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Interaction Effects of Parenting Styles and Child Temperament: Motor, Cognitive, and Language Development in Children Prenatally Exposed to Alcohol

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INTERACTION EFFECTS OF PARENTING STYLES AND CHILD TEMPERAMENT: MOTOR, COGNITIVE, AND LANGUAGE DEVELOPMENT IN CHILDREN PRENATALLY EXPOSED TO ALCOHOL

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ABSTRACT

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By

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May 2015

Dissertation supervised by Ara J. Schmitt, Ph.D.

Despite the social stigma and attempts over the years to increase public awareness of the risks of drinking during pregnancy, there has been little change in women's prenatal drinking patterns (Bhuvaneswar, Change, Epstein, & Stern, 2007; Ernhart, Morrow-Tlucak, Sokol, & Martier, 1988). In the literature it is unclear to what extent alcohol exposure in utero has on motor, cognitive, and language development. Although, due to the plasticity of the immature nervous system, long-term effects of early exposure to negative teratogens (alcohol exposure in utero) need to be researched to determine if a child's development can be ameliorated by positive parenting practices (Paone & Alperen, 1998). This study aims to investigate the association

between parenting styles and child temperament as it relates to motor, cognitive, and language development in children who were exposed to alcohol in utero. Results indicated that there is a significant relationship between parenting styles and child temperament in motor, cognitive, and language development. Specifically, authoritarian parenting style and easy child temperament was related to greater motor development. Authoritative parenting style and difficult child temperament was associated with greater cognitive development. Lastly, authoritarian parenting style and easy child temperament was related to greater language development in children who were two years old. These findings imply that the interaction between parenting practices and child temperament has an impact on the developmental skills in children prenatally exposed to alcohol. Implications of these findings and recommendations for future research were discussed.

DEDICATION

I would like to thank everyone for supporting me throughout the past five years while I completed my doctoral degree. Especially, my husband, Stephen Hogan, who has provided me with love, humor, and encouragement throughout this process. Thank you for the sacrifices you have made and for always believing in me. This document is also dedicated to my parents, Lori and Jeff Hennessey, who have instilled in me the drive and ambition to achieve my career goals. Without your endless love and encouragement I wouldn't be where I am today. Mom, a special thanks to you for the countless hours you have spent reading and editing my dissertation. Lastly, I would like to dedicate this document to my labrador retrievers, Chloe and Izzy, who spent many Sunday afternoons curled up by my feet supporting my dissertation writing efforts and giving me a distraction when writer's blocks would set in. I am forever grateful for the support and love that my family has provided me.

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Chapter I

Introduction

In the 1970s, research on prenatal alcohol exposure began to investigate patterns of birth defects and developmental deficits found in children of mothers who consumed alcohol during pregnancy. Despite the social stigma and attempts over the years to increase public awareness of the risks of drinking during pregnancy, there has been little change in women's prenatal drinking patterns (Bhuvaneswar, Change, Epstein, & Stern, 2007; Ernhart, Morrow-Tlucak, Sokol, & Martier, 1988). Consequently, maternal prenatal substance abuse remains the leading preventable cause of physical and neurological concerns in infants and children (Wells, 2009).

Prenatal alcohol exposure occurs when a woman consumes ethanol, the chemical in drinking alcohol produced by fermentation, during pregnancy. Alcohol, which is absorbed into the mother's bloodstream, is passed freely through the placenta to the fetus (Ismail, Buckley, Budacki, Jabbar, & Gallicano, 2010). Since babies do not process alcohol at the same rate as adults, alcohol exposure can be associated with a host of problems including placental abruption, restricted fetal cell growth, fetal tolerance, and/or dependence on alcohol (Lui, Jones, Robinson, Greenwood, Aplin, & Tower, 2014; Aliya, Lynhc, Nana, Alio, Wilson, Marty, Zoorob, & Salihu, 2011). This is evident at the time of birth; however, motor, cognitive, and language difficulties can persist across the lifespan (Mattson & Riley, 1998). Indeed, Fetal Alcohol Spectrum Disorders (FASD) is meant to describe a wide range of negative effects due to fetal alcohol exposure including the milder symptoms noted in fetal alcohol effects (FAE) to the very significant impairments associated with fetal alcohol syndrome (FAS). The pattern and quantity of alcohol consumption as well as the timing of exposure can influence what FASD the infant could acquire (O'Leary, 2004). Withdrawal symptoms are particularly important to understand

when considering which children have been exposed to alcohol in utero and can also assist with the diagnosis of a FASD. In addition, withdrawal symptoms give clinicians a sense of the impact of alcohol exposure on the infant, which in turn provides information about the type and level of support that the family and child may need during postnatal care (Hudak & Tan, 2012).

Significance of the Problem

According to the Substance Abuse and Mental Health Services Administration (SAMHSA), approximately eighteen percent of women report that they consume alcohol in their first trimester (SAMHSA, 2013). Of those women, nearly seven percent binge drink (i.e., consuming five or more drinks at a time in the past month) during the first twelve weeks of their pregnancy. First trimester fetal exposure to alcohol has been associated with low cell growth in the placenta, which can negatively affect subsequent fetal development (Lui, Jones, Robinson, Greenwood, Aplin, & Tower, 2014; Aliya, Lynhc, Nana, Alio, Wilson, Marty, Zoorob, & Salihu, 2011). Interestingly, there appears to be a decrease in alcohol use in pregnant women during their second (i.e., 4.2 percent of women that consume alcohol) and third trimesters (3.7 percent of women that consume alcohol) (SAMHSA, 2013). However, May and Gossage (2011) found that approximately twenty to thirty percent of women abuse alcohol at some point in their pregnancy.

Researchers note that the majority of women who drink during their third trimester continue to abuse, and not simply use, alcohol after their baby is born. These children are often exposed to inconsistent or poor parenting practices (e.g., harsh punishments, ignoring the needs of the child, inability to be empathetic, etc.) (Horwitz, Widom, McLaughlin, White, 2001). Further, mothers who use alcohol tend to experience disruptions in attachment and provide low levels of positive parenting care to the baby (Suchman, McMahon, Zhang, Mayes, & Luthar,

2006; Gottwald & Thurman, 1994). Children of parents with substance abuse disorders are more likely to experience abuse (i.e, physical, sexual, and emotion) (Hansen, Self-Brown, Fricker-Elhai, Kilpatrick, Saunders, & Resnick, 2006). What is less understood is if parenting practices alone (e.g., harsh punishments, ignoring the needs of the child, inability to be empathic, etc.) (Horwitz, Widom, McLaughlin, White, 2001) account for the abuse or neglect children experience or if the mismatch is between the parenting style and child temperament.

There are limited resources to help educate/promote a healthy lifestyle during pregnancy and encourage positive parenting of mothers who report alcohol use during pregnancy (Lester, Andreozzi, & Appriah, 2004). Although for those who find help the outcomes are tentatively promising. Nevertheless, researchers have shown that alcohol treatment during pregnancy can improve maternal-infant attachment (Goler, Armstrong, Osejo, Hung, Haimowitz, & Caughey, 2012) as well as increase prenatal care (Elk, Schmitz, Spiga, Rhoades, Andres, Grabowski, 1995). Therefore, it is reasonable to conclude that the positive child-rearing practices (e.g., providing both adequate nurture and structure/discipline) could positively affect alcohol-exposed infants given the plasticity of the immature nervous system (Paone & Alperen, 1998). Subsequently, identifying which children are exposed to significant amounts of alcohol (as defined by those who show withdrawal symptoms at birth) as well as which parenting practices promote health and subsequent developmental skills adds to our understanding of which treatment interventions may provide the best success for these children's motor, cognitive, and language skills.

Positive Parenting and Motor, Cognitive, and Language Development

The importance of positive child-rearing environments, such as positive parenting styles, has been well documented in the literature for the past forty years. Thomas & Chess (1977) were

at the forefront of this research initiative and developed the concept of goodness of fit to describe how characteristics of a child's temperament fit with the demands and expectations of the environment to produce adaptive outcomes. The goodness of fit concept was founded through direct interviews and questionnaires of parent-infant or teacher-infant dyadic relationships. Differences in child temperament require caregivers to adapt their parenting style. The premise of the goodness of fit model is for caregivers to match their demands or expectations with what their child is able to do, given the child's temperament, age, and abilities/skills (Ostergren, 1997). Goodness of fit does not suggest an absence of stress and conflict. Stress and conflict are beneficial in moderation to help an individual reach their developmental potentials (Chess & Thomas, 1996).

The goodness of fit model encompasses both parenting styles and child temperament in its theory. Prior to the development of the goodness of fit theory, Baumrind (1965) categorized parenting styles by the levels of warmth and control they exhibit towards their infant or child. Warmth as a construct refers to the degree in which parents display involvement, responsiveness, and support. Baumrind's theory refers to control as the demands or expectations parents place upon or holds for their children as well as the degree of monitoring that is present in a child parent dyad. Based on these concepts, each parenting style is associated with different dimensions of parental action (i.e., warmth and control). In Baumrind's theory, he categorized three parenting styles based on the level of warmth and control the caregiver displayed: authoritative, authoritarian, and permissive parenting styles (Baumrind, 1967).

Caregivers who exhibit both warmth and control are denoted as having an authoritative parenting style. These caregivers are also depicted as being responsive, supportive, and encouraging, but at the same time they are firm and impart clear standards and/or demands for

their children's behavior. These caregivers place demands without being intrusive or restrictive. These parents set a standard of responsibility, self-control, conduct, and boundaries, through teaching correct principles and employing consequences for behaviors. Furthermore, authoritative parents encourage positive reinforcement over harsh punishment (Crockenberg & Leerkes, 2003; Baumrind, 1991).

Research has shown that children reared by authoritative parents tend to have better social, emotional, and cognitive development compared to children raised by parents who employ authoritarian or permissive parenting styles (Seifer, Dickstein, Parade, Hayden, Magee, & Schiller, 2014; Baumrind, 1966). In middle childhood, children whose caregiver displays traits of responsiveness and place reasonable demands on his or her child tend to excel in the following areas: independence, creativity, persistence, social skills, academic competence, leadership skills, and self-control (Baumrind, 1970). In adolescence, children raised by authoritative parents tend to have higher self-esteem, socially confident, self-reliant, respect for authority, and display increased academic performance compared to same aged peers raised by authoritarian or permissive parents (Baumrind, 1966).

According to Baumrind (1977), authoritarian parenting style is described as a caregiver that shows limited warmth and maintains control over the child. Caregivers that display this type of parenting styles have clear rules for their child(ren) to follow. Authoritarian parents have strong parental command over their child and allow minimal input of the child in decisions making (Crockenberg & Leerkes, 2003; Baumrind, 1968). Authoritarian parents use coercive and punitive control (i.e., physical or emotional punishment) as a means of disciplining (Baumrind, Larzelere, & Cowan, 2002; Baumrind, 1965).

Outcomes for children raised by authoritarian parents are not as positive as after-effects for children raised by authoritative parents. By preschool, children raised by authoritarian parents tend to display the following outcomes: dissatisfied, apprehensive, fearful, socially inhibited, and experience difficulty in regulating emotions (Baumrind, 1967). Research has also shown that over years of development, children parented by authoritarian parents continue to fall behind in both cognitive and social skills (Baumrind, 1991).

The permissive parenting style, also known as an indulgent parenting style, is used by caregivers that are considered responsive and warm. Unlike authoritative parents, permissive parents place limited to no demands on their children. Permissive caregivers allow their child(ren) extensive autonomy and give them high parental support in hopes of building a close relationship. This can result in the development of negative behaviors that seldom are acknowledged or corrected. Additionally, punishment is often inconsistent and confusing.

By preschool age, children raised by indulgent parents have difficulties regulating emotions, low self-control, and appear very immature (Baumrind, 1965). Teachers often report these children as bossy, dependent, and impulsive. Difficulties with learning persistence and limitations are also noted of children raised by permissive parents (Baumrind, 1967).

Maccoby & Martin (1983) extended the work of Baumrind to include the uninvolved parenting style, which is also known as neglectful parenting style in the literature. Uninvolved parents are neither responsive nor place demands for their children to obtain. Instead these parents have limited involvement in their child's life; however, they do provide their children with basic needs of survival in most cases. Furthermore, uninvolved parents often dismiss their children's feelings and opinions and appear emotionally unsupportive or unresponsive. Children

whose parents are neglectful present as if other aspects of their lives are more important than their children's.

In regards to child development, neglected preschool children between the ages of four and five were highly dependent on teachers and exhibited adjustment problems. In kindergarten, neglected children had difficulty understanding the day-to-day demands placed on them, and they had poor work habits. Teachers frequently characterized children of uninvolved parents as anxious, withdrawn, unpopular, and inattentive. On intelligence assessments, such as the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) (Gordon, 2004), neglected children scored much lower on measures of vocabulary and comprehension. These children also have difficulties with adhering to daily routines as well as acquiring reading skills (Crittenden, 1985).

Infants of mothers who continue to have substance abuse concerns after birth are at an elevated risk for child maltreatment (Sun, Freese, & Fitzgerald, 2007; Chaffine, Kelleher, & Hollenberg, 1996; Jaudes, Ekwo, & Van Voorhis, 1995; Murphy, Jellinek, Quinn, Smith, Poitrast, & Goshko, 1991). Parents or caregivers who are abusing alcohol are not able to respond appropriately to his or her infant's cues, which often results in the infant's needs not being met. This impaired judgment causes the child to grow up in an environment that has inconsistent care and guidance, which a child needs to appropriately develop. Alcohol abuse also can cause a caregiver to act in a manner that is violent, paranoid or aggressive, which may create situations where injury or neglect can occur (Wells, 2009).

Another component to the goodness of fit theory is child temperament. Thomas and Chess (1977) observed temperament in infants and categorized temperament from the following nine behaviors: activity level, rhythmicity (regularity), approach or withdrawal, adaptability,

threshold of responsiveness, intensity of reaction, quality of mood, distractibility, attention span, and persistence. After understanding all elements associated with child temperament, Thomas and Chess classified child temperament into three subtypes, easy child temperament, difficult child temperament, and slow to warm child temperament.

Children with an easy temperament have regular eating, sleeping, and elimination cycles; a positive response to new situations; and accept a degree of frustration with little fuss. They adapt to change, such as new food or a new school quickly. They demonstrate a good mood most of the time, and smile often. Conversely, children with a difficult temperament show irregular eating, sleeping, and elimination cycles. They display a negative response to new situations; for example, frequent and loud crying or throwing tantrums when frustrated. They are slow to adapt to change, and need more time to get used to new food, people, places, etc. (Putnam, Ellis, Rothbart, 2001). Lastly, children with a slow-to-warm-up temperament show mild negative responses when exposed to new situations, but slowly come to accept new situations with repeated exposure. It's important for parents to be aware of their child's temperament and adjust their responses to their child accordingly (Weiss, Jonn-Seed, & Harris-Muchell, 2007).

Prenatal Alcohol Exposure and Motor, Cognitive, and Language Development

There is a substantial literature base detailing the effects of prenatal alcohol use on motor, cognitive, and language development. However, there are inconsistent results present among these studies in regards to the degree or whether or not alcohol contributes negatively in the above areas of child development.

Motor Development of Infants' Exposed to Alcohol in Utero

It is unclear to what extent alcohol exposure in utero has on motor development. Prenatal alcohol exposure has been linked to significant motor development delays in the first few years of life. Kalberg, Provost, Tollison, Tabachnick, Robinson, Hoyme, Trugillo, Buckley, Aragon, & May (2006) found fine motor delays primarily in children between the ages of 22 to 68 months old. In addition, early deficits have been related to weak reflexes, decreased strength of movement, and increased frequency of spontaneous startles (Driscoll, Streissguth & Riley, 1990). Osborn, Harris, & Weinberg (1993) establish an association between motor delays in children with Fetal Alcohol Syndrome (FAS) and cognitive delays. Another study investigated the role of prenatal alcohol exposure on motor development of three-year-old children using the Psychomotor Development Index (Larroque, Kaminski, Dehaene, Subtil, Delfosse, & Querleu, 1995), which is a motor development assessment that measures an infant's ability to perform coordinated large muscle movement and fine motor skills as well as the degree of motor control an infant exhibits. The results of this study concluded that the use of alcohol during pregnancy significantly affected gross motor skills, fine motor skills, and motor control (Tarr & Pyfer, 1996).

In a study conducted by Barr, Streissguth, Darby, & Sampson (1990), fine and gross motor performances were investigated in children at four years of age. This study conveyed poorer balance on gross motor tasks in children who were prenatally exposed to moderate levels of alcohol compared to same aged peers. Roebuck, Simmons, Richardson, Mattson, & Riley (1998) also discovered balance deficits in children who were prenatally exposed to alcohol. Researchers have also associated prenatal alcohol exposure to decrease in cell migration and

dendritic growth in the third trimester of pregnancy in the cerebellum, which resulted in deficits with balance and gait (Ornoy & Ergaz, 2010).

However, some studies have reported no negative effects of alcohol exposure on infants and motor ability. Ioffe & Chernick (1990) found no difference with reflexes (i.e., grimace response) between prenatally exposed infants and non-exposed neonates when using Apgar scores. Additionally, a study found that fine and gross motor skills were within normal limits when using the Bruininks-Oseretsky Test of Motor Proficiency (Bruininks, 1978), which assesses fine manual control, manual coordination, body coordination, and strength and agility (Venetsanou, Kambas, Aggeloussis, Serbezis, & Taxildaris, 2007).

Cognitive Development of Infants' Exposed to Alcohol in Utero

There are a plethora of studies that have documented that exposure to alcohol during fetal development can cause the development of an intellectual disability (Weinberg, 1997; Janzen, Nanson, & Block, 1994). Janzen, Nanson, and Block (1994) found that eighty percent of the study's population who were diagnosed with FAS had borderline to severe cognitive impairment. Although intellectual disabilities and cognitive deficits are prevalent among FAS children, it should be acknowledged that research shows that children with prenatal alcohol exposure can present with average intelligence (Steinhausen & Sphor, 1998). Puslifer, Butz, Foran, and Belcher (2008) compared children who were exposed to alcohol to a control group to analyze the differences in cognitive functioning. The researchers found no significant differences in cognitive ability between the two groups. Streissguth, Barr, Kogan, & Bookstein (1997) performed a study to investigate neuropsychological deficits in adolescents prenatally exposed to alcohol in utero. Results of this study concluded that this population demonstrated average IQ; however the researchers found a significant split between participant's Performance IQ and

Verbal IQ, with the later being significantly lower. Mattson & Riley (1998) also found that children diagnosed with FAS have greater deficits in Verbal IQ compared to Performance IQ.

Research has also shown that ethanol exposure during prenatal development can lead to other deficits in a variety of cognitive processes. Impairment in visual spatial skills in preschool children has been documented in the literature (Conry, 1990). Deficits in verbal learning and memory were also identified in a study that examined the effects of FAS on Native American and African-American children (Church & Kaltenbach, 1997). Spatial memory, verbal memory, attention, problem solving, information retention, and comprehension have also been associated with prenatal alcohol exposure (Wesson, 2005).

Researchers have investigated the relationship between the amount of alcohol exposure in utero and the level of cognitive deficits. When using the Bayley Scales of Infant Development (Bayley, 1993), slower cognitive processing was identified in infants six and twelve months of age, who were exposed to a moderate level of alcohol during pregnancy (Jacobson, Jacobson, & Sokol, 1994). Lower IQ scores, when using the Bayley Scales of Infant Development, were also associated with moderate levels of prenatal alcohol exposure at ages eight and thirteen months (Streissguth, Barr, Marin, & Herman, 1980; Jacobson, Jacobson, Sokol, Martier, Ager, & Kaplan-Estrin, 1993). In addition, children with heavy prenatal alcohol exposure showed impairment on measures of concept formation. Specifically, these children showed deficits with generalizing and verbalizing concepts (McGee, Schonfeld, Roebuck-Spencer, Riley, & Mattson 2008). In addition, children with Fetal Alcohol Syndrome (FAS) and partial Fetal Alcohol Syndrome (PFAS) displayed cognitive deficits in the following areas: work comprehension, naming ability, academic skills, visual-motor integration, and nonverbal learning (Mattson, Riley, Gramling, Delis, & Jones, 1998).

Even though there are inconclusive results regarding the effects of exposure of alcohol during prenatal development on cognitive development, research consistently supports the notion that maternal sensitivity and responsiveness plays a significant role in promoting an infant's cognitive development. One study investigated infant temperament, maternal sensitivity, and psychological risk in predicting cognitive development in children who were born premature. The results of the study showed that maternal sensitivity and psychological risk predict cognitive development in children. Researchers also found that a child's environmental ecology also plays a significant role in cognitive development (Lemelin, Tarabulsy, & Provost, 2006). Another study conducted research on parent-infant interaction with prenatal and socio-demographic risk to predict cognitive development. Results indicated that quality of parent-infant interaction mediated the relationship between neonatal risk and cognitive development. This study also indicated that when mothers engage in a dyadic interaction with their infants, the infants tend to have higher cognitive functioning (Poehlmann & Fiese, 2001).

Language Development of Infants' Exposed to Alcohol in Utero

Although there is a research base regarding the effects of prenatal alcohol exposure on cognition, there are far fewer studies that investigate the prospects of deficits in areas of language development with this population. Like motor and cognitive development, there are inconsistent results among these studies. Greene, Ernhart, Martier, Sokol, & Ager (1990) found an association between the amount of alcohol exposure in utero and performance on phonological processing tasks. Pulsifer, Butz, O'Reillly, and Belcher (2008) compared the expressive language skills of children exposed to prenatal alcohol exposure and children not exposed to alcohol in utero. The researchers found that 60% of alcohol exposed children earned at least a standard deviation below the mean compared to 33% of children who were not exposed

to prenatal alcohol on this assessment. A similar study found comparable results, linking heavy prenatal alcohol exposure to deficits in receptive and expressive language skills. In addition, this study found that these deficits impacted social interactions with peers and led to behavioral concerns (McGee, Bjorkquist, Riley, & Mattson, 2009). Additional language deficits found in this population are as follows: comprehension, naming ability (Mattson, Riley, Gramling, Delis, & Jones, 1998), and articulation (Becker, Warr-Leeper, & Leeper, 1990).

When assessing intelligence using the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) (Gordon, 2004), a study found deficits in verbal intelligence. Specifically, children with prenatal alcohol exposure had difficulties with the word attack subtest, which measure a child's ability to read nonsense words and their knowledge of pronunciation rules (Streissguth, Barr, Carmichael, Sampson, Bookstein, & Burgess, 1994). On a test of verbal fluency, children with FAS displayed impairments in phonemic fluency, but not in semantic fluency (Kodituwakku, Handmaker, Culter, Weathershy, & Handmaker, 1995; Mattson, Riley, & Jernigan, 1994).

In contrast, Fried & Watkinson (1990) established no significant differences between children exposed and non-exposed children in regards to expressive language in children between the ages of one and three. Receptive language deficits at the age of three with this population were found; however, this longitudinal study failed to find receptive language deficits at age four (Fried, Watkinson, & Gray, 1998).

Problem Statement

The purpose of this study is to investigate how the association between parenting styles and child temperament relates to motor, cognitive, and language development in children who were exposed to alcohol in utero.

Research Questions and Hypotheses

The first research question examined the percentage of parents of children prenatally exposed to alcohol who exhibit the following parenting styles: authoritative, authoritarian, indulgent, and neglectful. It was hypothesized that there will be a higher percentage of neglectful parenting style as compared to authoritative, authoritarian and indulgent parenting styles. Research has shown that when comparing non-users and polydrug users, a greater portion of polydrugs users were characterized as having a neglectful parenting style (Montgomery, Fisk, & Craig, 2008). However, no research has analyzed the association between parenting styles and mothers who consume alcohol during pregnancy.

The second research question examined the percentage of the children prenatally exposed to alcohol that show easy and difficult temperament types. This study hypothesized that there will be a higher percentage of difficult child temperaments as compared to easy child temperaments. Based on previous research by Weiss, Jonn-Seed, & Harris-Muchell (2007), fetal alcohol exposure was associated with both distractibility and intensity of children's responses to their environment even after six months of age. However, no research study has categorized children who were prenatally exposed to alcohol into child temperament groups.

The third research question investigated which parenting style is associated with greater outcomes in motor, cognitive, and language development. Authoritative parenting styles are hypothesized to be associated with greater motor development, cognitive, and language development as compared to authoritarian, indulgent and neglectful parenting styles. As mentioned earlier, children reared by authoritative parents tend to fare better developmentally than children raised by parents who employ permissive or authoritarian parenting styles (Baumrind, 1968). There is also evidence that relates appropriate degree of responsiveness and

demands in a mother child dyad with behavioral and cognitive proficiency (Baumrind, 1991). In regards to language development, research has also shown that authoritative parenting style is linked with positive outcomes in early language knowledge and literacy development (Birch & Ladd, 1996).

The fourth research question asked which child temperament style is associated with greater motor, cognitive, and language development in this population. Easy child temperament was hypothesized to be associated with greater motor, cognitive, and language development as compared to difficult child temperament. Limited research has been conducted on how temperament is related to child development. However, there has been research to indicate that children with easy temperaments tend to get more exposure to positive responses from their environment, which has the potential to positively impact children's overall development (Thomas & Chess, 1977).

Lastly, this study investigated if the interaction between parenting style and child temperament improve outcomes in motor, cognitive, and language development in children prenatally exposed to alcohol. It was hypothesized that the authoritative parenting style will promote motor, cognitive, and language development more effectively as compared to authoritarian, indulgent, and neglectful parenting styles for children with an easy temperament. There is currently no existing empirical research demonstrating the relationship of goodness of fit of parenting style and child temperament and its impact on different aspects of child development in this population.

Chapter II

Review of Literature

Child development is a complex process that can be influenced by many different biological and environmental factors. Despite over one hundred years of research and policy attempts, prenatal alcohol use remains at the forefront of preventable causes of neurological and developmental deficits. Prenatal alcohol exposure occurs when a woman consumes ethanol, the chemical in drinking alcohol produced by fermentation, during pregnancy. Alcohol, which is absorbed into the mother's bloodstream, is passed freely through the placenta to the fetus (Ismail et al., 2010). At birth, the baby may still be dependent on the ethanol exposed to him or her in utero resulting in withdrawal symptoms. The severity of the withdrawal symptoms depends on the quantity of alcohol use during pregnancy along with the duration and timing of exposure. Withdrawal symptoms may appear at birth or within one to three days after the infant is delivered. Withdrawal symptoms that may be present include: blotchy skin coloring, diarrhea, excessive high-pitched crying, fever, hyperactive reflexes, increased muscle tone, irritability, poor feeding, rapid breathing, seizures, sleep problems, slow weight gain, sweating, tremors, and vomiting. Although, withdrawal symptoms tend to appear less in this population compared to other legal and illicit drugs that fetus's can be exposed to in utero (Johnson, Rosenthal, Capece, Wiegand, Mao, & Beyers, 2007).

Fetal Alcohol Syndrome Disorders

Fetal Alcohol Syndrome Disorders (FASD) can result from prenatal alcohol exposure. FASD affects approximately ten in every one hundred babies born each year (O'Leary, 2004). Children with FASD can present with a variety of physical and neuropsychological symptoms

such as facial abnormalities, neurological deficits, cognitive impairments, poor memory, growth deficits, poor judgment, difficulties adhering to social boundaries, delays in language development, challenging behaviors, and academic difficulties (Ryan & Ferguson, 2006; Sokol, Delaney-Black, & Nordstrom, 2003).

FAS encompasses a range of diagnostic categories. Diagnostic conditions that fall under the FASD umbrella include: partial Fetal Alcohol Syndrome (pFAS), Alcohol-Related Neurodevelopment Disorder (ARND), Alcohol-Related Birth Defects (ARBD), and Fetal Alcohol Syndrome (FAS) (Manning & Hoyme, 2007). The pattern and quantity of alcohol consumption as well as the timing of exposure can influence what FASD the infant could acquire (O'Leary, 2004). The differences between each subset of FASD are highlighted below.

PFAS can be diagnosed regardless of confirmed maternal alcohol exposure. Evidence of at least two minor facial anomalies need to be present, such as short palpebral fissures, thick upper lip, and smooth philtrum. Indication of either prenatal and/or postnatal growth deficits or abnormal central nervous system growth needs to exist (Riley, Infante, & Warren, 2011). The presence of central nervous system damage needs to be seen in three or more of the ten areas of cognitive functioning outlined by Streissguth, Bookstein, and Barr (1996). The ten areas are as follows: achievement, adaptation, attention, cognition, executive functioning, language, memory, motor, sensory/soft neurological, and social communication (Lang, 2006; Streissguth, Bookstein, & Barr, 1996).

Unlike pFAS, for a diagnosis of ARND maternal alcohol exposure needs to be confirmed. Growth deficiency can range from normal to minimally deficient. Central nervous system damage is evident in structural, neurological or functional deficits. Deficits in cognition

must be present in three or more of the previously mentioned areas of cognitive functioning (Manning & Hoyme, 2007).

ARBD is formerly recognized as Fetal Alcohol Effect. ARBD can be diagnosed when maternal alcohol use is unknown. Facial features associated with prenatal alcohol exposure can be absent to warrant a diagnosis of ARBD. With ARBD there are no common features of FASD; however, congenital anomalies need to be linked to prenatal alcohol exposure (e.g., structural brain abnormalities and/or less than ten percent decrease in head circumference) (Manning & Hoyme, 2007).

FAS is the most commonly known FASD. Birth prevalence of FAS in the United States are between 0.5 and 2 per 1000 births (Astley, Bailey, Talbot, & Clarren, 2000). FAS can be more readily detected by physicians due to associated hallmark phenotypes (Thomas, Warren, & Hewitt, 2010). There are three major categories of symptoms that fall under the FAS diagnosis: characteristic patterns of facial anomalies, central nervous system abnormalities, and growth retardation (Manning & Hoyme, 2007). Facial features of FAS can include short palpebral fissures, maxillary hypoplasia, epicanthal folds, thin upper lip, and flattened philtrum. Central nervous system abnormalities or dysfunction could comprise microcephaly, developmental delays, intellectual disabilities, and neonatal problems (e.g., irritability and oral feeding difficulties) (Paintner, Williams, & Burd, 2012). Growth retardation can be seen through low birth weight, postnatal growth deficiency, and low weight to height ratio. Facial features and low birth weights are the obstetrician's first indicators that alcohol use during pregnancy could be present (O'Leary, 2004).

FASD Screening Tools

Screening practices can take place when mothers openly admit to prenatal alcohol consumption during their prenatal visits or when physicians sense risky drinking behaviors. Screening tools, such as T-ACE (Chang, Fisher, Hornstein, Jones, & Orav, 2010) and TWEAK (Sarkar, Einarson, & Koren, 2010), are the most popular means of assessing pregnant women who are at risk for prenatal alcohol consumptions. T-ACE is a measurement tool that consists of four questions that identify mothers who are at risk for alcohol consumption during pregnancy. A score of two or more on the T-ACE scale identifies a woman at risk for harming her fetus through maternal alcohol consumption. TWEAK is a similar screener used to detect at risk drinking behaviors. Like T-ACE, a total score of two or more indicates a positive screen for risky drinking behaviors during pregnancy on the TWEAK screener. However, physicians have been slow to implement universal screening due to time constraints of implementing screening practices, which has resulted in low rates of referrals to treatment prior to delivery (Chang, 2001).

FASDs are often difficult to detect after the baby is born. Diagnostic screening can take place after there are possible indicators of prenatal substance abuse: infants are observed withdrawing from alcohol, recorded for low birth weight/height, and the presence of facial abnormalities (Streissguth & Little, 1994). The most common diagnostic testing for prenatal alcohol exposure is conducted via cord stat testing. Cord stat testing assesses for ethyl glucuroinide, which is an alcohol biomarker created by exposure to ethanol. To conduct this diagnostic screener, physicians need to send approximately 6 inches of umbilical cord tissue to a Cord Stat testing facility. Cord Stat testing has recently replaced traditional meconium testing because it allows for a higher level of sensitivity for alcohol exposure. Screening and diagnostic

efforts are beneficial for medical treatment and identification of symptoms; however, these practices do not alleviate the effects of alcohol exposure on brain development and are often not implemented due to being costly. (Morini, Falcon, Pichini, Garcis-Algar, & Danesino, 2011).

Brain Development of Infant Exposed to Alcohol In utero

The fetus's central nervous system begins developing at three weeks gestation and continues throughout postnatal development (Kuehn, Aros, Cassorla, Avaria, Unanue, Henriquez, Kleinsteuber, Conca, Avila, Carter, Conley, Troendle, & Mills, 2012). A crucial factor determining the effects of alcohol on fetal brain development is the timing of alcohol exposure during pregnancy. Effects of alcohol exposure may cause damage to the brain if the fetus is exposed to ethanol during a sensitive period in prenatal development. Prenatal development is divided into three sensitive periods of development including periconceptual, embryonic, and fetal. The central nervous system develops most extensively during the embryonic and fetal stages. The embryonic period in humans begins at fertilization and continues until the end of the 10th week of pregnancy (Siegler, Deloache, & Eisenberg, 2006). During the embryonic stage, the major organs including the brain begin to develop. As the fetus enters into the fetal stage, organs begin to develop their basic structures (Cunningham, Leveno, & Bloom, 2010). Disruption of development during the fetal stage can cause fetal death, but it is more likely to cause congenital malformations or anomalies. The sensitive period for the central nervous system is throughout the majority of prenatal developmental, and alcohol exposure during this time can have a large impact on how the central nervous system matures (Siegler et al., 2006).

Another crucial factor determining the severity of the effects of prenatal alcohol exposure on brain development is the amount and length of exposure. Specifically, the dose-response

relation is known in the literature as the amount and length of exposure to a negative environmental hazard. The more alcohol an infant is exposed to in utero the more likely the infant's brain development will be negatively impacted. (Siegler et al., 2006).

The last critical factor is known as the sleeper effect. The sleeper effect is when the effects of alcohol exposure during prenatal development do not become apparent for years after an infant is born. Namely, the influences of prenatal alcohol exposure may not affect infants at the time of their birth, but could lead to deficits in cognitive processes later in life. (Thompson, Levitt, & Stanwood, 2009). These deficits could consist of but are not limited to difficulties in processing and integrating information, attention, memory, expressive and receptive language, and executive functioning (Davis, Desrocher, & Moore, 2011).

As previously mentioned, the use of alcohol during pregnancy can adversely affect structural and functional brain abnormalities, resulting in deficits in a child's development. This study will focus on three main areas of development: motor development, cognitive development, and language development. While exploring motor, cognitive, and language impairments in children exposed to alcohol, typical development, with concentration on the first two years of life, will also be discussed.

Motor Development

One of the earliest approaches in motor development is the maturational perspective, which emerged in the early 20th century (Piek, 2006). There have been many researchers who have supported the maturational perspective on motor development. Over the past century, there have been two prominent researchers who have notably contributed to this approach to better understand infant motor development, Arnold Gesell and Myrtle McGraw. The McGraw theory

of motor development proposes that motor development emerged from the structural development and maturation of the central nervous system (Heriza, 1991). McGraw conducted multiple longitudinal studies on various infants' motor movements and categorized the results of infant movements into four periods of neural maturation (McGraw, 1946). Arnold Gesell, like McGraw, investigated the movement and cognitive ability of infants through observations of developing infants (Heriza, 1991). From these observations, he developed a sequence of infant's motor development, which is highlighted below (Gesell, 1964).

Infants are born with organized behaviors, which are referred to as innate reflexes. Reflexes are predetermined patterns of action that occur in response to stimuli. Reflexes that infants can exhibit are grasping, rooting, sucking, and swallowing reflex (Ulrich, 2007). In relation to the grasping reflex, infants will close their fingers around any object that is placed in the palm of their hand. When a caregiver or object touches an infant's cheek, the rooting reflex will cause the infant's head to turn to the side that was touched and the infant will open his or her mouth (Heineman, Middelburg, & Hadders-Algra, 2010). The sucking reflex and swallowing reflex are exhibited when an infant is being fed via oral motor movement. When something comes into contact with the infant's mouth, the infant begins to display a sucking reflex followed by a swallowing reflex to get nourishment into his or her body for survival (Piek, 2006).

Within the first month of a typical infant's motor development, infants increase their visual awareness of the environment and then begin to learn to adapt to their surroundings. Infants are also more mobile with their extremities; however, they are still limited to head lifting and turning (Bly, 1994). At two months old, an infant continues to become more alert and his or her head will move towards the person or object to which he or she is attending. In addition, the infant's muscle movement tends to appear more disorganized compared to when he or she was

one month old. This is in part due to an increase of motor movement and lack of motor control (Heriza, 1991).

At three months of age an infant is aware of his or her environment and can interact visually with a caregiver. He or she can also hold his or her head up briefly when lying flat on his or her stomach in a prone position. Infants will try to roll over from their stomachs and try to support some of their weight with their legs. Although, at this stage of motor development, their movement has not gained control and can still appear jerky, infants will begin to successfully reach for objects (Santos, Gabbard, & Goncalces, 2001).

The four month milestone marks the beginning of controlled movement. An infant at this age will begin to sit with little support. At four months old, an infant is visually active, which in turn stimulates different head movements that were not present previously (Bly, 1994). At five months old, an infant can sit without support and begins to stand with support (Siegler et al., 2006). Head control improves significantly during this stage of motor development. Head movements begin to not be associated with movements of the rest of the body, which suggests the infant is gaining head control (Heineman, Middelburg, & Hadders-Algra, 2010). At six months, infants begin to pull themselves up by use of stationary objects to stand (Siegler et al., 2006). Furthermore, typical developing infants have more refined hand and finger movement, which allows them to grasp for toys and place toys in their months or a desired location (Bly, 1994)

At seven months, an infant's main locomotive means is by crawling on his or her hands and knees. To be able to crawl an infant must be able to lift the trunk of his or her body and bear weight on his or her arms and hips. An infant is also able to pull him or herself up to a standing

position. At eight months of age, infants continue to become more active in their environment. Their desire to explore their environment promotes motor development by reaching for objects and moving to upright positions to obtain objects in their reach. By nine months, infants are combining their gross and fine motor skills to perform more complex tasks, such as grasp an item that is at first out of their reach. Infants at this age also begin to assume many different sitting positions while engaging in fine motor activities and crawling skills are expanded to climbing skills (Bly, 1994).

At ten months of age, infants begin to develop hand-eye coordination through playing with toys and they are fascinated by taking objects in and out of containers. Infants also begin to mimic play interactions with caregivers. By eleven months of age, infants have refined their gross motor skills and are able to stand up using furniture and manipulate toys with the use of both hands. At this time, infants have gained increased control of their fine motor skills and are able to release and grasp objects held in their hands. When an infant reaches twelve months of age, all basic motor skills should be present. Playing with new objects in the environment becomes a challenge for infants as they attempt old motor schemes on the new objects and develop new schemes when the old ones are inadequate (Bly, 1994).

After twelve to fifteen months, infants are able to stand alone and transfer to standing from being seated. Infants are also able to stand without losing balance and they begin to change directions while walking without falling. Additionally, infants begin to take an active part in dressing and feeding practices by being able to hold their arms and legs out when clothing are being put on them as well as they are able to self feed with a spoon without slippage. As infants transition into toddlers at the age of two, gross and fine motor skills begin to vastly develop. Toddlers are able to run without falling and walk up stairs placing both feet on one step without

holding on to the rail. At this age children are also able to throw items (e.g., ball) three to five feet in the direction of a target as well as jump up two inches from the floor. Toddlers also begin to develop independently by being able to wash their own hands, and hold utensils without assistance (Siegler et al., 2006).

Motor Development of Infants' Exposed to Alcohol in Utero

It is well established in the literature that prenatal alcohol exposure affects the developing embryo, but it is unclear to what degree alcohol exposure in utero has on motor development. Prenatal alcohol exposure has been linked to significant motor development delays in the first few years of life. Kalberg et al. (2006) found fine motor delays primarily in children between the ages of 22 to 68 months old. In addition, early deficits have been related to weak reflexes, decreased strength of movement, and increased frequency of spontaneous startles (Driscoll, Streissguth, & Riley, 1990). Osborn et al. (1993) establish a relationship between motor delays in children with FAS and cognitive delays. Another study investigated the role of prenatal alcohol exposure on motor development of three-year-old children using the Psychomotor Development Index (Larroque, Kaminski, Dehaene, Subtil, Delfosse, & Querleu, 1995), which is a motor development assessment that measures an infant's ability to perform coordinated large muscle movement, fine motor skills, and motor control. The results of this study demonstrated that the use of alcohol during pregnancy significantly affected gross and fine motor skills as well as motor control (Tarr & Pyfer, 1996).

In a study by Barr et al. (1990), fine and gross motor performances were investigated in children at four years of age. This study conveyed poorer balance on gross motor tasks in children who were prenatally exposed to moderate levels of alcohol compared to same aged

peers. Roebuck et al. (1998) also discovered balance deficits in children who are prenatally exposed to alcohol. Researchers have also associated prenatal alcohol exposure to decrease in cell migration and dendritic growth in the third trimester of pregnancy in the cerebellum, which resulted in deficits with balance and gait (Ornoy & Ergaz, 2010).

However, some studies have reported controversial results regarding alcohol exposure and motor ability. Ioffe and Chernick (1990) found no difference with reflexes (e.g., grimace response) between prenatally exposed infants and non-exposed neonates when using Apgar scores. Additionally, a study found that fine and gross motor skills were within normal limits when using the Bruininks-Oseretsky Test of Motor Proficiency (Bruininks, 1978), which assesses fine manual control, manual coordination, body coordination, and strength and agility (Venetsanou, Kambas, Aggeloussis, Serbezis, & Taxildaris, 2007).

Cognitive Development

Jean Piaget's theory of cognitive development suggests that children go through four continuous stages of cognitive development: sensorimotor, pre-operational, concrete operational and formal operational (Piaget, 1952). Typical developing children progress through the sensorimotor stage from birth to two years of age. During this stage, infants' cognitive complexity increases and is expressed through their sensory and motor abilities. As infants perceive and explore their environment around them, infants begin to gain information about the individuals and objects to create new concepts (Singler, Deloache, & Eisenberg, 2006). The sensorimotor stage consists of six substages. Infants typically go through the first substage from birth to one month of age. During this substage, infants rely on and modify their reflexes to assist them in getting their needs met. During the second substage of sensorimotor development,

which occurs around one to four months of age, infants begin to organize their reflexes into larger behaviors, such as holding their bottles while sucking. The third substage occurs between four and eight months. Infants in this stage are able to start to gain pleasure and knowledge about the world beyond their bodies. Object permanence begins, which is when the infant gains knowledge that when an object is out of sight it still exists in the world. Infants reach the fourth substage of sensorimotor development between eight and twelve months of age. At this stage, infants fully understand object permanence and will search for objects when placed out of sight. Infants at this stage, however, do have difficulties finding an object if it is placed in a different hiding place than it was previously hidden (Papalia, Olds, & Feldman, 2009). During the fifth sub stage, which is between twelve and eighteen months, infants begin to actively explore the world and will test objects to understand their characteristics, such as the sounds they make and how they work. During the final substage in sensorimotor development, which occurs between eighteen and twenty-four months, infants become able to form mental representations helping them move into the pre-operational stage of cognitive development (Huitt & Hummel, 2003).

Cognitive Development of Infants' Exposed to Alcohol in Utero

Many studies have documented that exposure to alcohol during fetal development can cause the development of an intellectual disability (Weinberg, 1997; Janzen, Nanson, & Block, 1994). Janzen, Nanson, and Block (1994) found that eighty percent of the study's population who were diagnosed with FAS had borderline to severe cognitive impairment. Although intellectual disabilities and cognitive deficits are prevalent among FAS children, it should be acknowledged that research shows that children with prenatal alcohol exposure can present with an average intellect (Steinhausen & Sphor, 1998). Puslifer, Butz, Foran, and Belcher (2008) compared children who were exposed to alcohol to a control group to examine the differences in

their cognitive functioning. The researchers found no significant differences in cognitive ability between the two groups. Streissguth et al. (1997) performed a study to investigate neuropsychological deficits in adolescents prenatally exposed to alcohol in utero. Results of this study concluded that this population demonstrated average IQ; however he found a significant split between Performance IQ and Verbal IQ, with the later being significantly lower. Mattson & Riley (1998) also found that children diagnosed with FAS have greater deficits in Verbal IQ compared to Performance IQ.

Research has also shown that ethanol exposure during prenatal development can lead to other deficits in a variety of cognitive processes. Impairment in visual spatial skills in preschool has been documented in the literature (Conry, 1990). Deficits in verbal learning and memory were also identified in a study that assessed the effects of FAS on Native American and African-American children (Church & Kaltenbach, 1997). Spatial memory, verbal memory, attention, problem solving, information retention, and comprehension have also been associated with prenatal alcohol exposure (Wesson, 2005).

Research has investigated the relationship between the amount of alcohol exposure in utero and the level of cognitive deficits. When using the Bayley Scales of Infant Development (Bayley, 1993), slower cognitive processing was identified in infants six and twelve months of age, who were exposed to a moderate level (i.e., two to three drinks per week) of alcohol during pregnancy (Jacobson, Jacobson, & Sokol, 1994). Lower IQ scores, when using the Bayley Scales of Infant Development, were also associated with moderate levels of prenatal alcohol exposure at ages eight to thirteen months (Streissguth, Barr, & Marin, 1980; Jacobson, Jacobson, Sokol, Martier, Ager, & Kaplan-Estrin, 1993). However, two studies were not able to find differences in IQ between the control and moderate levels of maternal alcohol consumption

during pregnancy (Richardson, Ryan, Willford, Day, & Goldschmidt, 2002; Streissguth, Barr, Samspon, Darby, & Martin, 1989). In contrast, children with heavy prenatal alcohol exposure (i.e., four or more drinks per week) showed impairment on measures of concept formation. Specifically, these children showed deficits with generalizing and verbalizing concepts (McGee, Schonfeld, Roebuck-Spencer, Riley, & Mattson, 2008).

In addition to examining the relationships between prenatal alcohol exposure and dose response, research has also looked at cognitive functioning in the four subtypes of FASD discussed previously. One study found that children with FAS and PFAS displayed similar cognitive deficits in the following areas: work comprehension, naming ability, academic skills, visual-motor integration, and nonverbal learning (Mattson, Riley, Gramling, Delis, & Jones, 1998).

Even though there are inconclusive results regarding the effects of exposure of alcohol during prenatal development on cognitive development, research consistently supports the notion that maternal sensitivity and responsiveness plays a significant role in promoting infant's cognitive development. One study investigated infant temperament, maternal sensitivity, and psychological risk in predicting cognitive development in children. The results of the study show that maternal sensitivity and psychological risk predict cognitive development in children born premature. Researchers also found that a child's environmental ecology also plays a significant role in cognitive development (Lemelin, Tarabulsy, & Provost, 2006). Another study examined parent-infant interaction with prenatal and socio-demographic risk to predict cognitive development. Results indicated that quality of parent-infant interaction mediated the relationship between neonatal risk and cognitive development. This study also indicated that when mothers

engage in a dyadic interaction with their infants, the infants tend to have higher cognitive functioning (Poehlmann & Fiese, 2001).

Language Development

From the beginning of life, infants are able to communicate with caregivers. Over the first two years of life, their communication skills develop dramatically. Just like motor development, the first sounds that an infant makes are reflexive (Iverson, 2010). With the first breath after delivery, an infant uses a reflexive cry. Infants then continue to use this reflexive cry to indicate to his or her caregiver that he or she is hungry, angry or in pain (McLaughlin, 1998). As an infant develops, his or her cry differentiates to elicit different responses from his or her caregiver. Another innate reflex that an infant exhibits is the moro reflex, which is a startle response to sudden loud noise. In addition to the reflexive cry and moro reflex, infants will use vegetative oral sounds, such as lip clicks, burps and coughs in the first four weeks following birth. Vegetative oral sounds, like reflexive cries, are automatic responses to feeding and digesting food (Hulit, Howard, & Fahey, 2011; Luinge, Post, Wit, & Gorrhuis-Brouwer, 2006). From birth to four weeks of age, infants will also start to produce a non-crying sound to indicate a state of pleasure (Owen, 1996).

Between one and four months of age, infants begin to coo and have distinct differentiated cries. Cooing is described as the production of vowel-like sounds that can be combined with brief consonant-like sounds (Hulit et al., 2011). Cooing usually occurs when the infant's caregiver interacts with the infant and when the infant is in a pleasurable state (McLaughlin, 1998). At the end of one month of age, caregivers are able to begin to identify their infant's discriminated cries to determine how to better meet their needs. When an infant reaches two

months old, his or her frequency of crying behaviors decreases and his or her cries become more distinguished (Hulit et al., 2011).

During the period of four to six months, infants begin to babble. Babbling is the infant's ability to string sounds together that consist of vowels and consonants to produce a single sound (Owen, 1996). This milestone is the most significant development for later speech because the production of consonants suggests an increasing maturity in the infant's ability to control speech mechanisms. As an infant's motor development advances, so does the quality of babbling skills (McLaughlin, 1998). Also with the more exposure infants have to their own language, babbling begins to more closely resembles discrete words within their innate language (Hulit et al., 2011). During this milestone in language development, infants begin to exhibit social smiles in response to their caregiver or to familiar faces. Infants also start to attend to their caregiver's voice or appearance (McLaughlin, 1998).

Vocal play begins to develop around six to eight months of age. Vocal play pertains to lengthier strings of syllables that expand out of babbling as infants continue to experiment with sounds (McLaughlin, 1998). Vocal play appears to result from infants' experimentation with sounds and greater control over oral abilities. When an infant is between six and eight months old he or she begins to recognize the emotions of their caregivers through facial expressions and vocal tones. Infants at this stage of language development are also able to respond to routine phrases or gestures, such as "hello" and/or "goodbye" (Papalia, Olds, & Feldman, 2009).

By the time infants are eight months old, language development has dramatically advanced. Interactions with caregivers help to mature oral motor skills by increasing the exposure to sounds and practice of producing sound (McLaughlin, 1998). Between eight and

twelve months infants are able to reproduce echolalia behavior. Echolalia is when infant imitate sounds, syllables or words that are first produced by a caregiver (Hohm, Jennen-Steinmetz, Schmidt, & Laucht, 2007). This behavior is a parrot-like behavior because the infant does not receptively understand what he or she repeating from his or her caregiver (Hulit et al., 2011).

As the first year of infancy comes to an end, infants are able to produce jargon. Jargon is the ability of an infant to combine syllables with inflection in one's voice that imitates real speech. Jargon typically begins between nine and twelve months of age (Kale, & Bhargava, 2006). Researchers have found that infants as young as eight months have been able to imitate words that were uttered by caregivers. During this phase, infants are able to express their needs to obtain a caregiver's attention or an object they desire (McLauglin, 1998).

Typically around the age of twelve months, infants begin to learn and produce their first words. As children begin to be exposed to more word utterances from caregivers, around eighteen to twenty four months of age, they begin to put two words together (Hulit et al., 2011). At this stage, there is a great variation between children in terms of language development. Children can produce up to six combinations of words by around the age of two (Papalia, Olds, & Feldman, 2009).

Language Development of Infants' Exposed to Alcohol in Utero

There is a plethora of research conducted on the effects of prenatal alcohol exposure on cognition; however, there are limited studies that investigate the prospects of deficits in areas of language development with this population. Like motor and cognitive development, there are inconsistent results among these studies. Greene, Ernhart, Martier, Sokol, & Ager (1990) found an association between the amount of alcohol exposure in utero and performance on

phonological processing tasks. Pulsifer et al. (2008) compared children exposed to prenatal alcohol exposure and children not exposed to alcohol in utero by assessing differences in expressive language skills. They found that sixty percent of alcohol exposed children earned at least a standard deviation below the mean compared to thirty-three percent of children who were not exposed to prenatal alcohol on this assessment. A similar study found comparable results, linking heavy prenatal alcohol exposure to deficits in receptive and expressive language skills. In addition, this study found that these deficits impacted social interactions with peers and led to behavioral concerns (McGee, Bjorkquist, Riley, & Mattson, 2009). Additional deficits found in this population are as follows: comprehension, naming ability (Mattson, Riley, Gramling, Delis, & Jones, 1998), and articulation (Becker, Warr-Leeper, & Leeper, 1990).

When assessing intelligence using the WPPSI (Gordon, 2004), a study found deficits in verbal intelligence. Specifically, children with prenatal alcohol exposure had difficulties with word attack subtest, which measure a child's ability to read nonsense words and the child's knowledge of pronunciation rules (Streissguth, Barr, Carmichael, Sampson, Bookstein, & Burgess, 1994). On a test of verbal fluency, children with FAS displayed impairments in letter fluency, but not in category fluency (Kodituwakku, Handmaker, Culter, Weathershy, & Handmaker, 1995; Mattson, Riley, Jernigan, 1994.

In contrast, Fried & Watkinson (1990) established no significant differences between children exposed and non-exposed children in regards to expressive language in children between the ages of one and three. Receptive language deficits at the age of three with this population were found; however, this longitudinal study failed to find receptive language deficits at age four (Fried, Watkinson, & Gray, 1998).

Parenting Styles

Due to the plasticity of the immature nervous system, long-term effects of early exposure to negative teratogens (alcohol exposure in utero) need to be researched to determine if a child's development can be ameliorated by positive parenting practices (Paone & Alperen, 1998). According to research conducted by Baumrind (1965), there are three types of parenting styles, each associated with differing dimensions of control and warmth. Baumrind (1966) described control as the demands or expectations parents place upon their children and the amount of supervision they exhibit. Warmth as a construct refers to the degree in which parents display involvement, responsiveness and warmth toward their children. Based on a parent's degree of control and warmth, a parent can be categorized as exhibiting one of three parenting style types. The three types of parenting styles are authoritative, authoritarian and indulgent. Baumrind (1965, 1966, 1967, 1968, 1970, 1978, and 1991) conducted many studies of these three parenting styles to determine how parenting styles affect aspects of child development.

Authoritative parents display both responsive and demanding traits. These parents are warm, supportive, and encouraging, but are also firm and convey clear standards for their children's behavior without being intrusive or restrictive. Parents that fit into the authoritative category do not reward dependency, but instead set a standard of self-control and responsibility that a child is to follow. Authoritative parents teach rules of conduct, set boundaries, and foster responsibility through teaching correct principles. Consequences are employed for negative behaviors; however, authoritative parents exhibit more positive reinforcement than harsh or corrective punishment (Crockenberg & Leerkes, 2003).

Overall, Baumrind has found that children reared by authoritative parents tend to fare better developmentally than children raised by authoritarian or permissive parents (Seifer,

Dickstein, Parade, Hayden, Magee, & Schiller, 2014; Baumrind, 1966). In middle childhood, children raised by authoritative parents have been shown to excel in the following areas: independence, creativity, persistence, social skills, academic competence, leadership skills, and self-control (Baumrind, 1970). They also tend to have higher self-esteem, be more socially confident, are self-reliant, have more respect for authority, and display increased academic performance (Baumrind, 1978). Additionally, parents who display appropriate control and warmth tend to have children with behavioral and cognitive proficiency (Baumrind, 1991).

Authoritarian parents are demanding and controlling, but not responsive or warm. They have clear rules that their children are not supposed to question. Authoritarian parents encourage minimal input from their children in making decisions and provide few rationales behind their parenting rules (Baumrind, 1968). The parent-child dynamic includes one-way communication, which has a limited focus on the child's view or opinions (Baumrind, 1965). Authoritarian parents use coercive and punitive control, which often includes physical or emotional punishment as a means of disciplining children for inappropriate behaviors (Baumrind, Larzelere, & Cowan, 2002; Baumrind, 1965).

Outcomes for children raised by authoritarian parents are not as positive as after-effects for children raised by authoritative parents. By pre-school age, children raised by authoritarian parents report being unhappy, apprehensive, socially inhibited, and experience difficulties in regulating their emotions (Baumrind, 1967). Across years of development, children of authoritarian parents continue to fall behind in both cognitive and social skills (Baumrind, 1978).

The permissive parent style, also known as an indulgent parenting style, is used by caregivers that are considered responsive and warm. Unlike authoritative parents, permissive

parents place minimal to no demands on their children. These caregivers allow considerable self-regulation, but are lenient and avoid confrontation. Indulgent parents require little of their children and have few expectations for appropriate behavior. Permissive parents also allow their children autonomy, offering high parental support in hopes of forming close relationships. Indulgent parents are highly responsive to their children's needs; however, bad behaviors are seldom acknowledged or corrected.

Preschool children of indulgent parents have difficulties regulating their emotions and tend to have low self-control (Baumrind, 1967). It has also been reported in the literature that children raised by indulgent parents tend to be bossy, dependent and impulsive. These children can also have difficulties learning persistence and dealing with limitations due to the lack of demands placed on them by their parents (Baumrind, 1967).

Maccoby and Martin (1983) extended the work of Baumrind to include a fourth parenting style, which they named the uninvolved parenting style. Uninvolved parenting style is also known as neglectful parenting and includes parents that are neither responsive nor demanding. These parents are generally not involved in their child's life; however, they do meet their children's basic needs, such as food, housing and toileting needs. Parents who fit into this style present as though other aspects of their lives are more important than their children. Many children raised by neglectful parents attempt to provide for themselves or cease depending on their parents early in life. They also tend to gain independence and maturity beyond their age.

Preschool children raised by neglectful parents can be highly dependent on teachers and exhibit adjustment problems. When these children reach kindergarten, they have difficulties understanding daily demands placed on them and develop poor work habits. Teachers report

these children as being anxious, withdrawn, unpopular, and inattentive (Maccoby & Martin, 1983). On the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) (Gordon, 2004), children of uninvolved parents exhibited deficits in vocabulary and comprehension (Crittenden, 1985).

Child Temperament

Thomas and Chess (1977) studied child temperament and identified nine characteristics or behaviors to assess a child's temperament (Thomas & Chess, 1977). These characteristics and behaviors are activity level, rhythmicity, approach or withdrawal, adaptability, threshold of responsiveness, intensity of reaction, quality of mood, distractibility, attention span, and persistence. Based on these characteristics, there are three main types of temperament that infants can exhibit: an easy temperament, difficult temperament, and slow-to-warm-up temperament. Previous research by Weiss, Jonn-Seed, and Harris-Muchell (2007), found that fetal drug exposure was associated with both distractibility and intensity of children's responses to their environment even after six months of age.

Children with an easy temperament have regular eating, sleeping, and elimination cycles, a positive response to new situations and accept a degree of frustration with little fuss. They adapt to change, such as new food or a new school quickly. They demonstrate a good mood most of the time, and smile often. Conversely, children with a difficult temperament show irregular eating, sleeping, and elimination cycles. They display a negative response to new situations; for example, frequent and loud crying or throwing tantrums when frustrated. They are slow to adapt to change, and need more time to get used to new food or people (Putnam, Ellis, Rothbart, 2001). Lastly, children with a slow-to-warm-up temperament show mild negative responses when

exposed to new situations, but slowly come to accept new situations with repeated exposure. It's important for parents to be aware of their child's temperament and adjust their responses to their child accordingly (Weiss, Jonn-Seed, & Harris-Muchell, 2007).

Goodness of Fit

The idea of goodness of fit encompasses the match between the needs of the infant and the parenting style of the mother. This concept was founded by Thomas and Chess (1977) via direct interviews and questionnaires. The goodness of fit concept proposes that when the characteristics of a child fit with the demands and expectations of the environment, adaptive outcomes will result (Thomas & Chess, 1977). Goodness of fit theory between child's temperament and parenting style has been shown to be an important aspect for healthy social and emotional development. Goodness of fit does not imply an absence of stress and conflict because without conflict, individuals would have difficulties reaching their developmental milestones (Chess, & Thomas, 1996). For a good fit, parents need to match their demands or expectations with their children's skills and abilities, given their age and temperament (Ostergren, 1997). Understanding the factors that are related to promoting a child's development has important implications for enhancing motor development, cognitive development, and language development in children exposed to negative teratogens in utero.

Problem Statement

The purpose of this study was to investigate how the association between parenting styles and child temperament relates to motor development, cognitive development, and language development in children prenatally exposed to alcohol in utero.

The first research question examined the percentage of parents of children prenatally exposed to alcohol who exhibit the following parenting styles: authoritative, authoritarian, indulgent, and neglectful. The study hypothesized that there will be a higher percentage of neglectful parenting as compared to authoritative, authoritarian and indulgent parenting styles. Research has shown that when comparing non-users and polydrug users, a greater portion of polydrugs users were characterized as having a neglectful parenting style (Montgomery, Fisk & Craig, 2008). However, no research has analyzed the association between parenting styles and mothers who consume alcohol during pregnancy.

The second research question examined the percentage of the children prenatally exposed to alcohol that show easy and difficult temperament types. It was hypothesized that there will be a higher percentage of difficult child temperaments as compared to easy temperaments. Based on previous research by Weiss, Jonn-Seed and Harris-Muchell (2007), fetal alcohol exposure was associated with both distractibility and intensity of children's responses to their environment even after six months of age. However, no research study has categorized children who were prenatally exposed to alcohol in to child temperament groups.

The third research question investigated which parenting style is associated with greater outcomes in motor development, cognitive development and language development. Authoritative parenting style was hypothesized to be associated with greater motor development, cognitive development and language development as compared to authoritarian, indulgent and neglectful parenting styles. As mentioned earlier, children reared by authoritative parents tend to fare better developmentally than children raised by parents who employ permissive or authoritarian parenting styles (Baumrind, 1966). There is also evidence that relates appropriate degree of responsiveness and demands in a mother child dyad with behavioral and cognitive

proficiency (Baumrind, 1991). In regards to language development, research has also shown that authoritative parenting style is linked with positive outcomes in early language knowledge and literacy development (Birch & Ladd, 1996).

The fourth research question asked which child temperament style was associated with greater motor development, cognitive development and language development in this population. Easy child temperament was hypothesized to be associated with greater motor development, cognitive development and language development as compared to difficult child temperament. Limited research has been conducted on how temperament is related to child development. However, there has been research to indicate that children with easy temperaments tend to get more exposure to positive responses from their environment, which has the potential to positively impact children's overall development (Thomas & Chess, 1977).

Lastly, this study investigated if the interaction between parenting style and child temperament improves outcomes in motor development, cognitive development, and language development in children prenatally exposed to alcohol. The study hypothesized that the authoritative parenting style will promote motor development, cognitive development and language development more effectively as compared to authoritarian, indulgent, and neglectful parenting styles for children with an easy temperament. There is currently no existing empirical research demonstrating the relationship of goodness of fit of parenting style and child temperament and its impact on different aspects of child development in this population.

Chapter III

Methods

Sample and Participant Selection

Data Source

Data for this project was derived from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B). The ECLS-B is a data set sponsored by the U.S. Department of Education and the National Center of Education Statistics (U.S. Department of Education, 2004b). The intention of the ECLS-B is to make available information to researchers on child development as well as provide data on confounding variables that have a potential impact on a child's development. The ECLS-B consists of a nationally representative sample of approximately 11,000 children who were sampled beginning in 2001 and were followed through kindergarten. Data were collected at four phased in early child development (i.e., nine months, two years, preschool and kindergarten). For this study, only phase two will be discussed. Phase two consists of data collected when the child was two years of age.

Data Collection

The ECLS-B data set includes observational data, assessment data and parent/caregiver self reports in regards to children's cognitive, language, motor, social, and emotional development. Data was collected by trained researchers in the participants' home setting via direct formal assessments with the child as well as structured interview with the child's primary caregiver using a computer-assisted program. Additional data such as the child's height, weight, head circumference, and birth weight were measured (U.S. Department of Education, 2004a).

Participants

Data were collected near the time when the child turned 24 months of age (i.e., ranging between 20 months and 38 months). The child's age was confirmed via birth certificates and

caregivers' interviews. Approximately, 10,000 children and their caregivers participated in this wave of data collection. In regards to race and ethnicity, the sample population included participants in the following categories: 43% White, 20% Hispanic, 16% Black, 11% Asian/Pacific Islander, and 10% other. The poverty reported in this wave of data was 24% of the participants. Eighteen percent of the infant's mother disclosed not receiving a high school diploma. Approximately nineteen percent of the caregivers in the study spoke a native language besides English (U.S. Department of Education, 2004c).

Weights

Weights were used in the ECLS-B during all phases of data collection. Weights compensate for collecting data from a sample rather than the entire population and allow for inference of the sample data. The weighted unit response rate for child assessments at two years was 94.2% and the un-weighted unit response rate was 93.7%. The weighted unit response rate for the parent interview when the child was approximately two years old is 93.1%. The un-weighted unit response rate for the 2-year parent interview is 92.8% (U.S. Department of Education, 2004b). Weights were used in this study to ensure there is an adequate sample size to be able to run the analysis. Specifically, the W20 weight was applied to the data in this study.

Assessment and Measures

The independent variables in this study that originated from the 2- year parent interview were gender, race, socio-economic status, level of parent education, level of maternal alcohol consumption, parenting style, and child temperament. The complex independent variables are described below in greater detail.

Level of Maternal Alcohol Consumption

The level of alcohol consumptions is derived from self-reports on the parent/caregiver's structured interview. For this research study, only children whose biological mother's reported heavy alcohol consumptions during the last three months of pregnancy were extracted from the data set for analyses. Brown, Olson, and Croninger (2010) reported that heavy alcohol consumption consists of four or more drinks per week. Consequentially, data consisting of biological mother's who reported drinking four or more drinks per week were used in this study. The decision to utilize the last months of the mothers pregnancy was based on the rationale that prenatal substance abuse during the third trimester has potential to alter brain development, especially in the subcortical structures of the brain (Mattson & Riley, 1998).

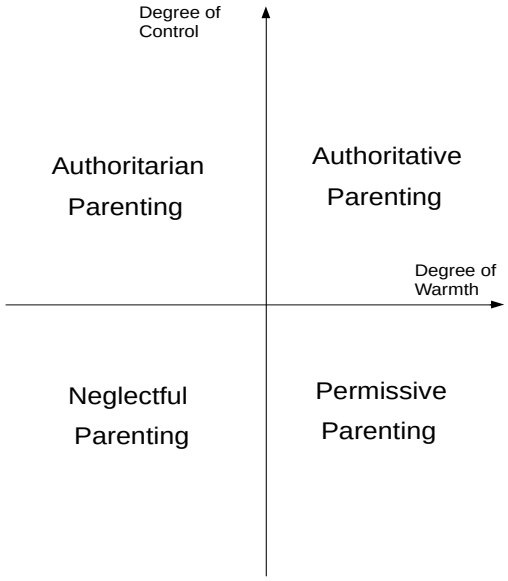
Parenting Styles

Given the main focus of this research study is the affects of parenting style on developmental outcomes of children prenatally exposed to alcohol, types of parenting styles were examined. The theoretical basis for this research project is based on the goodness of fit Model that was created by Alexander Thomas and Stella Chess in 1977. As mentioned previously, parenting style is one component to the goodness of fit concept and is categorized by levels of warmth and control a parent exhibits to their child. Based on these concepts each parenting style is associated with different dimensions of parental action (i.e., warmth and control) (See figure 1). There are four dimensions of parenting styles and they are: authoritative, authoritarian, permissive, and neglectful parenting styles. In the data set questions involving the construct warmth consist of: do you engage in activities with your child, do you talk to or soothe your child often when he or she is upset, and do you give your child physical affection. The construct demands consists of questions such as: is your child able to do less than you expected,

do you consistently enforce rules in your house, and do you implement physical discipline when your child misbehaves. Questions were presented on a six point likert scale with 1 = strongly agree, 2 = agree, 3 = disagree 4 = strongly disagree, 5 = refused, and 6 = don't know.

Factor Analysis was conducted to determine what items on the 2- year parent interview related to the constructs warmth and demands. Six items factored together to create a variable that was associated with the degree of warmth mothers elicit to their children. Eight items factored to create a variable that measures the construct demand. The mean and standard deviation was computed on these two constructs with all biological mothers who completed the 2- year parent interview. The computed mean and standard deviation was used to determine the cut offs (i.e., above and below the mean) for the constructs warmth and demands. Biological mothers who reported heavy maternal alcohol use during the last three months of pregnancy were coded in one of the four parenting styles. Mothers were coded as a one to represent the authoritative parenting style if data signified high ratings of demand (i.e., above the mean) and high ratings of warmth (i.e., above the mean). Mothers were coded as a two to represent the authoritarian parenting style if data indicated high ratings of demand (i.e., above the mean) and low ratings of warmth (i.e., below the mean). Mothers were coded as a three to represent the permissive parenting style if data suggested low ratings of demand (i.e., below the mean) and high ratings of warmth (i.e., above the mean). Lastly, mothers were coded as a four to represent the neglectful parenting style if data denoted low ratings of demand (i.e., below the mean) and low ratings of warmth (i.e., below the mean).

Figure 1



Child Temperament

Another component to the goodness of fit between an infant and their caregivers is child temperament. Thomas and Chess (1977) categorized child temperament into the following nine behaviors to create a construct to measure child temperament: activity level, rhythmicity (regularity), approach or withdrawal, adaptability, threshold of responsiveness, intensity of reaction, quality of mood, distractibility, attention span and persistence. This study only explored the following characteristics of child temperament: intensity of reaction, approach/withdrawal, and threshold of responsiveness. This study also only incorporated two of the three child temperaments (i.e., easy and difficult) discussed in Thomas and Chess's goodness of fit model. Three items from the parent interview were used to create the construct child temperament. These questions included the following: child is frequently irritable or fussy, child demands your attention and company constantly, and child goes easily from a whimper to an

intense cry. Questions were presented on a seven point likert scale with 1= always, 2= frequently, 3= sometimes, 4= rarely, 5= not at all, 6= refused, and 7= don't know.

Factor analysis was conducted to determine what items on the 2- year parent interview measure the constructs child temperament. Four items factored to create the construct child temperament. The mean and standard deviation were then computed on all biological mothers who answered these four items on the 2- year parent interview to determine the cut off for the two types of temperament. Children in the study were coded with either presenting with easy (i.e., coded as a one) or difficult child temperament (i.e., coded as a two).

Cognitive and Motor Development

The Bayley Short Form-Research Edition (BSF-R) was developed specifically for collecting data for the ECLS-B. The BSF-R is a shortened version of the Bayley Scales of Infant Development-Second Edition (BSID-II; Bayley, 1993). Permission to create an abbreviated version of the BSID-II was granted by The Psychological Corporation, which published the BSID-II. Item response theory (IRT) modeling was used to select items from the BSID-II for the BSF-R. The BSF-R was designed to replicate results obtained from the BSID-II as closely as possible. Specifically, the BSF-R was designed to condense administration time without compromising the quality of data collected. Items in the BSID-II that were difficult to administer and score were deleted from the BSF-R. The BSF-R also consisted of shortened basal and ceiling rules (West & Andreassen, 2002).

The BSF-R was administered as a follow-up assessment when the children in the study were approximately two years of age. This assessment battery is a normed referenced assessment that assesses both children's mental and motor development. Mental and motor development was reported via the mental development index and the motor development index.

Both development indexes on the BSF-F have a mean of one hundred and standard deviation of fifteen. The overall reliability coefficient for the BSF-R mental development index was .88 and the reliability coefficient for the BSF-R motor development index was .72.

Mental Development Index

The BSF-R's Mental Development Index measures attention, orientation, and engagement. Specifically, the BSF-R assesses a child's ability to explore objects, early problem solving, ability to name objects, listening, comprehension, and discrimination. Tasks included in the BSF-R are as follows but are not limited to pointing to objects, using words to make wants known, following directions, naming objects in pictures, combining words with gestures, using a two-word utterance, imitating, discriminating between objects, matching objects, and attending to stories. This assessment included thirty-three items that were administered to the child by a trained researcher in the home setting (U.S. Department of Education, 2004a).

Motor Development Index

As previously mentioned, the Bayley Short Form-Research Edition (BSF-R) was also used to assess children's motor development through the computation of the Psychomotor Development Index. The BSF-R's Psychomotor Development Index measures a child's motor quality. Specifically, the Psychomotor Development Index assesses a child's ability to walk, balance, fine motor control, ability to use stairs, ability to alternate balance, and motor planning. Tasks that comprise the BSF-R Psychomotor Development Index include walking with good coordination, walking backwards, throwing a ball, grasping a pencil, standing on one food, running with good coordination, jumping off the floor, imitating hand movements, buttoning up buttons, etc. Like the Mental Development Index, this assessment was administered by a trained

researcher in the child's home setting, but contains thirty-two items (U.S. Department of Education, 2004a).

Language Development

Expressive language development was measured via reported language milestone attainment during a structured interview with the child's biological mother. The direct assessment of the children's expressive language could not be administered due to time constraints. Consequently, information was obtained via parent report using an indirect assessment. The MacArthur Communicative Development Inventory (M-CDI) was adapted primarily for the use of collecting data on participates' expressive language abilities for the ECLS-B dataset. Authors of the M-CDI were consulted and reduced the assessments wordlist to fifty words. No age-appropriate norms were available for the abbreviated M-CDI (Fenson, Dale, Reznick, Thal, Bates, Hartung, Pethick, & Reilly, 1993). For this indirect assessment parents indicated whether or not their child is able to clearly pronounce words indicated on a list of fifty words. Words on the list include mommy, thank you, shoe, airplane, bye, hot, etc.

Due to the abbreviated M-CDI having no age-appropriate norms, additional analysis was performed to create the variable used to measure the language development construct. Data for this dependent variable needed to be transformed into z-scores. To transform the data into z-scores, the mean and standard deviation was computed on all biological mothers who completed the abbreviated M-CDI on the 2- year parent interview. A data transformation was then conducted to convert the raw scores on the indirect assessment to z-scores via subtracting the raw score by the sample's computed mean and dividing by the sample's computed standard deviation.

Data Preparation

Data was extracted from the ECLS-B via the creation of a taglist comprising all variables needed to conduct the research study. The data was then exported to STATA. The sample was then reduced to only include participates who were two years old at the time of data collection. The sample was further narrowed to include participants whose mother engaged in heavy alcohol consumptions during the last three months of pregnancy (i.e., four or more drinks per week). In this subsample, participants who were missing data from the following independent and dependent variable items were eliminated due to complications with conducting a factor analysis for the parenting styles and child temperament variables.

In regards to screening for missing data in the database, a descriptive analysis revealed that there were no cases of missing data for the independent and dependent variables. Mahalanobis distance was then computed to determine if multivariate outliers existed in the dataset. For this analysis the critical value was set at 13.816. There were no cases in the dataset with a mahalanobis distance greater than the critical value. Consequently, no extreme outliers were found using this method.

Prior to running multivariate analysis of variance (MANOVA), all applicable assumptions were evaluated. Specifically, the following assumptions were examined: linearity, multivariate normality, homogeneity of variance, and multicollinearity. Linearity is the assumption that requires there to be a linear relationship between the dependent and independent variables in order to conduct statistical analysis. To confirm the assumption of linearity, a scatter plot was created to assess if there is linearity between the dependent and independent variables. The assumption of multivariate normality is also known as the assumption of normal distribution. To evaluate this assumption, skewness and kurtosis were computed for each

variable. Homogeneity of variance examines robustness among dependent variables. A Box M test was used to report if there was variance across dependent measures. Multicollinearity refers to the existence of strong relationship between predictor variables. Multicollinearity was assessed through the analysis of Mahalanobis (Mertler & Vannatta, 2010). Furthermore, individuals with data points that were extreme in value (i.e., outliers), as determined through the use of Mahalanobis distance analyses, were eliminated.

Prior to conducting the analysis, power analysis was computed to determine the number of participants needed in the study. A power analysis using the G-power computer program (Faul & Erdfelder, 1998) revealed that a regression analysis with a high effect size and power of 95% would require 24 participants. According to Cohen (1988), .80 or greater is proposed as being a large effect size.

Research Questions and Analysis

Research Question One and Analysis

The first research question examined the parenting styles of parents of children who were prenatally exposed to alcohol. A higher percentage of neglectful parenting, as compared to authoritative, authoritarian, and indulgent parenting styles, was hypothesized. Descriptive statistics were conducted to calculate the percentage of mothers that fall into the four parenting styles categories.

Research Question Two and Analysis

The second research question examined what percentage of children prenatally exposed to alcohol displayed the following child temperament (i.e., easy and difficult). It was hypothesized that there will be a higher percentage of difficult child temperaments as compared

to easy temperaments. Descriptive statistics were conducted to assess the percentage of children that fell into these two types of child temperament categories.

Research Question Three and Analysis

The third research question investigated which parenting style (i.e., authoritative, authoritarian, indulgent and neglectful) is associated with greater motor development, cognitive development, and language development. Authoritative parenting style was hypothesized to be associated with greater motor development, cognitive development and, language development as compared to authoritarian, indulgent, and neglectful parenting styles. A one-way MANOVA was used for this analysis.

Research Question Four and Analysis

The fourth research question for this study consist of which child temperament style is associated with greater motor development, cognitive development and language development with this population. It was hypothesized that easy child temperaments will be associated with greater motor development, cognitive development and language development as compared to difficult child temperament. For this research question, a one way MANOVAs were used to analyze the two types of child temperament (i.e., easy and difficult) in relation to child development (i.e., cognitive, language, and, motor development).

Research Question Five and Analysis

The fifth research question explored if goodness of fit between parenting style and child temperament improves outcomes in motor development, cognitive development, and language development in children prenatally exposed to alcohol. It was hypothesized that the authoritative parenting style will be related to motor development, cognitive development, and language development more effectively as compared to authoritarian, indulgent, and neglectful parenting

styles for children with an easy temperament. For this research question, a two-way MANOVA was computed.

Chapter IV

Results

This chapter presents the results of the analyses discussed in the previous chapter in the following manner. Descriptive statistics for demographic variables including gender, education level, race/ethnicity are first discussed. Results of the preliminary data and tests of statistical assumptions that were performed to determine the appropriateness of running the main analysis for each research question were examined. Lastly, the results of analyses that are associated with each research question are presented.

Descriptive Statistics

The current study used data provided for the Early Childhood Longitudinal Study- Birth Cohort (ECLS-B). This data set consisted of a sample of 10,700 children born in the United States. The analyses for the current study examined approximately two year old children who were given to heavy prenatal alcohol exposure (i.e., four or more alcohol drinks per week). The unweighted sample population for the study consisted of a total of 13 participants (i.e., mother and child dyad) in the study. When the variables were weighted in the study the weighted sample population consisted of a total of 5,028 participants. The tables below highlights information regarding participates' gender, race/ethnicity, maternal education, and household income.

Table 1

Gender Frequencies of Prenatally Exposed Participants

Gender	***N***	***%***
Male	1835	36.50%
Female	3193	63.50%
Total	5,028	100%

Note N = Weighted Sample Population

Table 2

Ethnicity Frequencies of Prenatally Exposed Participants

Ethnicity	***N***	***%***
White, Non-Hispanic	3802	75.60%
Black or African American, Non-Hispanic	745	14.80%
Hispanic, Race Specified	172	3.40%
More Than One Race, Non-Hispanic	162	3.20%
American Indian or Alaska Native, Non-Hispanic	147	2.90%
Total	5028	100%

Note N = Weighted Sample Population

Table 3

Maternal Education Frequencies

Maternal Education	***N***	***%***
Less than a High School Diploma	171	3.4
High School Diploma or Equivalent	724	14.40%
Bachelor's Degree	2901	57.70%
Professional School with No Formal Degree	900	17.90%
Graduated from a Vocational Program	332	6.60%
Total	5028	100%

Note N = Weighted Sample Population

Table 4
Household Income Frequencies

Income	***N***	***%***
$5,000 or Less	71	1.4
$5,001 - $10,000	422	8.40%
$10,001 - $15,000	56	1.10%
$20,001 - $25,000	433	8.60%
$30,001 - $35,000	242	4.80%
$50,001 - $75,000	901	17.90%
$100,001 - $200,000	2555	50.80%
$200,001 or More	348	6.90%
Total	5028	100%

Note N = Weighted Sample Population

Preliminary Analyses and Test of Assumptions

Preliminary data analyses consisted of the screening of missing data and outliers. In addition, the following assumptions were investigated prior to conducting the MANOVAs related to the last three research questions: independent and random samples from the defined populations, normal distribution of the dependent variable, linearity of the dependent variables, and homogeneity of variance (Hinkle, Wiersman, & Jurs, 2003).

Data preparation also included investigating variables for multivariate normality. Examination of skewness and kurtosis for all dependent variables revealed negative skewness for the variable measuring language development. Subsequently, a square root transformation was performed on the language development variable to correct for negative skewness with this dependent variable. Additionally, high kurtosis values were found with the cognitive and language development variables. Although, transformations were computed with these variables, high kurtosis continued to be evident. However, a two-way MANOVA is robust to the violation of this assumption, especially with a large sample size (Maxwell & Delaney, 2004).

The assumption of linearity was examined with all for the dependent variables using inspection of scatter plot matrix. This screening process revealed that this assumption has been meet since the scatter plots visually appear to be linear in presentation. Furthermore, all three dependent variables in this study had linear relationships.

The preliminary analysis also included screening for homogeneity. This assumption of variance was assessed using the Levene's Test of homogeneity of variance. Results of the Levene's Test revealed significant p-values indicating there was unequal variance across the dependent variables. The failure to meet the assumptions of homogeneity of variances is usually not fatal given that an MANOVA is a relatively robust statistical procedure, particularly with large sample sizes. It should be noted that homogeneity was influenced by weights that were developed specifically for the ECLS-B dataset by the National Center for Education Statistics. Weights were used to ensure the analysis had adequate power and effect size. Specifically, the W20 weight was applied to the data in this study.

Statistical Analyses to Examine Research Questions

Research Question One and Analysis

The first research question examined the percentage of parents whose child was exposed to alcohol prenatally that exhibited the following parenting styles: authoritative, authoritarian, indulgent and neglectful. It was hypothesized that there would be a higher percentage of neglectful parenting as compared to authoritative, authoritarian, and indulgent parenting styles.

To answer research question one, descriptive statistics were computed to determine the percentage of parents who displayed authoritative, authoritarian, indulgent, and neglectful parenting styles. Analyses revealed that 37.9% of the sample population displayed an indulgent

parenting style, 35.8% of the sample population displayed an authoritative parenting style, 21.4% of the sample population displayed a neglectful parenting style, and 4.9% of the sample population displayed an authoritarian parenting style (see table 5).

Table 5
Parenting Style Frequencies of Mothers who Prenatally Exposed their Fetuses to Alcohol

Parenting Style	***N***	***%***
Authoritative	1802	35.8%
Authoritarian	249	21.4%
Indulgent	1906	37.9%
Neglectful	1071	4.9%
Total	5,028	100%

Note: N = Weighted Sample Population

Research Question Two and Analysis

The percentage of children prenatally exposed to alcohol displayed the following child temperament (i.e., easy and difficult) was examined. It was hypothesized that there will be a higher percentage of difficult child temperaments as compared to easy temperaments. Of the sample population, 41.4% of the children prenatally exposed to alcohol displayed an easy child temperament at age two. Conversely, 58.6% of the children exposed to alcohol in utero in this study displayed difficult child temperaments (see table 6).

Table 6
Child Temperament Frequencies of Children Prenatally Exposed to Alcohol

Child Temperament	***N***	***%***
Easy Child Temperament	2112	41.40%
Difficult Child Temperament	2947	58.60%
Total	5,028	100%

Note N = Weighted Sample Population

Research Question Three and Analysis

The third research question investigated which parenting style (i.e., authoritative, authoritarian, indulgent, and neglectful) is associated with greater motor, cognitive, and language development. It was hypothesized that authoritative parenting styles would be associated with greater motor, cognitive, and language development as compared to authoritarian, indulgent, and neglectful parenting styles.

Table 7
Multivariate Analysis Summary for Child Development Outcomes Across Parenting Styles

Dependent Variables	***df***	***Type III SS***	***MS***	***F***	***Sig***
Motor Development	3	12541.96	4180.65	1426.51	0.001
Cognitive Development	3	87937.82	29312.61	1667.48	0.001
Language Development	3	762.41	254.14	6559.33	0.001

Note: The independent variable in this analysis was parenting style

Data was screened to ensure that assumptions of a one-way MANOVA were fulfilled. Transformations (i.e., square root transformation) were conducted to normalize data; however, high kurtosis still existed with the cognitive and language development variables. In order to determine if parenting styles influences motor, cognitive and language development, a one-way MANOVA was conducted. A significant result was obtained, [Pillai's Trace = 1.376, $F(9,15060) = 1417.74$, $p < .0001$, $\eta^2 = .459$] indicating parenting style differences with regards to motor, cognitive, and language development. However, multivariate effect sizes were small. According to Cohen (1988), .50 or lower is proposed as being a small effect size. Analysis of variance (ANOVA) was conducted to determine which dependent variable or variables contributed to the significant multivariate result. Tests of between subjects indicated that significant parenting styles differences were present with regards to motor development

[$F(3,5020) = 1426.51$, $p < .0001$, partial $\eta^2 = .460$], cognitive development [$F(3,5020) = 1667.48$, $p < .0001$, partial $\eta^2 = .499$], and language development [$F(3,5020) = 6559.33$, $p < .0001$, partial $\eta^2 = .797$] (see table 7). Table 8 presents means and standard deviations for developmental categories (i.e., motor, cognitive, language) per parenting styles. The Tamhane post hoc analysis revealed that motor, cognitive, and language categories significantly differed cross all pairings of parenting style categories. Table 13 presents significant values with regards to the Tamhane post hoc analysis along with effect sizes across parenting style categories.

Table 8

Mean and Standard Deviations for Motor, Cognitive, and Language Development Outcomes Across Parenting Groups

	Motor		**Cognitive**		**Language**	
Parenting Style Groups	***M***	***SD***	***M***	***SD***	***M***	***SD***
Authoritative	83.53	0.05	134.26	0.12	-0.87	0.01
Authoritarian	85.88	0.12	122.27	0.30	0.35	0.01
Indulgent	80.94	0.05	123.23	0.11	0.12	0.01
Neglectful	79.03	0.07	128.50	0.18	-0.09	0.01

Research Question Four and Analysis

The fourth research question for this study consisted of which child temperament style is associated with greater motor development, cognitive development, and language development with this population. It was hypothesized that easy child temperaments would be associated with greater motor development, cognitive development, and language development as compared to difficult child temperament.

Table 9

Multivariate Analysis Summary for Child Development Outcomes Between Child Temperament Groups

Dependent Variables	***Df***	***Type III SS***	***MS***	***F***	***Sig***
Motor Development	1	1275.90	1275.90	435.36	0.001
Cognitive Development	1	9314.40	9314.41	529.86	0.001
Language Development	1	93.71	93.71	2418.64	0.001

Note: The independent variable in this analysis was child temperament

Data was screened to ensure that assumptions of a one-way MANOVA were fulfilled. Transformations (i.e., square root transformation) were conducted to normalize data; however, high kurtosis still existed with the cognitive and language development variables. In order to determine if child temperament is related motor, cognitive and language development, a one-way MANOVA was conducted. A significant interaction was obtained, [Pillai's Trace = .439, $F(3,5018) = 1307.00$, $p < .0001$, $\eta^2 = .439$] indicating motor, cognitive and language development outcomes vary as a function of child temperament. However, multivariate effect sizes were small. ANOVA was conducted on each dependent variable as a follow-up test to MANOVA. Tests of between subjects indicated that significant child temperament differences were present with regards to motor development [$F(1,5020) = 435.36$, $p < .0001$, partial $\eta^2 = .080$], cognitive development [$F(1,5020) = 529.86$, $p < .0001$ partial $\eta^2 = .095$], and language development [$F(1,5020) = 2418.637$, $p < .0001$ partial $\eta^2 = .325$] (See table 9). Table 10 presents means and standard deviations for developmental categories (i.e., motor, cognitive, language) per child temperaments.

Table 10

Mean and Standard Deviations for Motor, Cognitive, and Language Development Outcomes Across Child Temperament Groups

	Motor		***Cognitive***		***Language***	
Parenting Style Groups	***M***	***SD***	***M***	***SD***	***M***	***SD***
Easy Child Temperament	83.16	0.07	129.26	0.20	0.97	0.01
Difficult Child Temperament	81.53	0.04	124.87	0.10	-0.35	0.01

Research Question Five and Analysis

Lastly, goodness of fit between parenting style and child temperament was explored with respect to outcomes in motor development, cognitive development and language development in children prenatally exposed to alcohol. In particular, authoritative parenting style combined with easy child temperament was hypothesized to result in greater motor development, cognitive development and language development as compared to authoritarian, indulgent and neglectful parenting styles for children with an easy temperament.

Table 11

Multivariate Analysis Summary for Child Development Outcomes in Relations to the Interaction Between Parenting Styles and Child Temperament

Dependent Variables	***df***	***Type III SS***	***MS***	***F***	***Sig***
Motor Development	3	4358.62	1452.87	495.74	0.001
Cognitive Development	3	104789.36	34929.79	1987.02	0.001
Language Development	3	138.02	46.01	1187.43	0.001

Note: The independent variables in this analysis were parenting style and child temperament

A two-way MANOVA was conducted to investigate developmental differences (i.e., motor, cognitive and language development) in relation to parenting styles and child temperament. Data were transformed to attempt to eliminate the violation of the normality and homogeneity assumptions. However, after a square root transformation, high kurtosis still

existed with the cognitive and language development variables. Results of the MANOVA indicated a significant interaction between parenting styles and child temperament [Pillai's Trace = 1.142, $F(9,15060) = 1028.50$, $p < .0001$, $\eta^2 = .381$] and the combined dependent variables of motor, cognitive, and language development. Multivariate effect sizes were small. ANOVA and Tamhane post hoc tests were conducted as follow-up tests.

ANOVA results indicate that there were significant differences between motor development [$F(3,5020) = 495.74$, $p < .0001$, $\eta^2 = .229$], cognitive development $F(3,5020) = 1987.02$, $p < .0001$, $\eta^2 = .543$], and language development $F(3,5020) = 1187.43$, $p < .0001$, $\eta^2 = .415$] when analyzing the interaction between the independent variables parenting styles and child temperament (See Table 11). Table 12 presents means and standard deviations for developmental categories (i.e., motor, cognitive, language) per interaction between parenting styles and child temperament.

Table 12

Mean and Standard Deviation for Motor, Cognitive, and Language Development In Relations to the Interaction Between Parenting Style and Child Temperament

	Motor Development				**Cognitive Development**				**Language Development**			
	Easy		**Difficult**		**Easy**		**Difficult**		**Easy**		**Difficult**	
	M	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Authoritative	84.90	0.09	82.17	0.05	129.93	0.21	138.58	0.11	-0.35	0.01	-1.39	0.01
Authoritarian	85.93	0.21	85.83	0.13	121.89	0.51	122.66	0.31	0.42	0.02	0.27	0.02
Indulgent	80.41	0.05	81.47	0.08	130.95	0.11	115.51	0.19	0.21	0.01	0.04	0.01
Neglectful	81.39	0.13	76.67	0.06	134.26	0.32	122.74	0.14	0.10	0.02	-0.29	0.01

Post hoc analysis was only able to be conducted with one of the independent variables (i.e., parenting styles) due to the child temperament variable only having two groups. The Tampane's T2 post hoc test was conducted to determine which parenting style categories were significantly different from the dependent variables (i.e., motor, cognitive and language development). The Tamhane post hoc analysis revealed that motor, cognitive, and language categories significantly differed cross all pairings of parenting style categories. Table 13 presents significant values with regards to the Tamhane post hoc analysis along with effect sizes across parenting style categories.

Table 13

Effect Sizes for Motor, Cognitive, and Language Development Outcomes Across Parenting Groups

	Motor Development		**Cognitive Development**		**Language Development**	
	Sig.	***ES***	***Sig.***	***ES***	***Sig.***	***ES***
Authoritative						
Authoritarian	.001	-.996	.001	.999	.001	-.999
Indulgent	.001	.999	.001	.999	.001	-.999
Neglectful	.001	.999	.001	.999	.001	-.999
Authoritarian						
Authoritative	.001	.996	.001	-.999	.001	.999
Indulgent	.001	.999	.001	-.906	.001	.995
Neglectful	.001	.999	.001	-.996	.001	.998
Indulgent						
Authoritative	.001	-.999	.001	-.999	.001	.999
Authoritarian	.001	-.999	.001	.906	.001	-.995
Neglectful	.001	.998	.001	-.998	.001	.998
Neglectful						
Authoritative	.001	-.999	.001	-.999	.001	.999
Authoritarian	.001	-.999	.001	.996	.001	-.998
Indulgent	.001	-.998	.001	.998	.001	-.998

Chapter V

Discussion

This chapter will address the findings of the current study in relations to the existing literature. Limitations of the study will then be examined. Lastly, the implication for clinical practice and research will be presented.

Summary of Results

Previous literature has shown inconsistent results regarding the relationship between prenatal alcohol exposure and child development. Specifically, it is unclear to what extent alcohol exposure in utero has on motor development. Prenatal alcohol exposure has been linked to significant motor development delays in the first few years of life (Kalberg et. al, 2006; Tarr & Pyfer, 1996; Larroque, Kaminski, Dehaene, Subtil, Delfosse, & Querleu, 1995; Osborn, Harris, & Weinberg, 1993; Driscoll, Streissguth & Riley, 1990). However, a few studies have reported fine and gross motor skills were within normal limits when assessing fine manual control, manual coordination, body coordination, and strength and agility (Venetsanou, Kambas, Aggeloussis, Serbezis, & Taxildaris, 2007; Ioffe & Chernick, 1990). In regards to cognitive development, there are a plethora of studies that have documented that exposure to alcohol during fetal development can cause the development of an intellectual disability (Weinberg, 1997; Janzen, Nanson, & Block, 1994). Although intellectual disabilities and cognitive deficits are prevalent among FAS children, it should be acknowledged that research shows that children with prenatal alcohol exposure can have an average intelligence (Steinhausen & Sphor, 1998). In addition, there are limited studies that investigate the prospects of deficits in areas of language development with this population. Studies have shown deficits in expressive language skills in children exposed to prenatal alcohol exposure (McGee, Bjorkquist, Riley, & Mattson, 2009; Pulsifer, Butz, O'Reillly, 2008). By contrast, a few studies have established no significant

differences between children exposed and non-exposed children in regards to expressive language in children between the ages of one and four (Fried, Watkinson, & Gray, 1998; Fried & Watkinson, 1990).

Understanding the factors that are related to promoting a child's development has important implications for enhancing motor, cognitive, and language development in children exposed to negative teratogens in utero. The purpose of this study was to investigate how the association between parenting styles and child temperament relates to motor, cognitive, and language development in children who were exposed to alcohol in utero.

The first research question examined the percentage of parents whose child was exposed to alcohol prenatally that exhibited the following parenting styles: authoritative, authoritarian, indulgent and neglectful. It was hypothesized that there will be a higher percentage of neglectful parenting as compared to authoritative, authoritarian and indulgent parenting styles. This study's analysis revealed that 37.9% of the sample population displayed an indulgent parenting style, 35.8% of the sample population displayed an authoritative parenting style, 21.4% of the sample population displayed a neglectful parenting style, and 4.9% of the sample population displayed an authoritarian parenting style. The hypothesis was not supported for the first research question.

No previous research study has analyzed the association between parenting styles and mothers who consume alcohol during pregnancy. However, research has shown that when comparing non-users and polydrug users, a greater portion of polydrugs users were characterized as having a neglectful parenting style (Montgomery, Fisk, & Craig, 2008). When relating this study to the literature, the results are not consistent or generalizable to research on the relationship between parenting styles and prenatal drug use.

The second research question examined what percentage of children prenatally exposed to alcohol displayed the following easy and difficult child temperaments, respectively. It was hypothesized that there will be a higher percentage of difficult child temperaments as compared to easy temperaments. Analysis of this research question indicated that 41.4% of the children prenatally exposed to alcohol displayed an easy child temperament at age two. By contrast, 58.6% of the children exposed to alcohol in utero in this study displayed difficult child temperaments. The hypothesis for this study was supported for the second research question

Fetal alcohol exposure has been associated in the literature with both distractibility and intensity of children's responses to their environment even after six months of age in the literature (Weiss, Jonn-Seed, & Harris-Muchell, 2007). However, no prior research study has categorized children who were prenatally exposed to alcohol into child temperament groups. Results of this study are consistent with the research literature discussed above.

The third research question investigated if group differences would manifest among parenting style (i.e., authoritative, authoritarian, indulgent, and neglectful) with respect to motor development, cognitive development, and language development, considered together. It was hypothesized a significant multivariate result would be produced and that upon follow up, authoritative parenting style would result in significantly greater motor development, cognitive development, and language development when compared to authoritarian, indulgent, and neglectful parenting styles.

Analysis resulted in a significant relationship between parenting styles and motor, cognitive, and language development. With regards to motor development, authoritarian parenting style was associated with greater motor development followed by authoritative parenting style, indulgent parenting style, and neglectful parenting style. Authoritative parenting

style was associated with greater cognitive development compared to authoritarian parenting styles, indulgent parenting style, and neglectful parenting styles. In regards to language development, authoritarian parenting style was associated with greater language development followed by indulgent parenting style, neglectful parenting style, and authoritative parenting style. The hypothesis was supported by one of the three developmental areas (i.e., cognitive development) examined in this study.

Research indicates that children reared by authoritative parents tend to fare better developmentally than children raised by parents who employ permissive or authoritarian parenting styles (Baumrind, 1968). There is also evidence that relates appropriate degree of responsiveness and demands in a mother child dyad with behavioral and cognitive proficiency (Baumrind, 1991). In regards to language development, research has also shown that authoritative parenting style is linked with positive outcomes in early language knowledge and literacy development (Birch & Ladd, 1996). Results regarding cognitive development and parenting styles are consistent with the literature. Conversely, outcomes for motor and language development are not consistent with research. Language has a motor component with regards to the oral motor production of sound. This could explain why motor and language development were both associated with the same parenting style. As previously mentioned, authoritarian parents place strict rules and demands that their child is expected to follow (Baumrind, 1968). With consistent repetitive gross, fine, and/or oral motor demands, there is a potential for these skills to develop and become rote. This may explain why authoritarian is associated with larger motor and language development with children prenatally exposed to alcohol.

The fourth research question for this study investigated which child temperament style (i.e., easy child temperament and difficult child temperament) is associated with greater motor

development, cognitive development, and language development with this population. This study hypothesized that easy child temperaments will be associated with greater motor development, cognitive development, and language development as compared to difficult child temperament. Analysis resulted in a significant main and interactions effects between child temperament and motor, cognitive, and language development. Interactions effects revealed the following. Easy child temperament was associated with greater motor development compared to difficult child temperament. Similarly, easy child temperament was associated with greater cognitive development compared to difficult child temperament. In regards to language development, easy child temperament was also associated with greater development compared to difficult child temperament. The hypothesis was support in all three developmental areas (i.e., motor development and cognitive development) examined in this study.

Limited research has been conducted on how temperament is related to child development. However, there has been research to indicate that children with easy temperaments tend to get more exposure to positive responses from their environment, which has the potential to positively impact children's overall development (Thomas & Chess, 1977). Results of this study are consistent and generalizable to prior research literature.

The final research questions examined if the interaction between parenting style and child temperament improves outcomes in motor development, cognitive development, and language development in children prenatally exposed to alcohol. This study hypothesized that the authoritative parenting style will promote motor development, cognitive development, and language development more effectively as compared to authoritarian, indulgent, and neglectful parenting styles for children with an easy temperament. Study results revealed significant main and interaction effects in relations to the interaction between parenting styles and child

temperament and motor, cognitive, and language development. However, the effect size for each factor indicates a small proportion of variance across the three dependent variables (i.e., motor, cognitive, and language development). In regards to motor development, authoritarian parenting style and easy child temperament was related to greater motor development. Authoritative parenting style and difficult child temperament was associated with greater cognitive development. Lastly, Authoritarian parenting style and easy child temperament was related to greater language development in children who were two years old. Further, the post-hoc univariate analysis revealed significant difference across all variables and interactions. Overall, the hypothesis was not supported by this analysis.

There is currently no existing empirical research demonstrating the relationship of goodness of fit of parenting style and child temperament and its impact on different aspects of child development in this population. Explanation/rationale for the above results are as follows. Authoritative parents give recognition to autonomy and likely provide appropriate support to child with difficult temperaments, which in turn may promote cognitive development. Adapting to the child's temperament is the hallmark principle to the goodness of fit theory, which could explain why authoritative parenting style and difficult child temperament was associated with greater cognitive development. As previously mentioned, consistent repetitive gross, fine, and/or oral motor demands can cause these skill areas to develop and become rote. In addition, children are more likely to follow demands directed towards them when they present with an easy temperament compared to difficult temperament. This may explain why authoritarian is associated with greater motor and language development in children prenatally exposed to alcohol.

Limitations

There are a few limitations that need to be considered when investigating the current findings of this study. First limitation of the study was the normality and homogeneity assumptions were violated with the dependent variables. Transformations (i.e., square root transformation) were conducted to normalize data; however, high kurtosis still existed with the cognitive and language development variables. It should be noted that a two-way MANOVA is robust to the violation of this assumption especially with a large sample size (Maxwell & Delaney, 2004). The homogeneity assumption was also violated, which was evident by the Levene's Test revealing unequal variance across the dependent variables. Similar to the normality assumptions, the failure to meet the assumptions of homogeneity of variances is usually not fatal given that an MANOVA is a relatively a robust statistical procedure, particularly with large sample sizes. It should be noted that homogeneity was influenced by weights that were developed specifically for the ECLS-B dataset by the National Center for Education Statistics. Weights were used to ensure the analysis had adequate power and effect size. As a result of the homogeneity assumption being violated, a Tampane's T2 post hoc test was conducted as a follow up statistical analysis to investigate relationships between subgroups even when the homogeneity assumption is violated. Post hoc test revealed significant results across all categories.

A second limitation to the study is that self-reports were used to collect information regarding parenting styles. With self-report, participants in this study may have been less objective in their ratings of their parenting style and/or may have rated themselves in a more socially desirable manner. Chamberlain and Peterson (1995) found that self-reports were the least accurate form of rating. Naturalistic observations were found to be a more accurate method

of collecting data compared to self-report. Future research on the interactions between parenting style and children temperament in relations to child development of children prenatally exposed to alcohol, may want to use a naturalistic observation to ensure accurate reporting, especially in regards to alcohol intake.

Another limitation to this study is data for the language development construct were not derived from normed data. Authors of the MacArthur Communicative Development Inventory (M-CDI) adapted and reduced the assessment's wordlist to fifty words. The reliability coefficient for this language development variable and analysis revealed a cronbach alpha of .952, which suggests internal consistency. Additionally, information for this construct was obtained via parent report using an indirect assessment, which is a less accurate data collecting method compared to a direct assessment of the child's language ability.

A fourth limitation to this study involves the accuracy of coding participants into appropriate parenting style and child temperament groups. Due to a small sample size and to have adequate power statistically, participants were not able to be removed from the study when data points were within one standard deviation of the mean when parenting style and child temperament groups were being formulated. Consequently, when confidence bands associated with the population's means and standard deviation are not used to establish cut offs, you are at risk for inaccurately placing participants in groups.

An additional limitation to this study is the source of the data collected. Data in this study was derived from The Early Childhood Longitudinal Study – Birth Cohort (ECLS-B). Data was collected ten years ago. Over the past ten years, prenatal alcohol exposure has increased in the United States. Specifically, approximately ten in every one hundred babies born

are exposed to alcohol in utero each year (O'Leary, 2004). As a result, this data set may not be generalizable to the current population of children prenatally exposed.

Lastly, this study did not assess confounding variables that have been known in former literature studies to have an influence on developmental outcomes (i.e., language, cognitive, and motor). Future studies need to evaluate the impact of variables such as prematurity, birth weight, specific amount of alcohol exposure throughout prenatal development to have a better understanding of how these variables impact the interaction between parenting styles and child temperament on child developmental.

Implications

This study provides insight on how parenting skills impact the development of children prenatally exposed to alcohol, primarily with regards to cognitive development. Specifically, this study revealed that authoritative parenting style was associated with greater cognitive development, easy child temperament was associated with greater motor, cognitive, and language development, and the interaction between authoritative parenting and difficult temperament promotes greater cognitive development with this population. Although multivariate effects sizes were small, statistically significant results were found. With regards to authoritative parenting and cognitive development as well as the interaction between authoritative parenting and difficult temperament promoting cognitive development, it should be noted that these interactions yielded clinically significant results. This was based on the notion that altering parenting style can impact cognitive development by approximately a half standard deviation, which is sufficient in supporting the need for parenting programs.

Parenting programs for children prenatally exposed to alcohol are limited to non-existent. These parenting programs need to be developed and implemented to not only educate these

parents on positive parenting practices to aid in mediating effects of alcohol exposure in utero, but to assist these parents in addressing continuing concerns with alcohol consumption after pregnancy. Education should also include an understanding of the child's alcohol related symptoms and how to cope with these symptoms to promote positive parenting practices. Having a better understanding of positive parenting practices and how to cope with the child's alcohol related symptoms will not only aid in promoting overall child development, but may decrease the reports of abuse and neglect in this subset of children. To support the attendance in these parenting programs, policy changes need to be conducted to mandate participation if prenatal alcohol exposure is identified during pregnancy or after birth by hospital staff or primary care physicians. Mandating parenting programs would also assist with tracking the infants' development and referring children with development delays to early intervention services much sooner. Future research will need to investigate the effectiveness of parenting programs on child development, especially with cognitive development in children prenatally exposed to alcohol.

In addition, this research study also shed light on how prenatal alcohol exposure is prevalent across all social classes, even in high socioeconomic status. Specifically, the majority of participants in this study who reported drinking four or more drinks in their last trimester of pregnancy had a household income between $100,001-$200,000. Despite having access to resources and educational opportunities, wealthy well-educated women are still putting their fetuses at risk by consuming alcohol during pregnancy. To add to the issue, obstetrician are less likely to implement screening procedures such as the T-ACE or TWEAK, screeners used to detect at risk drinking behaviors during pregnancy, with higher social class women (Chasnoff, McGourty, Bailey, Hutchins, Lightfood, Pawson, Fahey, May, Brodie, Mcculley, &, Campbell,

2005). Education on alcohol abstinence as well as screening procedures needs to be executed with all mothers throughout their prenatal care visits to assist in preventing neurological complications associated with prenatal alcohol use. Research initiatives also need to assess how education and screening procedures are being implemented with regards to promoting alcohol abstinence across demographics as well as assess the effectiveness of these practices in decreasing prenatal alcohol exposure.

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