

# Childhood Stressors and Symptoms of Schizophrenia

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## Abstract

There are many psychiatric disorders for which severe adverse events in childhood have been shown to be significant risk factors. This is particularly true for schizophrenia. The authors designed this study to determine whether specific childhood stressors might contribute to the specific symptoms of schizophrenia and not merely to increased risk for the psychosis. The authors divided childhood stressors into two domains: 1) “Childhood Neglect” in which the stressor is passively experienced as in the case of absent parenting and 2) “Childhood Abuse” in which the trauma is actively inflicted as in the case of physical maltreatment. Data for the study consist of the cumulative anonymous records of 134 schizophrenia patients carefully separated by positive or negative symptomatology. MANOVA testing yielded a statistically significant finding; childhood neglect is correlated with negative symptoms of schizophrenia and childhood abuse is associated with positive symptoms of the psychosis. The authors speculate that type of childhood stressor may incubate the specific symptoms of adult schizophrenia. They also call for more research on this topic since this is the first study of its kind.

**Key Words:** Adult Schizophrenia, Positive Symptoms, Negative Symptoms, Childhood Stressors, Childhood Neglect, Childhood Abuse

## Introduction

Consistent with current multifactorial models of schizophrenia, we have designed this study to determine whether severe adverse events in childhood might contribute to the specific *symptoms* of schizophrenia and not merely to increased risk for the psychosis.

Toxic psychosocial events in childhood may occur independently or in interaction with genetic predisposition or natality factors (1, 2). Indeed, the widely accepted “diathesis-stress” model of schizophrenia implies an integration of “bio-psycho-social” forces. However, there is some debate as to whether severe traumas belong exclusively in the stress component of the diathesis stress model since they may have organic influences on schizophrenia (3). More specifically, some argue that significant stressors and deprivations in childhood can have neurodevelopmental effects resulting in structural brain changes that lead to specific symptoms of schizophrenia (4). This hypothesis is central to the purpose of the present study, which is to examine types of childhood stressors and the specific presentation of schizophrenic symptoms.

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## Clinical Implications

We believe that our study is the first of its kind since it examines the effects of *specific* childhood stressors (“abuse” and “neglect”) on *specific* symptoms of schizophrenia (“positive” and “negative”). *Our central finding is that childhood neglect is correlated with more severe (negative) symptoms of schizophrenia and that childhood abuse is associated with positive symptoms of the psychosis.*

The main finding of this study is significant because it uncovers a connection between active childhood stressors (abuse) and active symptoms (positive) of adult schizophrenia. Consistently, the finding also connects passive childhood stressors (neglect) with passive symptoms (negative) of schizophrenia. It is as if the type of childhood stressor incubates the specific symptoms of adult schizophrenia. This, of course, is speculation on our part. Much more research is needed on the effects of childhood stressors on adult schizophrenia, particularly research that examines the effects of specific types of child maltreatment in adults with schizophrenia (14).

There are many psychiatric disorders for which child abuse and neglect have been shown to be significant risk factors (5-9), not only for the presence of symptoms but for their severity as well (3, 10, 11). There is also an impressive number of studies which link various types of childhood stressors to adult schizophrenia in particular (12-18). The types of stressors identified to date are also numerous, ranging from inadequate mothering (19), to the effects of being raised by a parent with a serious mental illness (20), to the pathological results of a wide variety of childhood stressors (21, 22).

We would be remiss to present this study as a test of the pure effect of childhood stressors on adult schizophrenia. That is presently an impossible task. As noted above, genetic forces often play an important etiological role. Disentangling the relative contributions of genes and childhood maltreatment may presently be beyond reach, but it is interesting to note an interconnection between the two. For example, some researchers hypothesize that biological children of parents with heritable psychiatric disorders may have an elevated risk for schizophrenia because they are particularly susceptible to the effects of bad parenting (20, 23). Consistently, one rare study of the genetics of schizophrenia evaluated the families adopting the offspring of parents with schizophrenia and found that only 4% of those children raised by “healthy” adoptive families were diagnosed as “severely psychotic” compared to 34% of the children raised by “disturbed” adoptive families (24). Another study estimates that heritability accounts for approximately 80% of the causation of schizophrenia, suggesting that the remaining causal input is childhood stress (25). Genetics aside, it is clear that “many people who have psychotic experiences have experienced abuse or trauma at some point in their lives” (26). A growing body of research demonstrates this finding in relation to schizophrenia.

What is missing in the research on childhood stressors and schizophrenia are more studies examining the *specific* effects of particular *types* of stressors. It is encouraging,

however, that recent research has moved in that direction. One detailed study reported a varying impact of type, timing and frequency of exposure to individual forms of childhood maltreatment and adult psychotic disorder, including schizophrenia (27). Another investigation examined separate associations between childhood abuse and neglect and different outcomes in neurotic and psychotic disorders, including negative symptoms of schizophrenia (28). And a third study explored differential associations between physical and sexual abuse and hallucinations, delusions, and thought disorder (29). While these studies have yielded important insights, the present study moves beyond those analyses by presenting novel findings on more specific associations between childhood stressors and psychotic symptoms.

Earlier studies refer to “potentially traumatic events” without providing a detailed list (3). Others are limited by using childhood abuse and neglect interchangeably (21), or using a dimension such as “self-neglect” without clearly defining it (30). Our study does not have such limitations. It parallels a limited amount of research that distinguishes between different “domains” of childhood stressors (11). Examine Table 1 where we provide an elaboration of two major domains of childhood stressors: 1) “Childhood Neglect” in which the stressor is *passively* experienced as in the case of absent parenting and 2) “Childhood Abuse” in which the trauma is *actively* inflicted as in the case of physical maltreatment.

A meta-analysis identified nine studies showing that child abuse survivors score higher than non-abused people on the “schizophrenia” and “paranoia” scales of the MMPI (31). In fact, there is also a reported pattern of more severe impairment as the number of types of abuse increases (14). This is especially true for schizophrenic persons with *positive* symptoms such as auditory hallucinations, paranoid ideation, thought insertion, ideas of reference, visual hallucinations or reading others’ minds (32).

If childhood *abuse* has been connected with positive symptoms, what are the symptomatic effects of childhood *neglect*? Clearly, neglect increases the likelihood of schizophrenia in general; in a 30-year study of 524 child guidance clinic attendees, 35% of those who developed schizophrenia as adults had been removed from their homes because of neglect (33). The “official” meaning of neglect is the failure to provide adequate care and protection for children, resulting in harm by “malicious or ignorant withholding of physical, emotional and educational necessities” (34). Parental absence and institutionalization are two of the most frequently reported forms of neglect (22).

Few studies to date have even suggested that neglect can produce specific symptoms of schizophrenia (19, 28). It is possible that neglect may result in *negative* symptoms such as blunted affect, motor retardation, emotional withdrawal and mutism. This is an important research avenue to pursue, given reports that children neglected between 3 months and 6 years old are 2.7 times more likely to become schizophrenic adults (35). Negative symptomatology is often referred to as *deficit* schizophrenia (1), a condition with poor prognosis and diminished responsiveness to medications (36, 37). Some contend that deficit schizophrenia has such poor outcome because it is linked with an abnormality in the actual structure of the brain (38, 39). This hypothetical link is consistent with reports of abnormal neurodevelopmental processes originating in significant life deprivations, such as childhood neglect, a concept known as the “Traumagenic Neurodevelopmental” (TN) model (4). Simply stated, “... neglectful experiences during childhood cause abnormal organization and function of important neural systems in the brain ...” (40).

Indeed, a large body of work by Perry supports the TN model. He specifically defines neglect as the absence of critical organizing experiences during development such as being raised in an orphanage where children are at risk for lacking emotional contact (41). Perry connects neglect with many severe long-term consequences for brain function including reduced brain size, enlarged ventricles and cortical atrophy. Although Perry’s research examines the effects of neglect on psychiatric outcomes in general, his findings logically connect with risk for schizophrenia with negative symptomatology. This connection is based on the aforementioned hypothesis that deficit schizophrenia is linked with abnormal brain structure. In fact, a reading of the effects of severe childhood neglect reported by Perry describes many extreme negative outcomes that sound much like schizophrenia caused by abnormal neurodevelopmental pathways (40, 42).

Before 2001, not one of the 19,099 studies conducted on child abuse, sexual abuse, physical abuse, emotional abuse,

child neglect, or family violence was related to childhood schizophrenia (3). Now that has started to change (4), but the research has concentrated on *active* forms of childhood abuse and *positive* symptoms (21). There is a missing body of research concentrating on *passive* (neglect) forms of childhood stressors, especially their connection with types of schizophrenic symptoms. This study is a response to the call by others to examine this under researched need (14). We test to see if there is an interaction between severe childhood neglect and type (positive/negative) symptoms. We also test for a possible interaction between active childhood stressors (abuse) and type of schizophrenic symptoms, as have some previous studies.

## Method

### Participants

Data for this study have been taken from the cumulative anonymous medical records of 134 schizophrenia patients discharged from Norristown State Hospital (NSH) in Pennsylvania (United States) between 1984 and 1990.

All of the patients had suffered stress during childhood and all were carefully evaluated in terms of symptoms of schizophrenia. Diagnostic procedures employed multidisciplinary evaluations with periodic review. Specific criteria for index diagnoses were based on the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM)* (43).

Upon admission, patients were evaluated by staff psychiatrists and other members of a multidisciplinary team within 48 hours for diagnosis and treatment plan purposes. Later, diagnostic reviews were conducted for each patient every three months or as needed during hospitalization. Since some patients have been discharged and readmitted over time, we employed a combination of three operational measures to enhance longitudinal analysis of symptom stability. The measures included clinical assessments by NSH staff at intake and during last hospital stay, as well as *DSM* diagnosis at last discharge.

### Clinical Assessments

In addition to diagnosis by *DSM* standards, NSH staff professionals further categorized patients into negative and positive subtypes described above (44). Subtyping in this study is enhanced by chart materials with detailed patient symptomatology. A number of positive and negative scales have been retrospectively applied from chart materials in addition to subtyping drawn from patient files. They include the Scale for the Assessment of Negative Symptoms (SANS) (45), the Scale for the Assessment of Positive Symptoms (SAPS) (45), and the Positive and Negative Syndrome Scale (PANSS) (46).

Although some may question the validity and reliability of chart-based assessments of negative and positive symptoms, we do not think these are serious problems in this study. It was standard procedure at NSH to require that interview observation of the patient be completely and directly recorded onto the charts. Therefore, the clinical assessments were solely conducted by NSH staff professionals. We retrospectively applied the identical assessments to our sample. Both the original assessments at NSH and our replication of those assessments were conducted independently of patient history of child abuse/neglect. However, we are not certain that the clinical staff who conducted the original symptom assessments would have been blind to the patients' history of child abuse/neglect. We do know that the retrospective applications of the SANS, SAPS and PANSS can be completed from chart materials if the latter are sufficiently detailed (46, 47). Such was the case in the present study.

One of the issues we faced was how to deal with diagnoses that changed over time. This proved to be a minor problem since this type of discrepancy rarely occurred and, when it did occur, we simply eliminated the case from the sample. Thus, diagnosis is operationalized from three temporal sources: clinical assessment at first intake, during last hospital stay, and DSM diagnosis at last discharge. The temporal points of these measurements not only permit the observation of symptom stability over time, but also reflect reports that schizophrenic patients who show *persistent* negative symptoms are an important subgroup with low remission rates (37).

Negative/positive assessments were conducted by three independent raters who are experts in the field. Consensus was reached on the classification of all included cases. Thus, inter-rater reliability is one hundred percent because, in the rare instances where there was disagreement, the cases were dropped. The end result is that the sample only includes patients who clearly presented as negative or positive and had a history of exposure to childhood stressors. No evidence of extrapyramidal complications is present.

### Assessments of Childhood Stressors

Information about the patients' childhood is contained in the "Social History" section of their hospital records. The Social History includes detailed accounts of the family into which the patient was born, including explicit descriptions of a long list of stressful childhood traumas. The histories were compiled at intake by psychiatric social workers from lengthy personal interviews with first-degree relatives and the patients. The social workers used a standardized intake interview, which included explicit questions about childhood abuse and neglect. These verbal accounts provide specific information germane to this study. In fact, reports like

these, as well as self-reports of abuse, have been determined to be surprisingly reliable (48, 49).

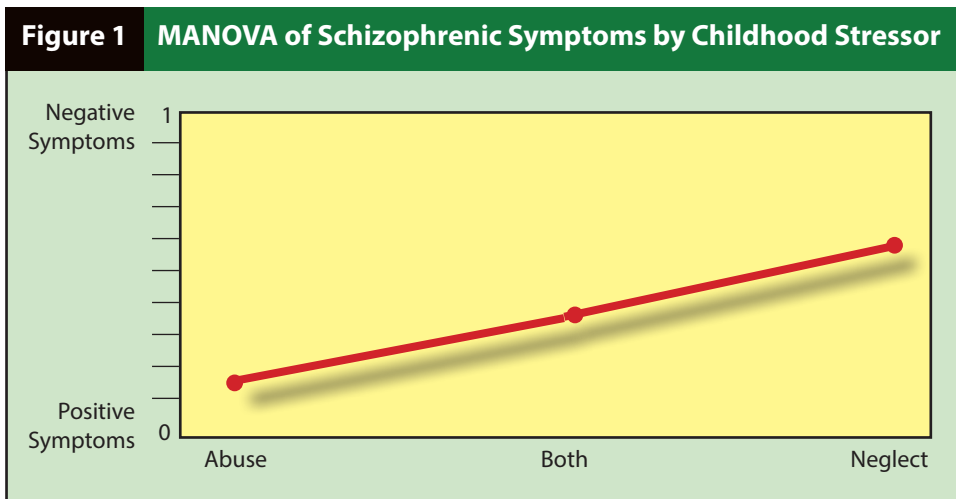
As noted earlier, we separate childhood stressors into two domains. One is "Childhood Abuse" in which the trauma is *actively* inflicted as in the case of sexual abuse. This is straightforward compared to the other domain of childhood stressor, "Childhood Neglect." We formally define *neglect* as the failure to provide adequate care and protection for children, such as by malicious or ignorant withholding of physical, emotional and educational necessities (34). We only included in our study cases of "severe neglect," the absence of psychosocial stimuli required for what some experts believe is necessary for normal brain development (40). Although extreme neglect is *passively* inflicted, its results may be extreme. Perry (40), for example, reports the case of an essentially feral 10-year-old girl who had been locked in a room by her mother and rarely even fed. Interaction with others was non-existent and she had the brain of a one-year-old despite her true age. Examples of the two domains of childhood stressors included in the present study are contained in Table 1. We include a separate category for cases where a person was actively abused and passively neglected. Three independent experts in the field classified patients into "Childhood Abuse" and "Childhood Neglect" categories. Consensus was reached on the classification of all cases included in our study. In the rare instances where there was any disagreement, the cases were dropped. Thus, inter-rater reliability was one hundred percent.

**Table 1** Domains and Examples of Childhood Stressors

Domain 1 - Childhood Abuse Examples	
	Physical abuse
	Sexual abuse
	Emotional abuse
	Verbal abuse
Domain 2 - Childhood Neglect Examples	
	Physically and/or psychologically abandoned by parents
	No interaction with others
	Institutionalization
	Regularly passed to series of foster homes
	Thrown out onto the streets to survive

### Statistical Analysis

The symptomatology under direct scrutiny here is the positive versus negative subtype of schizophrenia. This is a dichotomous dependent variable categorized as 0=positive and 1=negative. Formally, the question concerns *likelihood*—i.e., the probability that an individual will be affected by one subtype or the other.



The independent variable involves a classification of childhood stressors operationalized as “abuse” or “neglect” in the previous section. The information provided in the Social Histories is detailed enough to produce a complication: some patients had been exposed to *both* sets of experiences. This means that the proper categorization of the predictor variable is abuse vs. neglect vs. abuse *and* neglect.

The statistical technique of choice for this dichotomous, probability-based dependent variable and categorical independent variable is multivariate analysis of variance. MANOVA was originally developed for experimental applications, but has been subsumed within the general linear model widely available in statistical analysis packages (50). Like regression analysis, it is tested for significance using the sampling distribution of F, but MANOVA has two immediate advantages in the present application. First, it offers a single, direct test of the main effect which is more cogent than a series of dummy variable regressions. Second, the MicroCase data analysis package creates a visual display that was instrumental in deriving this finding and also facilitates substantive interpretation.

## Results

In Figure 1, the height of the dots represents the mean probability of negative (higher) vs. positive (lower) schizophrenic subtype. Observe that the left-hand dot above “abuse” has the lowest likelihood of negative schizophrenia, indicating an association with positive subtype. The dot at far right shows the highest (i.e., greatest) probability of negative schizophrenia directly over the “neglect” category. Patients exposed to “both” abuse *and* neglect display a likelihood very nearly in the mathematical middle.

The MANOVA test of the independent variable yields an F value of 4.581 with an associated probability of 0.012. This succinct, statistically significant finding suggests a substantive interpretation based on Figure 1. Patients who

have been actively mistreated—e.g., suffered physical or sexual “abuse”—are the most likely to manifest the acting out (active symptoms) of positive schizophrenia; those who have been ignored, rejected or ill-cared for—i.e., “neglected”—show more symptoms of the emotional withdrawal (passive symptoms) characteristic of negative subtype.

The logical connection between type of childhood stressor and schizophrenic subtype is striking, and is further underscored by the intermediary position of patients exposed to “both.” Also building the *prima facie* case for the abuse/positive, neglect/negative association are further analyses (not shown) utilizing sex and race as controls. Although case attenuation precludes meaningful statistical conclusions, male, female, black and white patients *all* display the same monotonic pattern that appears in Figure 1.

## Discussion

Our finding is consistent with a large number of studies demonstrating that histories of childhood maltreatment have been observed in a large percentage of adults with severe and persistent mental illness (12, 14). However, only a limited number of those studies have investigated risk for schizophrenia and specific background factors. The work of Schenkel (14) and his co-researchers used a schizophrenic population to investigate some aspects of the type, frequency, severity and age of onset of childhood stressors but it was not as specifically designed as the present study. Another study did find positive symptoms (delusions and hallucinations) to be strongly related to child abuse in general but did not examine for negative symptoms, let alone the specific effects of neglect (51). We believe that our study is the first of its kind since it examines the effects of *specific* childhood stressors (“abuse” and “neglect”) on *specific* symptoms of schizophrenia (“positive” and “negative”). *Our central finding is that childhood neglect is correlated with more severe (negative) symptoms of schizophrenia and that childhood*

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The main finding of this study is significant because it uncovers a connection between active childhood stressors (abuse) and active symptoms (positive) of adult schizophrenia. Consistently, the finding also connects passive childhood stressors (neglect) with passive symptoms (negative) of schizophrenia. It is as if the type of childhood stressor incubates the specific symptoms of adult schizophrenia. This, of course, is speculation on our part. Much more research is needed on the effects of childhood stressors on adult schizophrenia, particularly research that examines the effects of specific types of child maltreatment in adults with schizophrenia (14).

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The present study clearly has some limitations. There are three that stand out. First, this analysis is based on chart-based assessments. As noted earlier, we do not believe that validity and reliability are compromised by this fact but future studies would be well served by prospective, longitudinal studies of high-risk children who are maltreated. Second, we cannot demonstrate that the impact of physical, sexual, emotional, and verbal abuse on positive and negative symptoms is likely to be the same. We simply lack sufficient methodological power to test these more specific associations in our sample. Third, our description of positive symptoms as “active” may be debatable. We feel that the connection between the terms is a logical one. However, we welcome more discussion on this issue, particularly in light of recent findings that the phenomenon of hallucinations can occur in PTSD, another sequelae of child abuse (28). Standardized clinical terminology would be especially useful for symptoms of different disorders.

Earlier, we stated that there is a paucity of studies on the effects of childhood abuse and neglect on childhood schizophrenia. However, we also noted that there has been a slight, recent increase in research on the role of childhood stressors on adult schizophrenia (4, 27-29). It is this kind of research which may lead us to understand whether childhood trauma can increase the risk for schizophrenia with or without a genetic predisposition (21) and whether certain childhood stressors, such as neglect, should be considered as diathesis and not simply as stress.

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