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THE SOCIAL AND THE EMOTIONAL IN THE  
ETIOLOGY OF CHILDHOOD LEAD POISONING \*

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ABSTRACT

Childhood lead poisoning has been characterized as a silent epidemic. Significant social, emotional, and economic factors play a role in its etiology. Differential intervention in this problem is predicated on understanding the relative role of these causes.

The Problem of Lead

One enduring question about childhood lead poisoning's etiology concerns the relative role of social and emotional factors. It is important to develop clarity about these because different intervention procedures are associated with each cause.

Lead poisoning is probably the most serious underdiagnosed and undertreated childhood debilitating disease in the United States. Federally funded projects screened almost 4,000,000 children, ages 6 months to 5 years, between 1972 and 1981; almost 6.5% or 250,000 of these children had elevated blood levels. However, the average number of children screened per year, 400,000, represented only 2.5% of the estimated 16,000,000 U.S. children aged 6 months - 5 years (MMWR, 1982: 114). The number of children per year found to have elevated blood lead levels averaged only 25,000. Yet the National Health and Nutrition Examination Survey (Annest, et al. 1982) found 4% of all U.S. children ages 6 months - 5 years, or 640,000 children, were likely to have elevated blood lead levels. Over 600,000 lead poisoned children per year may be going undetected. This figure, as high as it is, conceals significant social and economic differences. Over 12% of all young black children were found with elevated blood lead levels, only 2% of young white children had this debilitating condition. Where the annual family income was less than \$6,000, the percentage of young children with elevated blood lead levels rises to 6% for young white children and over 18% for young black children. There is considerable evidence that neurological impairment occurs at levels below official standards (Chaiklin, 1979).

Despite the significant data about the size of the problem, in 1981 funding for the Center for Disease Control (CDC), Childhood Lead Based Paint Poisoning Prevention Program, was discontinued. State and local programs could elect to continue their screening activities through funding by the Maternal and Child Health (MCH) block grants. However, the mandatory reporting requirement was dropped and the number of reporting programs declined sharply from 60 in September 1981 to 21 in September 1982.

The problem is widely and strongly noted. Rothschild (1970) calls childhood lead poisoning a "silent epidemic". Reed (1972) goes further and says it is a "social crime". All of this attention does not bring much action. There are many reasons for this. One is size and cost. Federal legislation is required and that will take time and effort. Another is that the attention has had some effect. Today few children die from lead and most are identified before they become profoundly retarded. This leaves large numbers of children severely affected by a condition whose onset is insidious. It is not easy to focus attention for change when there is nothing dramatic to which to point (Chaiklin, 1979).

### The Causes of Lead Poisoning

Poverty and the factors associated with it target the source of the most serious cases of lead poisoning (Meigs & Whitmire, 1971; Lin-Fu, 1967; Talbot et al., 1982). Cultural factors are also heavily implicated (Chatterjee & Gettman, 1972). Emotional factors are usually identified in relation to pica; the habitual ingestion of substances which are not food. While all children with lead poisoning do not have pica, almost all children with pica, who live in old inner city housing, have elevated lead levels.

What is interesting about pica is that it is mainly a cultural pattern. It is fairly widespread in Africa in the form of clay eating and came here with the slaves (Cooper, 1957). Pica is not associated with any known dietary deficiency (Gutelius, 1962). This fact appears to have lead some investigators to focus on the emotional component. They see pica as a symptom of oral regression related to the way mothers handle anxiety and the

socialization patterns which are characteristic of the poor (Millican, et al., 1968; Lourie, et al., 1963). Chisolm (1971) ties the social, cultural, and emotional factors together as a triad of causative factors; these are a poorly maintained house, a toddler with pica, and parents unable to cope with the many pressures of living.

Poverty and pica are observable and measurable. The emotional component is not a objective. Almost all the literature reviewed identifies anxiety a present in the mothers of lead children (Chaiklin, et al., 1974; Sobel and Margolis, 1965; Sobel, 1970; Meigs, 1972). For this reason, it was decided to examine and attempt to measure the role of anxiety in childhood lead poisoning.

### Procedure

Data were collected at two sources; the Lead Poison Screening Clinic at the John F. Kennedy Institute for Handicapped Children in Baltimore, and the Well Baby Clinic #12 in the same city. The sample consisted of 30 families, 15 from each clinic site (1). The index child was between 2 and 5 years old.

Well Baby Clinic #12 is located in what is known as a "lead belt"; an area with old and deteriorating housing. This insured a rough comparability in the study groups since they were exposed to the same socio-economic and environmental living conditions.

At the time of the study, the defined level of toxicity requiring treatment was 50 micrograms of lead per 100 milliliters of blood. To provide some separation between the two groups, all children from the lead clinic had blood lead levels above 50 micrograms and all children from the Well Baby Clinic were below 40 micrograms.

Families were selected in the order in which they met study criteria. Procedures for informed consent were followed. All mothers asked participated in the study. In the normal group, five mothers had to be eliminated because their children had blood lead levels above 40. Replacements were selected and the families whose children had elevated levels were monitored. Parents were interviewed at home. In the treatment group data were collected at least two weeks after diagnosis to allow for reduction in anxiety and time for the first positive treatment results.

The Taylor Manifest Anxiety Scale, the TMAS, without buffer items, was used to measure anxiety (Taylor, 1953). Scores range from 0-50, low to high. Questions are in true/false form, e.g., "I do not have as many fears as my friends." This scale has been used extensively; both the short and the long forms have high reported reliability and validity (McCreary and Bendig, 1954; Holt and Magon, 1954; Kendall, 1954; Buss et al., 1955; Glaser and Ulett, 1952).

### Findings

There is an association between maternal anxiety and children's lead levels. This is reflected in Table 1.

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 Table 1  
 Maternal Anxiety and Children's Lead Levels  
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	Mean Lead Level	Mean TMAS
High Lead Group	59.7 mg/100 ml	27.4
"Normals"	36.6 mg/100 ml	16.4

-----  
 n=30, t=4.7, p < .001  
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The differences in anxiety levels for the two groups of mothers cannot be accounted for by differences in social characteristics. In Table 2 the largest difference is that the lead mothers report more inadequate housing. The adequate housing was in better physical shape but it was not necessarily more lead safe. The lead mothers, in comparison to the non-lead mothers, were slightly older, had somewhat larger families, and had children slightly older. Overall, these families are in or are struggling on the edge of poverty.

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 Table 2  
 Comparison of Lead Group and "Normals"  
 Social Characteristics  
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Social Characteristics	Lead Group	"Normal"
<u>Child</u>		
Average age	3.3	2.7
Percent black	87%	100%

Percent male	67%	73%
<u>Mother</u>		
Average age	26.3	24.9
Percent employed	27%	20%
Percent AFDC	60%	47%
<u>Marital Status</u>		
Intact Family	47%	40%
Separated-Divorced	13%	20%
Not Married	40%	40%
<u>Family</u>		
Average Number of Children	3.3	2.2
Average Family Size	5.5	4.1
Percent Adequate Housing	20%	53%

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### An Ex Post Facto Interpretation

The finding that maternal anxiety is associated with lead poisoning in children does not deal with the problem of causal order. Does maternal anxiety help produce lead poisoning or is it a result of the diagnostic and treatment procedures. We can suggest an answer.

Between the time this study was completed and reported, the Center for Disease Control recommended that the lower limit for undue lead absorption be set at 30 micrograms per 100 milliliters of blood because at that level, "significant numbers of children...have shown evidence of metabolic impairment" (CDC, 1975). This means that all but two children in the comparison group are now in a treatable category. It is our estimate that if these mothers were informed that their child had lead poisoning and given the TMAS two weeks after diagnosis and the beginning of treatment, their scores would be close to those of



the clinic group. This is an ex post facto interpretation; like all such interpretations it must be checked. One bit of supportive evidence comes from a sophisticated study of stress in the mothers of handicapped children. Bradshaw and Lawton conclude:

that the level of stress in mothers with severely disabled children is much higher than in any "normal" sample of mothers; that little of the variation in the level of stress could be ascribed to the external social and physical conditions of the family; and that the provision of goods did not appear to have an impact on the level of mental well-being of mothers (Bradshaw and Lawton, 1978).

In short, no known social or emotional variables, including the degree of handicap, explained the stress scores. Just having a handicapped child seemed a sufficient explanation of stress. Mothers of children with elevated blood levels bear the additional burden of knowing the disease was preventable and that a significant recurrence most certainly will bring impairment.

### Discussion

The high anxiety scores in the mothers of children with elevated lead levels are interpreted as coming from the fact that they have received a diagnosis. What is of more concern is that under the lead standard, 13 of 15 children in the well baby sample now require treatment. Unfortunately, the requirements for protecting confidentiality included destroying identifying information when the project was completed. The families cannot be traced. If one considers the five children eliminated because they were borderline for treatment, it would appear that a considerable number of children attending the Well Baby

Clinic are at risk. The similarity in social characteristics of the two groups of mothers suggests that in a couple of years, the "normal" group will be no different than the elevated lead group. To be poor, young, have little education, and to have close contact with a threatening disease are all characteristics which predict anxiety (Levine, G.N., 1962).

The measure used in this study corroborates the clinical observations of anxiety. This anxiety is interpreted as situational. Even if it were not, the question remains: How do practitioners take account of this anxiety in planning and carrying out treatment? The medical treatment for the child is clear, routinized, and almost always successful, especially if the child is hospitalized. Bringing the disease under medical control is only part of the job. The child must be brought back for check-ups. In most clinics, parents are given injunctions to clean up the house or to move to a safe house. Given their limited finances, they can usually do neither.

In too many cases, the inability to move or delead a house results in institutional or foster home placement. Family break-up is an indirect and tragic cost of the problem of lead in the environment. Recent evidence suggests that even when the lead is removed, the residual dust in the house creates a threat (Milar and Mushak, 1982). The parent can do nothing about lead from automobile and industrial sources. Children who live in areas of older housing, heavy traffic, and close proximity to heavy industry cannot escape having pathological lead levels. There are so many ways of absorbing lead from the environment, including canned food especially evaporated milk, that every source of lead which can be controlled should be identified and acted on (Shea, 1973).

## Policy Recommendations

Lead poisoning tends to be a disease of the poor. When it strikes, the cooperation of the parents is needed. Often, they do not have the necessary ability or resources. Future legislation for health services should provide social and material services to any family that needs this help.

Further epidemiological studies of lead levels in the inner city are needed. It is probable that a significant share of what is now called "education disability" comes from dangerous blood levels that are undetected. Children with grades not up to par and who are distractable and excitable are often labeled minimally brain damaged and put on tranquilizers almost indefinitely. The drugging of innocents is bad enough; but if it comes from misdiagnosis, it is malpractice. Needleman has said:

Had thalidomide produced mental retardation rather than the characteristic deformity of phocomelia, it might still be sold and ingested in Europe and the United States. Minor degrees of perceptual and cognitive impairment, motor incoordination, and disturbances in attention can easily escape detection. The renewed controversy over race and intelligence generally has ignored this systematic distribution of lead among the urban poor; lead poisoning runs in families (Needleman, 1975. Emphasis Added).

All that we can add to this statement is that if lead poisoning runs in families, then any program to prevent or cure this disease must take families into account. To attempt to treat or prevent the disease by only working with the individual and not with the

family is tantamount to insuring failure.

The concern with family services in preventing and treating elevated lead levels in children must be comprehensive. While work remains to be done in charting the extent of undiagnosed low-level lead poisoning, there needs to be no more demonstrating that families must be included in prevention and treatment. The Federal General Accounting Office has said, "it is futile to continue to sponsor new research without devoting attention to seeking use of valuable findings from past research" (General Accounting Office, 1978). Nowhere is this more true than in the need to provide family services for the prevention and treatment of lead poisoning in children.

Evidence mounts of the harmful effects of even low levels of lead (Charney, 1982). This, seemingly has persuaded the anti-regulatory Reagan administration to move toward the complete elimination of all lead in gasoline. Yet, without help, families are helpless to fight the lead which floods in on them from all sides. To continue to treat the child victim of lead without helping the family to be a part of the struggle is an exercise in futility. Those most interested in alleviating the problem often become caught up in an ideological battle about responsibility for the cause of the condition. These arguments about policy and politics center around what is today called the use of the medical model. This struggle is nothing new; the same issues have been fought over in the name of free will. There is no question that at the political level the tendency has been to develop programs aimed at changing people rather than the social structure and that often people have been stigmatized while an inappropriate remedy was being applied (Deschin, 1971). At the case level, there will always be a need for good diagnostic and

treatment procedures. These must be provided while the struggle to control and clean up lead in the environment continues.

### Conclusion

Based on an ex post facto interpretation, anxiety is a result of diagnosis rather than a cause. Practitioners who work with mothers of children with elevated blood lead levels can take this into account in their treatment. If medical facilities do not routinely screen for and treat children with elevated lead levels, millions of children will continue to be labeled hyperactive and become learning disabled. Millions more will not get the treatment they need.

\* Revision of paper originally presented as "Maternal Anxiety and Lead Levels in Children," at the National Council on Family Relations, Philadelphia, Pennsylvania, October 22, 1978

(1) The data for the present paper is from Barbara Mosher's unpublished Master's thesis: The Relationship Between Anxiety Levels in Mothers and Blood-Lead Levels in Pre-School Children, Catholic University of America, 1975.

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