depression and changes in neurotransmitter levels, particularly serotonin,
allows for increasingly effective clinical treatment but begs important questions about etiology and
epidemiology. Human moods necessarily reflect the chemical activity and balance in our brains,
and these necessarily reflect our species' evolutionary history. Dohrenwend et al. show that whereas psychoses appear to reflect the genome formed at conception, mood disorders far more likely originate in later life circumstances. The findings that childhood violence experiences produce adults who experience significant mental pain and that the effects of these experiences do not diminish with age thus suggest that childhood violence experiences induce specific, lifelong changes in brain structure and function.

Empirical evaluation of this possibility calls for a prospective cohort design, of course. The research design employed here means that the current study cannot rule out the possibility that people who currently experience depression may remember or report childhood experiences very differently from people who currently experience no depression. It also cannot rule out the influences of unspecified and unmeasured developmental and life experiences that, once identified and measured, might reveal a spurious relation-
ship between childhood violence experiences and depression in adulthood. The weight of six growing lines of evidence suggests that the linkage between reported childhood experiences and current depressive symptoms is not explained by either possibility, however.

First, a growing body of literature, including studies that employ prospective cohort designs, points to childhood violence experiences as precursors of an extraordinarily broad syndrome that encompasses, in addition to depression, a wide variety of affective disorders, substance abuse, delinquency, suicide, partnership and parenting problems, and a pattern of sexuality marked by adolescent pregnancy and various forms of high-risk behavior associated with sexually transmitted diseases and their sequelae, including HIV/AIDS—and, thus, the birth of infants with fetal alcohol syndrome, drug dependency, and HIV-positive diagnoses. Second, research using animal models documents specific linkages between infancy and childhood experiences and adult behavior. Third, a growing literature has increased the specificity with which we can characterize the bidirectional communication that occurs between the central nervous system and the immune system. Fourth, the most developed characterization of the relationship between stress and depression hypothesizes intracellular mechanisms that bear on the survival and function of specific hippocampal neurons. Fifth, a growing body of evidence documents associations between stress and hippocampal atrophy. Finally, longitudinal studies with human populations have begun to document linkages between childhood trauma, specific changes in brain structure and function, and the behavioral changes identified by the first body of literature.

The possibility that childhood violence experiences induce specific, lifelong changes in brain structure and function should not surprise us. Unless pertinent environmental features remain constant over the course of development, evolutionary processes produce developmental processes that are contingent on events in an organism's life history, as Handwerker and Belsky point out. Whether for purposes of prevention or therapy, we should not expect to effectively evaluate behavioral, cognitive, emotional, and biologic states without reference to the pertinent developmental process and the environmental circumstances on which it is contingent.

By altering brain structure and function in specific ways, violence experienced in childhood thus may create a distinctive developmental trajectory that influences the incidence of depression up to 80 or more years into the future. The probabilistic relationship between violence in childhood and depression in adulthood implies the existence of resiliency conferred by as yet

<table>
<thead>
<tr>
<th>Table 2. Mental Health Screening and Risk Assessment Instruments</th>
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<tbody>
<tr>
<td><strong>Screening instrument</strong></td>
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<tr>
<td>Over the last month, how often have you</td>
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<tr>
<td>Felt downhearted and blue?</td>
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<tr>
<td>Felt happy?</td>
</tr>
<tr>
<td>Felt so down in the dumps that nothing could cheer you up?</td>
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<tr>
<td>Felt angry or felt angry quickly?</td>
</tr>
<tr>
<td><strong>Risk assessment instrument</strong></td>
</tr>
<tr>
<td>Over the last month [When you were a child], how often did someone...</td>
</tr>
<tr>
<td>Demean or belittle you?</td>
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<tr>
<td>Treat you as an inferior?</td>
</tr>
<tr>
<td>Block your attempts to achieve?</td>
</tr>
<tr>
<td>Make you feel bad about yourself?</td>
</tr>
<tr>
<td>Treat you as an equal?</td>
</tr>
<tr>
<td>Help you achieve?</td>
</tr>
<tr>
<td>Make you feel special?</td>
</tr>
<tr>
<td>Show you respect?</td>
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</table>
ill-specified genomic properties or social resources and experiences. Nonetheless, twin studies\textsuperscript{15,16} may point to an inherited predisposition for depression primarily when they fail to control for childhood experiences. The striking finding that interethnic violence—which consisted of nonnatives (Russians and Americans) regularly blocking native children's aspirations and making demeaning remarks—exhibits such long-term effects is particularly troubling.

These findings reinforce the importance of clinical attention to violence, particularly violence against women and children.\textsuperscript{43,44} Within clinical settings, regular screening with an adaptation of the instrument of Berwick et al.\textsuperscript{23} and a short version of the violence and affection scales in Table 2 should help in the identification and management of significant mental and physical health problems. These findings also warrant public health violence prevention interventions that extend their focus beyond dramatic forms of violence\textsuperscript{45} to the subtle forms of emotional violence that members of one ethnic group may inflict on another and to the social power relationships that may give these forms of violence a lifelong impact.

ACKNOWLEDGMENTS

This report comes out of an ongoing project, Comparative Study of Social Transition in the North, that addresses the health implications of global changes in ecology, social relationships, and culture for peoples in the North. Arctic research was funded by National Science Foundation grant OPP-9213137 and was carried out as a team effort with Steve McNabb, Bill Richards, Alexander Pika, and Dmitry Bogoyavlensky. I gratefully acknowledge this support but note that the opinions, findings, conclusions, and recommendations expressed in this article are mine. They do not necessarily reflect the view of either funding agency or other Russian-American team members. Russ Bernard and Vanessa Fuller gave me insight into how I might control for potential decay in the effects of childhood experiences, Robin Harwood helped me think through issues related to what psychologists call the "continuity" assumption, and both Bernard and Harwood pointed out important considerations bearing on the implications of findings discussed here. I am most grateful. I thank the Journal of Women's Health referees for their valuable suggestions.

REFERENCES


