AN INVESTIGATION OF THE EFFECTS OF COMMUNITY DRUG USE

ON ACADEMIC ACHIEVEMENT IN THE PUBLIC SCHOOL

SYSTEMS OF THE STATE OF ALABAMA

Except where reference is made to the work of others, the work described in this dissertation is my own or was done in collaboration with my advisory committee.

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AN INVESTIGATION OF THE EFFECTS OF COMMUNITY DRUG USE ON ACADEMIC ACHIEVEMENT IN THE PUBLIC SCHOOL SYSTEMS OF THE STATE OF ALABAMA

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DISSERTATION ABSTRACT

AN INVESTIGATION OF THE EFFECTS OF COMMUNITY DRUG USE ON ACADEMIC ACHIEVEMENT IN THE PUBLIC SCHOOL SYSTEMS OF THE STATE OF ALABAMA

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Historical academic achievement data from the Alabama State Department of Education and historical drug arrest data from the Alabama Criminal Justice Information Center were analyzed to determine the correlation between community drug use, as measured by drug arrest data, and academic achievement, as measured by scores from standardized tests, across the state on a real-time, long-term basis. Real-time, long-term was defined as the comparison of drug arrest data from a specific year to academic achievement data from the same year. Also, the same data were analyzed to determine the correlation between community drug use and academic achievement on a skewed-time,

long-term basis to determine any apparent prenatal effects. Skewed-time, long-term was defined as the comparison of drug arrest data from a specific year to academic achievement data 8 years later. Free and reduced price lunch data, an indicator of socioeconomic status, were also analyzed to determine the correlation between community drug use and socioeconomic status in order to see if socioeconomic status might need to be a consideration when looking at community drug use and academic achievement relationships.

Results of the correlational analyses indicated a consistent low correlation between community drug use and academic achievement as measured by the Stanford Achievement Test Series, Ninth Edition, the Scholastic Aptitude Test, and the ACT. Socioeconomic status, as measured by free and reduced price lunch data, was also related to community drug use. Results of analyses controlling for socioeconomic status showed a trend toward diminishing positive correlations between drug use and academic achievement and a reversal from positive to negative values. A logical conclusion, suggested by the results of this study, is that increased drug usage in a community affects in some way the children of those users and in turn has some detrimental effect on their academic achievement.

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CHAPTER I

INTRODUCTION

Introduction

The use of illegal drugs in the United States and many other countries has been on the increase for many years and the trend upward continues. This upward trend is most apparent in heavily populated areas but is also being experienced more and more in rural and urban settings. Small towns and rural areas are no longer exempt from the effects of this ever burgeoning scourge (Villalva, 2000).

A simple supply-and-demand economic process occurs: as the demand for drugs increases, the monetary potential for drug suppliers also increases. As a result, the sale of

illicit drugs is a tremendously large and lucrative business. Many of these illicit drugs are narcotics which are highly addictive. It must be noted at this point that cocaine and other narcotics are seldom used alone. Many recreational drugs are quite often used with other substances such as alcohol, marijuana, barbiturates, designer drugs, tobacco, heroin, and others. It has been said repeatedly in the media that it only takes one puff on a crack pipe to become addicted to crack, a processed cocaine product. Once users become addicted, they become a customer for life, sparing no expense--mental, physical, emotional, or monetary--to again capture that fleeting feeling of euphoria or to assuage the pain of withdrawal (Nuckols, 1987) . Access to drugs in our society is exceedingly easy, especially in lower income areas where the target customer population is relatively captive. This captive population also may experience the hopelessness and helplessness associated with low socioeconomic status and use these drugs to escape, albeit temporarily, from their seemingly adverse environmental conditions, as well as use the sale of drugs as a quick way to get a lot of easy money without a lot of work output. The cyclical nature of drug use and poverty go hand in hand to continue to provide the drug pushers with a steady stream of new customers willing to lie, cheat, steal, prostitute themselves, and kill to attain their product. The resulting burden on society is astounding and continues to grow. The crime rate due to drugs, the requirements of law enforcement to try to control the problem or at least keep it in check, and the corruption caused by the high profit potential are astounding and these only begin to tell the whole sordid tale (Wallace, 1991).

Drug use is not restricted only to low socioeconomic status. Affluence can also contribute to the problem. Many young people whose parents give them free rein and the allowance to support that life style often feel the need to experiment and experience the drug scene either because of peer pressure, parental pressure, their rebellious ideals, or a combination of these factors (Wallace, 1991).

In addition to the human costs of drug use in the general adult population, the financial ramifications of prenatal drug exposure are staggering. It is estimated that an extra $4,100 (1989 dollars) is spent on each child suffering from prenatal drug exposure in postpartum hospital charges. Substance abuse during pregnancy adds up to $22.3 million to $125 million per year in extended hospital stays while the added cost of perinatal cocaine exposure is between $33 million and $650 million per year. Also, substance abuse costs child protection services about $10 billion per year, without looking at medical and legal costs. The estimated cost to the educational system to service a prenatally exposed child with significant impairments to the age of 18 years is $750,000. It is also estimated that, just due to the subtle effects on IQ scores, an additional $350 million annually will be needed for additional special education services (Ondersma, Simpson, Brestan, & Ward 2000).

Added to the financial burdens noted are many policy dilemmas associated with prenatal and perinatal drug exposure problems. The issues of civil rights, societal biases, and child protection collide when considering prenatal and perinatal drug screening. These issues are handled very differently at federal, state, and local government levels and in hospitals and hospital units as well. There is no standardization of practice. Child

protection services and the courts often must mandate drug rehabilitation and treatment because drug addiction is seen as a crime; however, mental health professionals see drug addiction as a sickness and feel it should not be treated as a crime. There is also the dilemma of whether or not to remove a child from a home into protective custody when substance abuse is known to occur. Does the overseeing agency do nothing and risk the health and welfare of the child or act and risk the parent/child bonding and attachment relationship and cause future, irreversible emotional damage to the child and even to the parent? Another dilemma is the conflict of timelines involved in treatment programs. On one hand is the child's development timeline which reflects the infant's immediate developmental needs and, on the other hand, the addict's recovery timeline which is more long term and subject to relapse (Ondersma et al., 2000).

An example of one such policy dilemma is a state law prohibiting child abuse, the Illinois Abused and Neglected Reporting Act (325 ILCS 5/1-5/11.7). This act defines neglect broadly, classifying any newborn whose blood or urine contains illegal drugs as neglected. It then requires mandatory reporting by social and health care workers which can lead to the parents being charged with abuse or neglect. When this mandatory reporting occurs, physicians often take temporary custody of the child in order to administer treatment to the child. Evidence of maternal drug use during pregnancy is also reported. By doing so the physicians avoid culpability and, by invoking the law, gain some measure of control over deviant parents, requiring them to enroll in drug treatment programs or receive mandatory child care training (Heimer, 1999).

Due to experiences in California with women using drugs during pregnancy in the recent past, the Perinatal Substance Abuse Services Act of 1990 was passed. This act provided for education, health, and social services; rejected criminalization; and halted the practice of removing infants from their mother's custody on the sole basis of a drug test. Many prosecutors see prenatal drug exposure cases as unwinnable, while others see them as temporary political assets to keep unwanted minority segments of society out of predominantly White or Anglo communities (Humpries, 2000).

Statement of Purpose

Thomas (2000) discussed the lack of national educational policy on drug-exposed children. This policy shortfall is the result of the problem being defined as a criminal and social service issue and not an educational issue and as a result the actual broad impact of community drug usage on academic achievement has not been determined (Thomas, 2000). The primary purpose of this study was to use existing data to determine if there is a correlation between community drug use and academic achievement in the public school systems of the State of Alabama. Also, if it can be determined that there is a relationship, what is the magnitude of that relationship? A secondary purpose was to determine if there is a correlation between community drug use and socioeconomic status and the resultant magnitude of that relationship.

Research Questions and Hypothesis

Specific research questions addressing this issue were as follows:

1. What are the trends in community drug usage as measured by drug arrests in the State of Alabama from 1988 to 2000?

2. Is there a correlation between community drug usage, as measured by drug arrest statistics, and children's academic performance, as measured by the Stanford Achievement Test Series, Ninth Edition (SAT 9) scores, and coincidently, is there a correlation between community drug usage and socioeconomic status as measured by averaged figures of free and reduced lunch participation in the Alabama public school systems on a real-time, long-term basis? Real-time, long-term basis is defined as and determined by correlating drug arrest data from a year to academic achievement or socioeconomic data from the same year.

3. Is there a correlation between community drug usage, as measured by drug arrest statistics, and children's academic performance, as measured by Scholastic Aptitude Test scores and ACT scores in the Alabama public school systems on a real-time, long-term basis?

4. Is there a correlation between community drug usage and socioeconomic status as measured by non-averaged figures of free and reduced lunch participation in the Alabama public school systems on a real-time, long-term basis?

5. Is academic performance, as measured by SAT 9 scores, in these same school systems affected by community drug usage on a skewed-time, long-term, basis? Skewed-time, long-term basis is defined as and determined by correlating drug arrest data to academic data 8 years later to determine the effects, if any, of prenatal drug exposure.

In addressing these research questions, the author hypothesized that there will be a direct correlation between community drug usage and children's academic performance on a real-time, long-term basis and on a skewed-time, long-term basis. Also the author

hypothesized that there will be a direct correlation between community drug use and socioeconomic status.

Significance of the Study

If a correlation can be shown between community drug use and academic performance, the vast amount of resources being used separately to combat drug use and improve academic performance could be redirected to address these issues more efficiently. If the impact of drug usage on the education and successful integration of future generations into society is significant, then policy makers will have a clear incentive to attempt to eliminate or at least control the problem. This elimination or control of the drug problem can be accomplished by the determined and focused cooperation of individual members of society; federal, state, and local governments; federal and local law enforcement; community educators; rehabilitation and drug awareness programs; and school-based drug awareness programs designed to attack the problem vigorously. This issue may also impact international policy on the control of the drug supply and suppliers. If a correlation is shown between community drug use and socioeconomic status, then existing resources can be redirected to more efficiently combat drug suppliers preying on this particular segment of society.

Limitations of the Study

The academic data used in this study were preexisting from established public sources and may not be indicative of academic performance of other populations in other states throughout the country. Also, the drug arrest data gathered for this study may not be comparable to that in other areas of the country due to differing state laws as to what

constitutes criteria for arrest. The population involved in this study is limited to the public school population of the State of Alabama from 1996 to 2001 and to those persons in the State of Alabama arrested for illicit drugs between 1988 to 2000. Caution should be used in generalizing these findings to other populations in different geographical regions of the country.

Definitions of Terms

Academic achievement - Performance by students in the public school systems in a given period of time as a measure of the quantity and quality of work done by those students. The quantity and quality of work is measured by standardized examinations administered to the entire student population and normed to that population.

ACT - A standardized assessment published by ACT, Inc. consisting of a battery of four multiple-choice tests of educational development: English, Mathematics, Reading, and Science Reasoning. ACT data are used in high schools for public relations, academic advising and counseling, accreditation documentation, and evaluation studies. Almost 3,000 institutions of higher learning recommend or require the ACT from their applicants and over 1 million college-bound students take the ACT each year.

Community drug use/usage - Drug arrest records from 1988-2001 included statistical information on adult and juvenile arrests for drug possession and sale broken down by county for the entire state. The arrest data on possession and sale were combined to produce a single number defined as total drug arrests for each Alabama county. These total drug arrest numbers for each county are assumed to be a numeric indicator of community drug usage.

Free and reduced lunch prices (FRL) - A program administered by the National School Lunch/School Breakfast Program of the United States Department of Agriculture. This program is used by the Alabama State Department of Education as an indicator of socioeconomic status.

Scholastic Aptitude Test (SAT) - A standardized examination published and administered by The College Board composed of 4,200 schools, colleges, universities, and other educational organizations that provides educational institutions with a measure of American students' abilities. Currently, more than 2 million students of different cultural and educational backgrounds take the SAT each year, generally in their junior or senior year in high school.

Stanford Achievement Test Series, Ninth Edition (SAT 9) - A standardized examination published by Harcourt, Inc. The SAT 9 covers domains of reading, mathematics, language, spelling, study skills, listening, science, and social science. Score reports display norm-referenced information at the cluster, test, domain, and battery levels. It is nationally standardized and norm-based on 1995 spring and fall testing of between 500,000 and 600,000 student participants and more than 10 million students in 2000. The SAT 9 national sample is stratified by geographic region, socioeconomic status, urbanity, and ethnicity. It is used by the Alabama State Department of Education as an indicator of academic achievement and school performance.

Skewed-time, long-term - Comparison of drug arrest data from a specific year to academic achievement data 8 years later.

Real-time, long-term - Comparison of drug arrest data from a specific year to academic achievement or socioeconomic data from the same year.

Weighted average scores - Data achieved by taking the reported SAT 9 percentile rank score and multiplying it by the second month enrollment for a given school systems for a given year. The resulting factors for each system in each county were then added together and the sum divided by the combined second-month enrollment of 1998 for all the systems in each county.

CHAPTER II

LITERATURE REVIEW

The Effects of Parental Drug Use on Prenatal And Postnatal Development

An, as yet, undefined factor in this research is the effect on the children of mothers who use drugs while carrying their babies inside their bodies. A report from England's Department of health, 1998, shows that 90.7% of documented female drug abusers were in the 15-39 year old reproductive age range (Thangappah, 2000). Estimates indicate that 1.1% of pregnant women in the United States (roughly 45,100 women) smoke crack cocaine and that emergency services found one in three to six infants are prenatally exposed to cocaine (Lang, 2000). In the United States it is currently estimated that

between 100,000 to 375,000 women abuse drugs during pregnancy, with the resultant number of prenatally exposed infants ranging from 13 to 181 per 1,000 births. It is also noted that estimates put the number of females of childbearing age using illicit drugs at seven million (Ondersma et al., 2000).

The time of pregnancy is an evolutionary creation of nature, a time of development into a human being. From the joining of sperm and egg, this 9-month period is critical and essential for proper development of a human. The human body has a remarkable ability to overcome obstacles of all sorts. However, some of the embryonic development periods and processes, when upset by external environmental factors, have irreversible effects on later development and adaptation. Newborns exposed in utero to different drugs may appear to be developmentally and physically normal at birth; however, there may be delayed developmental effects of the exposure. These effects may manifest themselves in differing functional changes. Behavioral anomalies may only appear later in life when this particular behavior is expected to mature. For example, organs such as the kidneys may only exhibit problems as increased physiological requirements manifest themselves (Mantovani & Calamandrei, 2001).

Kosofsky (1999) discussed a variety of infant outcomes such as spontaneous abortion, stillbirth, birth weight, birth length, and head circumference noted in several clinical studies from all across the United States. He also summarized several studies that

indicated that the influence of prenatal use of cocaine played a causal role in the development of congenital malformation. Many of these researchers, however, did not control for extraneous factors, thereby not conclusively supporting the independent role of cocaine in the outcomes. Controlling for factors such as maternal characteristics, maternal habits during gestation, and additional factors that influence maternal-infant interactions are extremely important when trying to determine actual causal correlations. Several more studies were mentioned in his research in which regression analyses were used to account statistically for these confounding variables. As a result, the magnitude of the effect of cocaine was found to increase, implying that cocaine has a direct effect on fetal development. One implication of these studies suggests that the window of biologic vulnerability of brain development may be early in gestation. The first-trimester insult, by the mother's use of cocaine, may be independent of second- and third-trimester effects on fetal growth. Also apparent in several studies is the correlation between degree of exposure to severity of outcome problems. In other studies electrophysiologic and neuroimaging examinations were discussed which further supported the dangers of prenatal cocaine use to the fetus and the perinatal child (Kosofsky, 1999).

Research accomplished by Bancalari (1991) showed that exposure to cocaine produces abnormal breathing patterns in human fetuses. These abnormal patterns include persistent rythmic, hyperneic, and regular breathing which may last up to 30 minutes. There is some evidence which shows that accelerated lung maturation may occur due to enzyme induction in infants exposed to opiods; however, the benefits of this occurrence are offset by the increased risk of premature delivery associated with use of these

substances. Because many of the drugs used by the mother cross the placenta, the effects on the fetus are similar to those in the mother. Intravenous injection of cocaine in pregnant ewes has shown to increase maternal arterial blood pressure, with a decreased uterine blood flow. The fetus also responds with increased blood pressure and heart rate. The dramatic increase in fetal blood pressure is due to impaired placental gas exchange due to the decrease in uterine blood flow (Bancalari, 1991).

After birth the incidence of RDS (respiratory distress syndrome) is increased as a result of exposure to opiods. Any drug that depresses the central nervous system increases the risk of neonatal respiratory depression, especially if the substance impairs placental gas exchange and the infant had become hypoxic before birth. Cardiovascular adaptation and function have been shown to cause lower stroke volume, lower cardiac output, and higher systemic blood pressure in cocaine exposed neonates. Also an increase in arterial blood pressure and coincident increase in cerebral blood flow may increase the risk of inter-cranial hemorrhage, especially in pre-term infants (Bancalari, 1991).

There are many methodological difficulties in the evaluation of the respiratory pattern and control mechanisms in infants. Human subject selection, compounding variables, the related instrumentation, and analysis and interpretation of data are examples of these difficulties (Bancalari, 1991). A fetus exposed to cocaine in the womb appears to be affected in two ways: indirectly through decreased uterine blood flow and directly by andrenergic effect. Cocaine also blocks the re-uptake of catecholamines at nerve terminals. Use of cocaine close to the time of delivery may serve to increase lung surfactant secretion and resorption of lung fluid due to increased catecholamine levels and may explain

improved respiratory status of these exposed infants. These short-term effects do not impact, however, the development of bronchopulmonary dysplasia caused by chronic stress on the infant due to the drug use by the mother (Hand, Noble, McVeigh, Kim, & Yoon, 2001). Brain proton magnetic resonance spectroscopy and imaging has shown an increase in creatine in the frontal white matter which suggests biochemical alteration at the cellular level in response to prenatal cocaine exposure. This phenomenon may reflect an abnormality in energy metabolism due to multiple episodes of decreased uterine blood flow to the fetus. Another finding is a decreased N-acetyl-containing compounds in the frontal lobe or striatum which indicates neuronal injury due to exposure to cocaine (Smith, Chang, Yonekura, Gilbride, Kuo, Poland, Walot, & Ernst, 2001). Other researchers studying newborns found that after the newborns' first-day examination, the maternal cocaine infant had a significantly lower cardiac output and higher stroke volume relative to the newborn of non-cocaine using mothers. Blood pressure was also significantly higher on the first day of life for the maternal cocaine- using infants versus the newborns of healthy mothers. There was no significant difference relative to heart rates for the two groups of infants on the first day. Cocaine metabolites were also present in the urine of babies who had cocaine-using mothers. On the second day, there was no difference in blood flow or blood pressure between the two groups (Van de Bor, Walther, & Ebrahimi, 1990).

Bakeman, Brown, Coles, Demi, and Sexson (1998) and Demi (1998) showed that gestational age moderated the effect of maternal drug use on infant birth weight, birth length, and ponderal index. Differences between these indices between drug exposed and

non-exposed became more extreme in later born infants. Compared to the direct affect of gestational age, these moderating effects were weak. They also showed in their research that drug-exposed infants were more irritable and scored lower on orientation than those non-exposed. Gestational age moderated differences in irritability, with increased irritability being more extreme in earlier born infants. Length of gestation was not associated with scores on orientation, probably due to the time period after birth when the infants were tested (3 days for full-term, 17 days for pre-term). The authors pointed out, however, that the sample was not representative of all the premature babies born between 30 and 36 weeks of gestation due to the decision to examine only relatively healthy infants allowing for a minimum of compounding variables concerning the health of the children (Bakeman et al., 1998; Demi, 1998). However, in a similar study by Woods, Eyler, Behke, and Conlon (1993), analysis of the Brazelton Neonatal Behavioral Assessment Scale clusters (habituation, orientation, motor performance, range of state, state regulation, and autonomic regulation) showed no significant differences between the cocaine-exposed and non-exposed infants when tested shortly after delivery. The 1-month follow-up assessment revealed no significant difference between the two groups of infants. However, the study showed a significantly higher level of self-reported depressive symptoms, using the Beck Depression Inventory to assess the intensity of depression, among the cocaine-using women than with women with no evidence of cocaine use.

In a study of infants, Bendersky and Lewis (1998) found that at 4 months of age a significantly greater number of infants were less able to recover from a stressful situation if they were heavily exposed to cocaine in utero. The findings appeared to indicate

independence from compounding variables such as environmental risk, neonatal medical condition, concurrent maternal interactive behavior, and exposure to other toxins. These data were obtained in a lab setting, and the authors did point out their reservations about the possibility that arousal regulation deficits in these infants may be due in part to extrinsic conditions such as cocaine using mothers being less consistent in their interactive behavior outside the test situation.

Alessandri, Bendersky, and Lewis (1998) observed no significant differences in cognitive functioning in cocaine exposed 8-month old infants as compared to infants from similar backgrounds. The researchers controlled for effects of other substances but found no difference between cocaine-exposed and non-exposed infants in habituation information processing or response to novelty using the habituation paradigm. Also, at 8 months old, Mental Development Index scores in all three groups (highly exposed, lightly exposed, and non-exposed) were within average ranges and compared well to at risk populations with the Bayley Scale of Infant Development. However, at 18 months, the Mental Development Index indicated that those highly exposed to cocaine and high environmental risk showed significantly worse scores. These scores indicate a "threshold of cocaine exposure for certain outcomes below which problems are not detectable" (Alessandri et al., 1998, p. 571). Also, because more cognitively challenging measures are used at this age, the effects are more likely to manifest themselves. High risk environmental scores also related negatively to Mental Development Index scores at both ages. The concluding results suggest that "infants with a high level of prenatal cocaine exposure are likely to exhibit difficulties in cognitive functioning" (Alessandri et al., 1998,

p. 571). Concurrently, low levels of cocaine exposure may have little effect, based on this study. Similar findings on learning and emotional responsivity were supported in another study by Alessandri, Sullivan, Imaizumi, and Lewis (1991). In addition Singer, Arendt, Minnes, Farkas, Salvator, Kirchner, & Kliegman (2002) found that cocaine-exposed children suffered a doubling of the rate of developmental delay and significant cognitive deficits during the first 2 years of life. These delays are indicative of later school-age learning difficulties.

In a follow-up study, Bunikowski, Grimmer, Heiser, Metze, Schafer, and Obladen (1998) and Dow-Edwards (1989) found that there was a higher rate of mild developmental retardation in drug-exposed infants than in the control group. They determined that these prenatally exposed infants were at higher risk for psychomotor development impairment. Also noted in the study was the fact that there was no difference in developmental outcome between those children in foster care and those children being cared for by their biological mothers (Bunikowski et al., 1998; Dow-Edwards, 1989; King, Perlman, Laptook, Rollins, Jackson, & Little, 1995). In a study by Arendt, Ange1opou1os, Salvator, and Singer (1999), the motor scores of a group of children obtained at birth and 2 years revealed poorer performance by the cocaine-exposed group in overall ability. Fifteen percent of the cocaine-exposed group versus 7 % of the unexposed group were classified as at risk on the gross motor scale, whereas 34 % of the cocaine-exposed children versus 21 % of the unexposed were at risk on the five motor scales (Arendt et al., 1999).

There are many factors, such as maternal malnutrition and lack of prenatal care and other unhealthy behaviors, that have influences on infants' development which are not related to the use of drugs. Some factors that play an important role in predicting indexed growth patterns of infants include pre-pregnancy weight and maternal weight gain, parity, and ethnicity (Harsham, Keller, & Disbrow, 1994). Other factors include maternal-infant interactions, maternal education, maternal depression/isolation, stress, home life, marital status, social supports, and cigarette and alcohol consumption (Cook, Peterson, & Moure, 1990; Dempsey, Hajnal, Patridge, Jacobson, Good, Jones, & Ferries, 2000; Kosofsky, 1999; Richardson, Day, & McGauhey, 1991). Due to the high probability of multi-drug use, including alcohol, concern for fetal alcohol syndrome also needs to be considered in the effect of prenatal drug use. Alcohol has been proven to cause clear and irreversible negative effects on the developing fetus. These effects include mental retardation, neurological deficits, facial malformations, and growth retardation. Though very few children demonstrate the profound deficits associated with fetal alcohol syndrome, attentional and informational processing capabilities may still be affected to a significant level (Ondersma et al., 2000). Children exhibiting fetal alcohol syndrome or fetal alcohol effects may show such aggressive traits as hitting, biting, pushing, and kicking. They also may be friendly and talkative yet acting on impulse, darting about the classroom. Other traits are lack of memory, loss of concentration, or an inability to learn, with children often forgetting their names and addresses if they can learn them at all (Duckworth & Norton, 2000; Jacobson, Jacobson, Sokol, Martier, & Ager, 1993). As one can see, there are many compounding factors associated with causal determination of infant outcomes.

There does not appear to be a consensus among researchers about the actual long-term effects of prenatal exposure to cocaine. However, there does seem to be evidence mounting which indicates that it may lead to deficits in the children's ability to adapt, habituate, or regulate, especially under stressful conditions. Also, subtle differences in IQ levels and language abilities occur which cause researchers to predict a yearly increase of 1,688 to 14,062 additional children falling within the range of mentally retarded according to the IQ tests. Also predicted are 4,000 to 30,000 more children experiencing language problems, both receptive and expressive (Ondersma et al., 2000).

The Effects of Parental Drug Use and Environmental Factors on Childhood Development

In a study by Cosden and Peerson (1997) concerning the effects of prenatal drug exposure, it was proposed that along with the physiological aspects, environmental aspects play an important role in the development of the child as well. Risk for neglect or abuse is higher for children living in homes where alcohol or drugs are used. Substance use over time may impair a mother's cognitive abilities and hamper her capacity to make important decisions about her children and their welfare. Drug use requires time, financial resources, and emotional expenditure, all of which are spent on the drug use and not on the children. This family instability and the resultant chaotic and unpredictable family life can compound any existing neuro-behavioral problems of the child, including the development of required secure early attachments. Postnatal effects of parental drug use often is seen by many researchers, especially in the child welfare profession, as a more appropriate focus based on the high correlation between poor child outcomes and substance abusing parents.

Relative risk of neglect increases by a factor of 3.2 and physical abuse by a factor of 2.9 when substance abuse is diagnosable in a caretaker. Studies also have shown evidence of substance abuse in 79% of the caretakers whose children were placed on out-of-home care. Any child who exhibits special needs or experiences deficits due to prenatal exposure is more likely to experience negative interaction when placed in a hostile or compromised environment (Ondersma et al., 2000). The effects of parental drug use are many and varied. Opiate and cocaine use by parents generally occurs in areas of poverty, and because it is an illegal activity, it must be conducted secretly. This type of drug use is associated with poor parenting, abuse, additional criminal activity, and exposure to AIDS, overdose, and hepatitis. All of these factors have the potential to affect children's psychosocial development in a number of ways: by depriving them of proper and adequate physical care, by impeding their socio-emotional and cognitive development, by influencing them to become drug users themselves, and by increasing their need for special social services. The social contexts in which drug-using parents raise their children expose those children to a risky lifestyle associated with exposure to other drug users in the home, absence of the parents due to imprisonment or sickness, immoral development caused by the illegality issues, bereavement due to parental death by various diseases or overdose, associated poverty, and lack of social support from the community, including school (Hogan, 1998; McIntosh, 2002).

For maltreated children placed in out-of-home care, 79% were determined to fall under the care-giver substance abuse definitions. Other important factors associated with the impact of this phenomenon are the quantity, frequency, and duration of use as well as

the type of drug used (Besinger, Garland, Litrownik, & Landsverk, 1999). Studies in several large states indicate that parental drug use is a leading reason for the increase of children in foster care. Several states now have mandatory child maltreatment reporting laws to expose prenatal exposure to cocaine. Research has challenged many of the assumptions of prenatally exposed children and have shown that those children develop well when exposed to competent care-giving in an appropriate environment. Conversely, there is an elevated risk of poor development when children live with an addicted mother. Many of the outcomes once attributed to prenatal exposure to cocaine have been shown to be a result of compounding variables and shortcomings in the previous studies (Berger & Waldfogel, 2000). Most longitudinal studies did find some long-run effects of prenatal cocaine exposure including lower conceptual development, higher incidence of physically violent behavior, impaired language development, and higher rates of depression and anxiety. There is a good deal of controversy now as to whether child protective services should intervene in cases of prenatal exposure (Berger & Waldfogel, 2000). Children placed in foster care then reunified with their parents often return to foster care for a variety of reasons. One factor, substance abuse, is a near-perfect predictor of reentry into out-of-home care. Substance abuse in the family has been credited with a steady rise of child maltreatment reports and, therefore, an increase in out-of-home care for these children. The stability of reunification with birth parents is especially crucial to infants due to their physical, affective, and cognitive developmental stage and their extreme vulnerability. In many cases, the return to out-of-home care may be the only safe

alternative for the child; however, these cases present a very taxing burden on the already overwhelmed child welfare system (Frame, Berrick, & Brodowski, 2000).

A problem for child welfare workers is deciding when to reunify children with their parents after an addicted parent has stopped using drugs. Cocaine addiction recovery is a developmental process with five predictable stages: (1) withdrawal (0-15 days), (2) the honeymoon (16-45 days), (3) the wall (46-120 days), (4) adjustment (121-180 days), and (5) resolution (181 days and up). During all of these stages the addict experiences various degrees of confusion, anxiety, depression, and risk of relapse. Many addicts drop out of treatment due to the irresistible urge to use drugs again to combat their discouragement and depression. Very important during the latter stages is the need for recovering addicts to change their lifestyles and work on balancing their lives through introspection and working through of past problems. Low income women, as compared to their male counterparts, have more difficulty with recovery due to poor life-management, limited vocational skills, past sexual abuse, limited social support, and/or poor coping skills (Hohman & Butt, 2001).

Mothers who abuse drugs tend to expect too much maturity in their children and also tend to be unaware of their children's developmental states. Recovering mothers feel guilt and shame about their past behavior and may tend to overcompensate. As a result, they may set unattainable expectations on themselves and their children, creating serious emotional problems when these expectations are not met. Children's behavioral and cognitive problems due to prenatal drug use only exacerbates the problems of the recovery process, thereby making the mother prone to relapse in an attempt to escape her guilt.

Often mothers may view and identify a child born during their addiction as a symbol of that addiction and therefore view that child negatively (Hohman & Butt, 2001).

Parenting classes, random drug testing, moves away from addiction-supporting environments, establishing non-drug-using friends and support systems, and relapse prevention plans are all practical aspects of an addiction recovery plan. Compliance with court-ordered plans and being active in their treatment provides social workers with evidence that recovering addicts are better able to care for their children (Hohman & Butt, 2001).

We cannot assume that drug dependence automatically results in an inability to be a good parent or that a child's development is necessarily adversely affected by parental drug use. We do know, however, that drug abuse increases the potential for adverse family outcomes. Chronic addiction results in time and attention being devoted to accessing and using drugs rather then toward parenting. Drug users' households are generally poor, unstable, and chaotic; and children in such households are at high risk of maltreatment, neglect, or abuse (Barnard, 1999). Few resources are available to help children who belong to families of drug-using parents. Often services that are available are targeted toward the chemically dependent adult and not the children. Treatment of the children in such cases is dependent on the parents' involvement in treatment. These children often experience high levels of violence, loneliness, isolation, and chaos as a result of their parents' habits and the resulting environment in which they are forced to live. Group-based interventions designed to help these children offer opportunities for them to be exposed to predictability, structure, and praise, which are often totally absent in their

homes. Also, these programs allow these children the opportunity to express themselves, their fears, needs, and desires to some caring adult and to help them deal with the overwhelming life problems they encounter every day (Dore, Nelson-Zlupko, & Kaufman, 1999).

Brook and Whiteman (1996) discussed parental drug use and the effect of parental personality on the adjustment of children. Studies have shown that parents' personalities affect their children's personalities. The attachment relationship between parent and child contributes to the development of the child's personality and the child's later identification with the parent's values. This attachment relationship increases the likelihood that children will imitate the behavior of the parent. Parental aggression and parental drug use were also found to affect toddler aggression directly by providing a model of aggression and reinforcement of the child's aggressive behavior (Brook, Zheng, Whiteman, & Brook, 2001) The implication here is that drug-using parents will produce drug-using children simply by association and assumption of parental values and beliefs. A strong positive family relationship may play a mediational role in the degree of behavioral and psychological problems of these children. Many homeless street youths come from homes plagued with parental drug use and often have histories of physical and sexual abuse. Parental drug use is an important predictor of street youth moving into the use of hard drugs and involvement in illegal pursuits including drug trafficking and robbery in order to support their habits (Baron, 1999). Early display in children of noncompliant difficult personality attributes may be a precursor for unconventional behavior and later drug use. These unconventional behaviors remain relatively stable between adolescence and early

adulthood and interrelate with adverse familial and peer group drug-conducive behaviors and practices (Brook & Whiteman, 1996).

Close mutual parent/child relationships promote conventional behavior which insulates children from drug use. Drug-using peer groups foster drug use in youngsters by providing social reinforcement for the continued use of drugs. This social reinforcement for the continued use of drugs is especially true for unconventional adolescents given that they tend to select drug-using peers because of the similarity in attitudes and values and because they engage in similar behavior (Brook, Whiteman, Finch, & Cohen, 2000). These factors support the cyclical nature of abuse and drug use. In addition, parental drug use also has been shown to impact, directly and indirectly, the negativity and anger of children. This anger and negativity are reflected by aggressiveness which is a risk factor in delinquency and later drug use (Brook & Tseng, 1996). These factors also need to be considered as compounding variables when combined with existing physiological difficulties of the child.

Along these same lines, studies have shown that children's internalizing behaviors of social withdrawal, anxiety, depression, and poor self-esteem along with children's externalizing behaviors of aggression, inattention, conduct disorder, and poor school performance are linked to parental drug and alcohol usage. Impaired cognitive functioning of the parents due to drug and alcohol usage can correlate highly to impaired cognitive functioning of their children (Fitzgerald, Sullivan, Ham, Zucker, Bruckel, & Schneider, 1993). These factors of behavior and impaired cognitive functioning do not bode well for children's proper development in elementary and middle school years. Antisocial behaviors

interfere with the learning process not only in learning assignments but also in peer relationships. Failing, disliked, and antisocial children select social settings that maximize social reinforcement. “Birds of a feather flock together” may be an appropriate phrase here because many times in schools children of commensurate academic skills are put in the same classroom, thereby forcing or encouraging these deviant peer groups into closer association. These associations may exacerbate the antisocial behavior and give opportunity to shape new forms of problem behavior and discourage academic engagement (Dishion, Patterson, Stoolmiller, & Skinner, 1991). This phenomenon is shown to be positively correlated with poor parental monitoring and discipline practices, one of the important results of parental drug use addressed earlier.

Added to this dilemma is another critical compounding factor: the onset of puberty in adolescence. Early pubertal timing, developmental level relative to same-sex, same-age peers, has been implicated as an important etiological factor in the development of adjustment problems, psychological distress, depression and anxiety, eating disorders, precocious sexual behavior, and early substance abuse. Decreased parental supervision may allow increased opportunities for these early maturers to engage in non-normative behavior. Rejection by developmentally normative peers may also reduce self-esteem, impair school performance and social functioning, and further exacerbate the potential for substance use and abuse. These problems are further complicated by the fact that attitudes of urban and inner-city settings influence the impact of pubertal timing. The simple increased availability of drugs, alcohol, and tobacco in urban and inner-city settings affects the likelihood of experimentation (Dick, Rose, Viken, & Kaprio, 2000). Many adolescents

view drug use as an intra-personal matter of individual discretion rather than something to be controlled by society. High-drug-use subjects discount the harm caused by drug use and treat it as a personal issue. High-drug-use subjects also see themselves as the only authority when drug use comes into question (Nucci, Guerra, & Lee, 1991). Young people continue to be vulnerable to persuasion to use drugs in spite of increased education about drugs. Their knowledge of the dangers of drug use and abuse remains limited. Many youth view their taking drugs as a way to feel grown up and to escape problems while others take drugs to feel good, for fun, and for kicks. Those children who become problem drug-takers may also be experiencing disrupted family life or have parents who use drugs. Other children may be disaffected or risk-takers and may have started using alcohol or tobacco, also known as gateway drugs, at an early age. Recreational drug use has become widespread and often is accepted by non-drug users. In order to combat this trend, young people should be given honest and accurate educational information at an early age so they can make informed choices. This honest and accurate educational information includes responsible coverage by the media and partnership programs including the youth, teachers, parents, and others in the communities (Wright & Pearl, 2000).

Practical Aspects and Educational Responses to Community Drug Usage

As the cycle continues, we see more cause for concern about this problem. We have looked at some of the effects of prenatal exposure to drugs, both physiological and psychological, and have followed these effects into adolescence. Other research has shown that aggression (a dominant characteristic of prenatal drug exposure) at an early age can

begin a cycle of maladaptation that may be manifested in school, home, and the community. Maladaptation in school prevents children from learning important skills--academic, physical, and social--which are essential to later life. These skills are necessary for higher education and later employment. Aggression in individuals may prohibit necessary successful interaction in the workplace and may contribute strongly to subsequent long-term unemployment (Kokko & Pulkkinen, 2000).

Research on parental beliefs about their children's abilities may also be a factor in adolescent and early adulthood drug usage. Studies have shown that parents overestimate their children's capabilities. This positive view of one's child enhances the parent's self-esteem and makes parenting more manageable (Miller, Manhal, & Mee, 1991). Also, because of cultural differences, minorities tend to view intelligence and academic achievement differently from the basic western, Anglo-American concept of intellectual development and achievement (Okagaki & Sternberg, 1993). These factors also come into play and may potentially cause the drug-using parent to feel less guilty about their own parenting behavior and lead them to assume that their children have the strength and ability to fend for themselves under any circumstance, if they care at all.

Children's schooling also is impacted in that drug-using parents' values, time commitments, and resource availability for their children's education may be much less than minimal. Support for the ongoing performance of a child may be inconsistent, causing a subsequent lack of motivation on the part of the child or total dismissal of the values and need of an education (Grolnick & Slowiaczek, 1994).

The practical matter of education, when dealing with this problem, is that there are many children in our schools who suffer from varying degrees of parental drug exposure. These children have to be addressed with the variety of services available in our school systems. Many of these children resemble the stereotype image of this troubled population, yet many others barely resemble the stereotype, and still others are indistinguishable from the general school population. The same holds true for resultant behavioral differences. There is a continuum from bad to normal in this diverse subgroup (Cohen & Erwin, 1994). Teacher-assessed child behavior studies of prenatal drug and alcohol exposure have shown a persistent biologic effect, which includes attention problems and delinquent behavior. Also having a significant effect on behavior problems has been postnatal exposure to violence and drugs in the home, irrespective of prenatal exposure (Delaney-Black, Covington, Templin, Kershaw, Nordstrom-Klee, Ager, Clark, Surendran, Martier, & Sokol, 2000; Delaney-Black, Covington, Templin, Ager, Nordstrom-Klee, Martier, Leddick, Czerwinski, & Sokol, 2000).

According to a survey of early childhood educators by Kim, Sugai, and Kim (1999) learning problems of children prenatally exposed to drugs included limited attention span, off-task behavior, and less goal-directed behavior. The same educators listed hyperactivity, impulsiveness, disruptiveness, and being easily frustrated as behavior problems. Other problems included less responsiveness, lack of self-regulation, excessive language difficulty, and a tendency to avoid physical and social contact. The educators polled agreed that it is important to focus on the individual characteristics and needs of the child rather than on his or her problems and other assumptions embedded in a particular

label. Systematic support will help these children acquire the necessary skills to cope with the challenges of their environment and allow them to become useful members of society (Kim et al., 1999).

Research by Chapman (2000) supported previous findings that prenatal cocaine exposure has a negative long-term effect on language development and that long-term effect may persist. Because the language system is complex, consists of interrelated components, and also operates as an interactive cognitive process, any disorders in the cognitive processing areas caused by prenatal cocaine exposure can have subtle to intense effects on development in other areas. Hampered acquisition of language skills is associated with multiple learning problems that will emerge over time. Therefore, disruption of formal or functional language aspects result in serious and diverse difficulties developmentally. Receptive and expressive language difficulties were exhibited in the prenatally exposed children studied. Additionally, some of these children, across age ranges, had not exhibited language difficulties previously (Chapman, 2000). Expressive language development has also been confirmed to be affected by prenatal exposure to cocaine and other substances, especially tobacco. Cocaine-exposed children were shown to be 2.4 times more likely to be classified in the low-language group compared to the control group (Delaney-Black et al., 2000). Another study by Dixon, Thal, Potrykus, Dickson, and Jacoby (1997) confirmed that prenatal exposure to stimulant drugs affects early language development. In this study, significant delays of all aspects of language development were exhibited by a sizable proportion of the children studied whose mothers abused drugs. Many of the children studied were not being raised in the homes of their

biological mothers, but in foster or adoptive care. The statistical analyses of these children showed that those children in the homes of the biological mother did significantly better than those in out-of-home care. One might conclude by this finding that out-of-home care provides less support for language development. Another possibility may be the severity of usage by the mother, thus higher exposure for the child, which leads to having the children put into foster care to start with. This study also showed increased delay with increased age indicating that, at the stage of development of more complex sentence structure and grammar, drug-exposed children have a much more difficult time. One explanation of this phenomenon may be impairment of the brain centers responsible for organization of the executive function by the stimulant drugs. This impairment is manifested by observed difficulty in organizing linguistic structure into meaningful utterances. Other effects may be due to damage caused by the drugs to neurotransmitters and attention and arousal centers and neurostructural damage caused by utero fetal and placental vasoconstriction (Dixon et al., 1997).

Early childhood educators should focus on ensuring that the learning environments for children exposed prenatally to illicit drugs be a small area or room and that programs for these children be predictable and amenable to the children's learning abilities. Distractions from other people entering or leaving should be minimized. Daily routines must be established that allows for self-directed exploration with adult intervention if necessary to guide the child. Educators should work with other involved professionals and work toward focusing on the individual child's needs, with community-based, family-centered solutions emphasized (Sluder, Kinnison, & Cates, 1996).

Daycare workers also need to have a clear understanding of the symptomology of children prenatally exposed to drugs. They should also have extensive training in dealing with the various aspects of the problems encountered in order to meet the needs of these children adequately. Effective and efficient intervention must be interdisciplinary and comprehensive because the primary goal is to provide a stable environment and positive interactions whenever possible in the lives of these children. The basis for future training of daycare providers should include intervention practices, developmental characteristics, collaboration requirements among different available services, developmental monitoring requirements, application of pertinent research into the classroom, and reevaluation and inclusion of best practices into the learning environment (Kinnison, Cates, & Baker, 1999).

Some possible classroom techniques which can be used to address this problem are covered in an article by Mary Waller (1993). Techniques include removing distracting stimuli from the classroom, limiting transitions, limiting different teaching styles, and teaching specific social and relational skills. Many of these students exhibit random and patternless behavior where learning has no beginning, no middle, and no end. They simply can not relate things in many cases (Waller, 1993). It is extremely important to provide appropriate early interventions for children prenatally exposed to cocaine. If early intervention does not occur, learning and behavioral challenges may become more problematic as the children age and these behaviors begin to manifest themselves as inappropriate social behavior, hyperactivity, and impulsive violent tendencies. Policymakers should take a number of steps including supporting allocations for funds for

teacher training focused on dealing with drug-exposed children and identifying and tracking these children through the public school system (Thomas, 2000). Many of the intervention programs are already in place in special education venues but in fact may take away from the quality education of those not included in this population, especially if inclusion is mandatory. As a result we are stuck with another quandary: How do we teach these unfortunate products of their parents' weakness and stupidity and provide the best education possible for the entire population of our school age children?

Neighborhood prevention and intervention services for children are potential means of addressing the reduction of the rates of youth violence and drug abuse which lead to future parental drug use in some communities. There are problems in establishing these programs, however, among them being allocation of funding and the difficulty in obtaining neighborhood volunteers. When the obstacles can be overcome, progress can be made toward improving neighborhoods by designing activities to engage the residents, providing pro-social recreational and educational activities, providing legitimate economic alternatives to selling drugs, providing other sustainable economic activities, and providing dedicated role models to help run these activities. The outcome of such a project will empower the residents to address the necessary issues such as criminal behavior, substance abuse, and other youth-associated antisocial behaviors. By having the youth of the neighborhood prioritize the most serious problems and by collaboratively designing appropriate interventions, there can be the necessary buy-in for success required by all participants (Randall, Swenson, & Henggeler, 1999).

As stated previously, infants exposed prenatally to cocaine at higher levels are likely to exhibit difficulties in cognitive functioning (Alessandri et al., 1998) and behavioral adjustment (Kosofsky, 1999). Many of the subsequent behavioral consequences of these phenomena have yet to be ascertained. Follow-up, long-term studies are needed to make these determinations. As of yet we are still not certain what the long-term affects of this prenatal exposure means to the maturing children involved nor do we fully understand how these effects will manifest themselves in the classroom. With current restrictions on privacy and other factors designed to protect the innocent, large-scale follow-up research on these children is a very sensitive issue and is one that needs to consider the children and the repercussions of exposure to such research. After all, the children are the victims in this tragedy and not the perpetrators.

CHAPTER III

METHODS

Drug Arrests

According to the year 2000 United States Census, the State of Alabama has a total population of approximately 4.45 million. This population breaks down to roughly 3.16 million White, 1.15 million Black, and .14 million other races.

Existing data on drug arrests were obtained from the Alabama Criminal Justice Information Center in Montgomery, Alabama. These data consisted of drug arrest records from 1988-2001 and included statistical information on adult and juvenile arrests for drug

possession and sale broken down by county for the entire state. The arrest data on possession and sale were combined to produce a single number defined as total drug arrests for each Alabama county. These statistical data are assumed to be indicative of community drug usage; however, there may be compounding or spurious variables involved in the reporting of these statistics which can be considered a weakness of the study. Among these variables are such factors as inconsistent funding for drug interdiction by different local law enforcement agencies over time, availability of adequate local law enforcement personnel for various reasons (local funding, reserve military duty, natural disasters, etc.), and incoming drug supply, just to name a few.

Student Achievement

The public school systems in the State of Alabama consist of 128 separate school systems, both county and city, and is comprised of 1,341 separate schools. The total 2001 public school student population was 727, 248, according to the 40-day average daily membership furnished by the Alabama State Department of Education. This public school student population makes up roughly 16 % of the population of the state. Not included in these figures are the student populations of private and parochial schools throughout the state.

Existing long-term data on the Stanford Achievement Test Series, Ninth Edition (SAT 9) were obtained from the Alabama State Department of Education databases in Montgomery, Alabama. The SAT 9 test scores are considered to be a valid and reliable indicator of academic achievement and are used as one of the primary measures for educational policy decisions across the state. The SAT 9 covers domains of reading, mathematics, language, spelling, study skills, listening, science, and social science. Reliability is determined through internal consistency, alternate forms, and consistency-over-time with reliability coefficients clustering around .90 for subtests and .80 for content. The expert judgement of national panels of educators in each content area participate in developing performance standards for the SAT 9. Score reports display norm-referenced information at the cluster, test, domain, and battery levels. It was nationally standardized and norm-based on 1995 spring and fall testing of between 500,000 and 600,000 student participants and more than 10 million students in 2000. The SAT 9 national sample is stratified by geographic region, socioeconomic status, urbanity, and ethnicity. Urbanity is further divided into urban, suburban, and rural. Socioeconomic status is subdivided into high, medium, and low based on a composite of median family income in the community and percent of adults holding high school diplomas (Harcourt, 2001).

The obtained statistical information included SAT 9 percentile scores for individual schools and school systems throughout the state from the 1995-1996 school year to the 2000-2001 school year. The reported percentile rank scores for each school system were unusable in their original format because they could not be compared to the county drug

arrest data on a county-wide basis. The scores for each school system were averages for that school system and could not be combined to produce a legitimate county average due to the difference in population of each system. The system scores therefore needed to be converted to a combined county weighted average of all of the separate school systems in each county. This combination of data was achieved by taking the reported percentile rank score and multiplying it by the second-month enrollment for that system for that year. The resulting factors for each system in each county were then added together and the sum divided by the combined second-month enrollment of all the systems in each county. In order to make the computer calculation less cumbersome, it was decided to use a total enrollment from a median year, and 1998 was chosen because the second-month enrollment numbers for this year were relatively stable. These calculations were performed for each grade level, 3-11, for each year reported.

Three additional groups of data were also gathered from the same databases of the Alabama State Department of Education: Scholastic Aptitude Test (SAT) scores, ACT (formerly named the American College Test) scores, and the free and reduced price lunch (FRL) data.

The SAT was first administered by The College Entrance Examination Board (now known as the College Board) in 1926 to 8,040 students. The aim of the current College Board, composed of 4,200 schools, colleges, universities, and other educational organizations, is to provide educational institutions with an honest measure of American students' abilities. Currently, more than 2 million students of different cultural and educational backgrounds take the SAT each year, generally in their junior or senior year in

high school. Norms for the SAT are derived from these 2 million test takers each year. Reliability coefficients range from a low of .884 to a high of .949 depending on the subject subtest. Validity is construct, content, and criterion related and based on the prediction of freshman-year grades. The students' scores are used in admissions decisions by more than 80% of colleges and universities and in combination with their high school grade point average to predict freshman success as measured by their freshman-year grade point average. The SAT is composed of a verbal and mathematics section and the average scores are 506 verbal and 514 math (The College Board, 2002).

The ACT assessment score scale was originally developed in 1959. In 1988 a special study was conducted to provide nationally representative norms and to revise the 1959 score scale. Later, in 1995, another special study was conducted to examine the 1988 score scale, to update the nationally representative norms, and to determine the impact of the use of calculators on the ACT math portion of the test. The present ACT assessment consists of a battery of four multiple-choice tests of educational development: English, Mathematics, Reading, and Science Reasoning. The 1995 national representative sample of the ACT produced reliability coefficients of .92 for the English battery, .91 for the Mathematics battery, .88 for the Reading battery, and .85 for the Science Reasoning battery. Validity arguments are made for five of the most common interpretations and uses of the test scores: educational development, college admissions decisions, college placement decisions, student progress evaluation in high school, and student progress evaluation in college. The tests are administered under standardized conditions and scores are used by colleges for admissions decisions, recruitment, course placement, and self

study. High schools use the ACT data for public relations, academic advising and counseling, accreditation documentation, and evaluation studies. Almost 3,000 academic institutions recommend or require the ACT from their applicants and over 1 million college-bound students take the ACT each year. These students, usually between 16 and 20 years of age, generally take the exams in their junior or senior year of high school. Each year ACT updates the user norms based on the most recent test scores of the more than 1 million students who take the tests (ACT, 1997).

The free and reduced price lunches (FRL) program is part of the National School Lunch Program/School Breakfast Program overseen by the United Sates Department of Agriculture. Eligibility is based on household size and total annual income. For example, a family of two with a total annual income of $22,089 or less per year, a family of four with an annual income of $33,485 or less, and a family of six with an annual income of $44,881 or less would qualify for free and reduced breakfast and lunches (USDA School Lunch Program, 2002). Families earning more than these amounts would not. FRL data are commonly used by the Alabama State Department of Education as a determiner of socioeconomic status for statistical purposes.

The same mathematical process, mentioned previously to generate a weighted average, was performed on the SAT average score for each grade level for each year reported, for the ACT average score for each year reported, and for the FRL data for each year reported. The FRL data dated from the 1997-1998 school year to the 2000-2001 school year. Previous FRL data were reported by the Alabama State Department of Education to be unreliable and unuseable. A further complication arose with the FRL data.

Since only 4 years of data were determined to be useful by the state, it was decided that a simple average of the resulting FRL weighted average would suffice to show a socioeconomic effect for each county. The weighted averages were then combined and the sum divided by four to produce an average FRL for each county.

After all of the data were calculated, they were arranged in a spreadsheet with the counties arranged alphabetically, coded by number, along the vertical axis producing 67 subjects and all of the variables (total drug arrests 1988-2000; weighted SAT 9 percentile rank scores Grades 3-11, 1996-2001; weighted SAT average percentile rank scores 1996-2001; weighted ACT average percentile rank scores 1996-2001; and average FRL of years 1998-2001) along the horizontal axis. These data were then loaded into Statistical Program for the Social Sciences (SPSS) Version 10.0.5 for correlation analyses using an alpha level of .05.

The primary dependent variables in this study were academic achievement as measured by the SAT 9 scores for each grade 3-11 for each year from 1996-2000, SAT average scores for each year 1996-2000, and ACT average scores for each year 1996-2000. Socioeconomic status, as measured by free and reduced lunch data for each county, was also included as a secondary dependent variable. The independent variable in this study was community drug usage as measured by total drug arrests for each county 1988-2000.

CHAPTER IV

RESULTS

Trends in Drug Arrests 1988-2000

What are the trends in community drug usage as measured by drug arrests in the State of Alabama from 1988 to 2000? In order to determine any obvious trends in drug

arrests and therefore assumed community drug usage, the total drug arrests for all 67 counties across the State of Alabama were combined and plotted against time from 1988 to 2000. Figure 1 is a graphic representation of the total number of drug arrests from 1988 to 2000.

FIGURE 1- Total Drug Arrests in Alabama 1988-2000

As the graph indicates, there is a dramatic spike in the number of arrests from 1988 to 1989 and then an equally dramatic drop from 1989 to 1991, followed by a steady climb to 1998 with a moderate decline through 2000. The dramatic drop in 1990, 1991, and 1992 is coincident

with the Persian Gulf War and may have been influenced by that conflict. From the author's personal knowledge and experience, many military reserve units across the state include a large number of active police officers. The resultant call-up of reserve units during that conflict would have been responsible for reducing the number of professional and experienced police on the street. The result of reduced numbers of police officers on the street would have directly influenced the affected police organizations' abilities to interdict the flow of drugs while still addressing the multitude of other police activities and responsibilities. In essence, the dramatic drop indicated by the graph may not necessarily indicate a drop in community drug usage but simply a drop in police manpower able to control the problem. This phenomenon warrants further study. It is highly unlikely, however, that the indicated drop is a patriotic gesture on the part of drug users across the state in sympathy with the military personnel involved in the conflict.

Real-Time, Long-Term Comparisons

Is there a correlation between community drug usage, as measured by drug arrest statistics, and children's academic performance, as measured by SAT 9 scores, and coincidently, is there a correlation between community drug usage and socioeconomic status as measured by averaged figures of free and reduced lunch participation in the Alabama public school systems on a real-time, long-term basis? Table 1 illustrates the correlation values between total drug arrests and weighted SAT 9 scores and averaged weighted free and reduced lunch values.

TABLE 1

Pearson r Values Between Total Drug Arrests (TDA) and Weighted SAT 9 Scores and Averaged Weighted Free/Reduced Lunch (FRL) Values, Real-Time, Long-Term

	Weighted SAT 9 scores by grade									
TDA/Year	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	11TH	Average FRL
TDA1996	.090	.157	.176	.109	.154	.124	.124	.168	.201	-.215
TDA1997	.008	-.004	.088	.035	.064	.088	.003	.097	.078	-.217
TDA1998	.147	.158	.172	.156	.199	.192	.136	.200	.231	-.224
TDA1999	.144	.147	.184	.106	.175	.190	.162	.207	.198	-.201
TDA2000	.156	.179	.206	.161	.194	.219	.209	.262	.294	-.244

When the data were analyzed, consistently positive low correlations were found between community drug usage, as measured by total drug arrests across the state, and academic achievement, as measured by weighted average SAT 9 scores across the state. Also found were consistently negative low correlations (but higher negative values) when comparing community drug usage and socioeconomic status, as measured by averaged weighted free and reduced lunch values. The positive correlations in Table 1 imply that higher drug use is related to higher academic achievement. Coincidentally, the negative correlations between drug use and free and reduced lunch data imply that higher drug use is related to higher socioeconomic status when one understands that a lower free and reduced lunch factor indicates a higher socioeconomic status.

A spot check of the data using hierarchical multiple regression indicated positive but statistically non-significant correlations between drug use and academic achievement. However, the partial correlations, when controlling for socioeconomic status, showed a trend of diminishing positive value or conversion from positive to negative, supporting the

assertion that higher drug use is related to lower academic achievement. A decision was made not to use the regression data due to the small sample size and reduced power associated with the analyses.

Obviously the data should not be construed as implying causation; however, they can be used as an incentive for further study. Worthy of note is the correlation data in the upper grades as compared to the lower grades. An obvious increase in correlations indicating possible drug effects at these levels may be explained by the increased mobility and freedom of the children in these grades and their propensity at these ages to experiment with an alternative lifestyle, an activity lacking in younger children in lower grades. Another possible implication is that community drug use may parallel older students' drug use. One curious and unexplainable phenomenon visible in the table is the consistently low correlation levels across all grades in the 1997 data. This phenomenon also is worth further study.

Is there a correlation between community drug usage, as measured by drug arrest statistics, and children's academic performance, as measured by Scholastic Aptitude Test scores and ACT scores in the Alabama public school systems on a real-time, long-term basis? The same consistency phenomenon occurred when community drug usage was compared to the weighted Scholastic Aptitude Test (SAT) average scores and weighted average ACT scores for each county for each year. Table 2 illustrates the correlation values between total drug arrests and weighted average Scholastic Aptitude Test (SAT) scores and weighted average ACT scores by year, real-time, long-term.

TABLE 2

Pearson r Values Between Total Drug Arrests (TDA) and Weighted Average Scholastic Aptitude Test (SAT) Scores and Weighted Average ACT Scores, Real-Time, Long-Term

TDA/Year	Weighted average SAT scores by year	Weighted average ACT scores by year
TDA 1996	.154	.108
TDA1997	.057	.063
TDA1998	.198	.226
TDA1999	.192	.239
TDA2000	.229	.153

Again, consistently positive low correlations were found between community drug usage and weighted average Scholastic Aptitude Test (SAT) scores and weighted average ACT scores indicating agreement with the previous data. The correlation coefficients for the ACT values appear to be less consistent with a considerable drop in 2000. One possible implication is the reduced impetus for college-bound students in areas of relatively high community drug use. Also, we see again the unexplainable drop in correlation coefficients for both sets of data for 1997.

Is there a correlation between community drug usage and socioeconomic status as measured by non-averaged figures of free and reduced lunch participation in the Alabama public school systems on a real-time, long-term basis? Correlations of community drug use for each year were run on available yearly data, 1998-2000, of weighted free and reduced lunch (not averaged as in Table I) and again indicated consistently negative low

correlation coefficient Pearson r values. Table 3 illustrates the correlation values between total drug arrests and weighted free and reduced lunch data.

TABLE 3

Pearson r Values Between Total Drug Arrests (TDA) and Weighted Free and Reduced Lunch (FRL) Data 1998-2000, Non-Averaged, Real-Time, Long-Term

TDA/Year	Weighted FRL (non-averaged)
TDA1998	-.169
TDA1999	-.203
TDA2000	-.259

These data indicate consistent negative low correlation values as in the Table 1; however, the non-averaged free and reduced lunch data show a steady increase in value implying a possible increase in the relationship between socioeconomic level and community drug usage between 1998 and 2000. This phenomenon warrants further investigation.

Skewed-Time, Long-Term Comparisons

Is academic performance, as measured by SAT 9 scores, in these same school systems affected by community drug usage on a skewed-time, long-term, timeline basis? In an effort to observe the effect of prenatal drug exposure on academic achievement using the same data, correlations were run on community drug use and academic data from 8 years later. For example, if one were to use 1988 drug arrest data and assume that data are indicative of parental drug use for 1988, then it also can be assumed that parental drug use affected children born up to 9 months later. Those children would matriculate through the

school system and would first be tested using the SAT 9 Test in 1996 in the third grade. Therefore, correlations were run on drug arrest data and the appropriate grades 8 years later (i.e., TDA 1988 run against weighted SAT 9 scores for Grade 3 1996, Grade 4 1997, Grade 5 1998, Grade 6 1999, and so forth). The same low but consistent correlations appeared as in previous analyses. Table 4 illustrates Pearson r correlation coefficients between total drug arrests and weighted SAT 9 scores skewed back 8 years.

TABLE 4

Pearson r Values Between Total Drug Arrests (TDA) and Weighted SAT 9 Scores Skewed Back 8 Years, Skewed-Time, Long-Term

	Weighted SAT 9 scores by grade				
TDA/Year	3rd	4th	5th	6th	7th
TDA1988	(1996) .134	(1997) .045	(1998) .198	(1999) .132	(2000) .196
TDA1989	(1997) .017	(1998) .111	(1999) .154	(2000) .101	
TDA1990	(1998) .093	(1999) .117	(2000) .159		
TDA1991	(1999) .140	(2000) .151			

These correlation values reflecting the effects of prenatal exposure are again consistent with the previous data but appear to be somewhat lower as would be expected due to the low number of students that may suffer these effects. Again, the curious low values associated with the 1997 data are present and raise questions as to cause.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In the literature review of this study we have looked at the detrimental effects of drug use and abuse, focusing on cocaine but including other companion drugs, from prenatal exposure of the fetus, through societal effects in children and adolescents, to use effects in young adults. The overwhelming majority of the research indicates detrimental effects of drug use and abuse physically, mentally, and emotionally on individuals as well as addresses the detrimental effects on society at large. The included research data often pointed to problems individuals face as the result of drug exposure but failed to look at the effect of drug use and abuse specifically on academic achievement on a large-scale basis. Used in this study were historical data in an attempt to determine if there is a correlation between drug use in the community and academic achievement in our schools.

From the real-time, long-term perspective, the results of this research indicated a low but consistent positive correlation between community drug usage and academic achievement across the State of Alabama, as well as consistent, low negative correlations between community drug usage and free and reduced lunch, an inverse indicator of

socioeconomic status. From the skewed-time, long-term perspective, which specifically addresses the prenatal effects of drugs in the school systems, the data showed the same consistency but with lower correlation values, probably due to the low numbers of students suffering from these effects.

Although the data gathered in this study did not show an obvious dramatic relationship between community drug usage and academic achievement, they did show consistent effects. Further, drug use correlated positively with higher socioeconomic status. With higher academic achievement also being strongly related to higher socioeconomic status, the implication here is that socioeconomic status may be the controlling factor in both community drug use and academic achievement.

One can conclude from this study that the academic achievement of the students of a community is affected by the actions of the community. The socioeconomic level of a community certainly impacts the funding of local school systems and therefore the academic achievement of the students in those school systems relative to other school systems whether richer or poorer. The socioeconomic level of a community also appears to be related to drug use. Increased drug usage in a community would affect in some way the children of those users which in turn would have some detrimental effect on their academic achievement, as has been shown in the literature.

The unexplained consistently low correlation values for the 1997 data is a subject for further study. It could be assumed that some change occurred during this time period that may have affected either the standardized test score values or the drug arrest data. The more likely possibility would have been a dramatic increase or decrease in drug

arrests across the state due to funding or manpower problems. However, this change is not indicated by the total number of arrests in the state for 1997, as seen in Figure 1. Another possible explanation is a fluctuation in the standardized test score values due to a change in the standardized exams themselves, scoring process changes, score reporting changes, or some other factor that affected all students across the state. Contact with the Alabama State Department of Education has not, to date, produced a specific reason for the fluctuation.

At the outset of this investigation, it was thought that any apparent influence on academic achievement due to community drug use would be low if it would be visible at all, due to what the author calls the "dilution factor" and the nature of the data. The dilution factor can be explained intuitively as the separation between the dramatic effects an observer would see if looking at several individual cases of parental drug use and its effects on the academic achievement of the children of those parents, versus looking at an entire parental population of a state and the entire population of the school systems of that state, the majority of whom do not use illegal drugs. A question arises when evaluating the results of the data, the dilution factor, and the combination of extraneous variables associated with looking at this particular research. That question is this: What is significant? Must the resultant correlation values between variables be in the .40 to .99 range in order to show significance, according to Jacob Cohen, "constrained by convention" (Cohen, 1988, p. 531)? Or, can a matter be important and critical enough to allow significance to be expressed in values at much lower levels of .10 to .20? Cohen (1988) addressed this issue and stated that

> In new areas of research inquiry, effect sizes are likely to be small (when they are not zero). This is because phenomena under study are typically not under good experimental or measurement control or both. When phenomena are studied which cannot be brought into the laboratory, the influence of uncontrollable extraneous variables (noise) makes the size of the effect small relative to these (makes the "signal" difficult to detect). (p. 25)

Ary, Jacobs, and Razavieh (1996) also stated that the value of correlation coefficient relationships are "arbitrary" (p. 399). This separation of effect and the plethora of extraneous variables associated with the data used combine to produce this dilution factor which would, in effect, reduce the correlational results of the data making them appear to be nonsignificant. However, it can be argued that if the correlational results were nonsignificant the correlation coefficients (Pearson r values) of the correlations would appear to be low, random, and inconsistent rather than stable and consistent in their values.

Halpin and Halpin (personal communication, 2002) espouse the doctrine that "A difference is not a difference unless a difference makes a difference." In the case of the academic achievement of our youth, even a small difference does make a difference. In the case of community drug usage, even a small difference does make a difference. These two concepts are terribly important to the entire population of our state, to the nation, and even to the rest of the world. They are not only terribly important, but they are also relatively easy to control and manipulate provided there is adequate incentive for that control and manipulation. The established educational systems at the federal, state, and

local levels are in place and already have the necessary tools to provide for an education of our state's youth. There are, however, grave problems with equity, funding, and additional support mechanisms which need to be addressed in order to optimize the educational systems and provide an adequate education for many disadvantaged students across the state. Along the same line, there already exists at the federal, state, and local levels law enforcement to combat the rising tide of drug inflow and usage. There are, however, many problems associated with the interdiction and control of illicit drugs--funding, manpower, adequate intelligence, just to name a few. It would seem reasonable to assume that a closer cooperative working relationship between these existing agencies may benefit both in the long run. Renewed and revitalized, real-life, no-nonsense drug education programs aimed at the already captive population of mandatory public school students would, in all likelihood, reduce the customer base of drug dealers if handled correctly. Increased interdiction resources at an international, federal, state, and local level also would seem to stem the incoming tide of illicit drugs.

It is the opinion of this author that the fundamental problem for policing and educational agencies to achieve their goals of eliminating the drug problem and providing an adequate education of our youth rests not solely with the agencies, and the waste and inefficiencies within these agencies, but with the public at large. The real problem is complacency--complacency on the part of citizens who do not have school-age children and who feel that education is not their problem, as well as complacency on the part of citizens who do not use drugs and who feel that increased funding for interdiction and the control of drugs is not their problem. It also is the opinion of this author that these

complacent citizens are dead wrong and totally mistaken in their belief that these two issues do not affect them. By all means they do! Random robberies and murders happen everyday so that addicts can pay for their habits. Gang warfare sparked by the desire to control drug territories are spreading. This phenomenon was, in the past, generally restricted to areas of higher population but not so now. An increasing number of drug-related crimes continue to move toward rural areas. Those who feel that drugs are a problem only for low socioeconomic groups and minorities are mistaken. Drug addiction knows no racial or economic boundaries.

The importance of an adequately educated populace has been accepted as a primary tenant of our democratic society. Educating our youth and providing them with the necessary tools to achieve in life can be viewed not only as that which is required by the law of the land but also as our duty as citizens to make our country stronger. The education issue is our problem, a problem shared by each individual citizen in our society. By providing our children with the best education possible, we reduce the uncertainty of our country's future. We more efficiently provide a broader base of potential from which we can draw leadership, advance technology, encourage the advancement of the arts and sciences, and strengthen our diverse culture. We must as a society look on these issues as trying to gain an advantage in the long term, and we as a society ought to aspire to perfection by controlling those variables that can be controlled in order to institute change.

Recommendations for Future Research

Further study using qualitative methods, such as specific case studies, would almost certainly provide evidence of the harm done and heartache endured by children of drug-using parents. Long-term longitudinal studies on identified drug-exposed children, across the country and at all economic levels, need to be done to produce definitive data on the educational progress of these children, pre-school through college. Ideally, looked at in these studies should be the entire spectrum of affected children from the minimally exposed to those with high exposure. The data produced could then be used to determine the actual long-term outcome for these children. The data could also be used to support policy decisions and methods and techniques available to overcome the children's cognitive and physical difficulties.

Another interesting study would be an in-depth investigation of the drug culture in the public school systems across the state. Important foci could be who, what, when, where, how, and why students get involved with drugs and the long-term repercussions of that involvement, both for the students and the schools.

The effects of community economics on local drug use and the resultant academic performance of the involved students are another possible study. It is hoped that this research will inspire future academic study and provide educational and governmental agencies incentive to examine existing historic data and identify other variables which impact academic performance. The apparent relationship between socioeconomic status and academic achievement should be one focus of further study. The effects of community economics on local school funding and the resultant academic performance of the involved

students are another focal point. When these issues are adequately defined and properly addressed by federal, state, and local policy makers, beneficial change can be instituted.

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