

Working with Individuals with Fetal Alcohol Spectrum Disorders:
A Meta-Synthesis

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Abstract

This meta-synthesis of the literature on working with individuals with Fetal Alcohol Spectrum Disorders (FASD) examines the characteristics of individuals with FASD and the need for supports and services for these individuals in the classroom. There are behavior characteristics unique to FASD and these behaviors coupled with sensory processing deficits lead to distinctive challenges for individuals with FASD. Early identification, supports and services are critical to address challenges for individuals with FASD in the classroom, yet are often unavailable or unidentified.

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1. Introduction

1.1 Background

Fetal alcohol spectrum disorders (FASD) refers to the wide range of physical, cognitive and behavior characteristics that occur as a result of prenatal exposure to alcohol. FASD is a life-long brain and spectrum based disorder. Characteristics range from mild to severe, based on the developmental phase of the fetus in relation to when and how much alcohol is consumed during gestation. The exact number of people affected by FASD is unknown according to the Center for Disease Control and Prevention (CDC). Studies have shown that 0.2 to 1.5 cases of fetal alcohol syndrome (FAS) occur for every 1,000 live births in certain areas of the United States. Also, according to CDC: 12.2% of pregnant women (about 1 in 8) reported alcohol use in the past 30 days. This rate has remained stable over a 15-year period. And, in studies 1.9% of pregnant women reported binge drinking in the past 30 days (Centers for Disease Control and Prevention, 2010, "Facts about FASDs"). FASD affects many children and it necessary for teachers, parents and communities to identify and proficiently implement interventions to ensure life-long success.

Teachers, parents and families may become a part of raising and teaching children with diagnosed and undiagnosed FASD. FASD is considered an umbrella term that encompasses several neurological and physical impairments. There are behavior characteristics that are common of FASD. Children with FASD may be impulsive, have trouble expressing themselves, have a hard time deciphering social cues, may have challenges deciding the difference between private versus public behaviors and may have trouble living on their own (Edmonds & Crichton, 2008). Further, children diagnosed with FASD might experience slow processing speed, limited

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visual-spatial reasoning, disorganization tendencies, poor memory and limited motor functioning (Edmonds & Crichton, 2008). In the absence of prevalent physical abnormalities these traits coupled with the knowledge of prenatal exposure to alcohol are the determining criteria of FASD (Edmonds & Crichton, 2008).

Although there are similar characteristics of FASD, tailoring interventions is proving to be a challenge for caregivers and institutions. There is no consistent pattern of disability manifestation among individuals despite known trait similarities of FASD. This lack of pattern makes planning interventions challenging and it is difficult to effectively support children with FASD (Edmonds & Crichton, 2008; Watson & Westby, 2003). Children with FASD may have similarities, but each individual with FASD is unique in specific needs and ability level due to inherent characteristics of the individual and environmental exposure differences. Because of the differences among individuals with FASD and the wide range of symptoms it is difficult to provide supports and services

Teachers face the challenge of working with students with FASD in the classroom. Teachers often feel ill-equipped and lack the skill set to proactively affect a student's learning and growth. Rural special education teachers state that they feel unprepared to meet the education needs of students with FASD (Bohjanen, Humphrey & Ryan, 2009; Ryan & Ferguson, 2006). With the pressure of high-stakes testing, common core, and teacher evaluations tied into student testing, teachers have a real need for the research-based interventions and strategies that drive special education when working with students with FASD. In order to truly advance education for children with FASD, evidence-based interventions are critical (Ryan & Ferguson, 2006).

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Attention is given to diagnosing specific disorders under the FASD umbrella and identifying characteristics, but teachers need to be able to effectively teach students with FASD traits, regardless of a confirmed diagnosis. Research states that there has been no systematic exploration into the education needs of children with FASD, or about the best strategies for teaching and learning associated with FASD (Carpenter, 2011; Ryan & Ferguson, 2006). With the prevalence of FASD, it is crucial to find proven, research-based, supported interventions and strategies for students with FASD.

1.2 Author's experiences and beliefs

I have spent my life in Alaska, learning, growing and loving this state. Through my journey towards becoming a teacher, I spent time working with students in Juneau and eventually landed my first teaching job in a small village on Kodiak Island with a population of about 200 residents. In this village I was a part of a three teacher team teaching 27 students from kindergarten through 12th grade. I personally taught the three primary grades, kindergarten through second grade. The students that I worked with ranged in ability. While I did not have any students with developed individual education plans, I was working with students who might have qualified for special education services through testing.

I learned about my students in the Alaska village setting in a way that might not be possible had I taught in a more urban area my first year. The seven students in my room were eager to learn, enjoyed working with each other and were often rambunctious in a “family” way. Despite potential need, special education services were often not recommended due to the limited number of students, lack of local services, and lack of confirmed medical diagnosis. I had one student in my room who appeared to have behaviors consistent with FASD but who was never

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labeled with a disability and might not be labeled in the future. I cannot speak to the likelihood of this diagnosis without knowing if a trained professional would see the same behaviors and would have the same concerns for possible FASD. I can say that working with this particular student was challenging most days, rewarding some days and most of all helped me see the value in early detection and intervention strategies, regardless of a label. Many of this child's behavior traits lined up with traits that students with FASD exhibit and I would liked to have been able to employ research-based interventions to help this student succeed.

During my second year teaching in the city of Kodiak, I had the opportunity to work with a boy in my fourth grade class who exhibited behavioral traits of FASD. He was impulsive, had a hard time with organization and had difficulty making friends. He struggled to track and follow through with simple instructions. He did not seem to understand the cause and effect of his actions. He was also honest, had a great sense of humor and sought the opportunity to engage with his peers. During his fourth grade year his teaching team and I worked toward a special education referral. Toward the end of the year, he received a diagnosis of ADHD from a medical doctor yet this did not seem to capture the spectrum of his need in the classroom. With this student, like the student in my class in the village, I saw behaviors that are typical of a student with FASD. Research-based FASD strategies would have helped me to meet the complexity of his needs in the classroom.

After only two years of teaching I worked with at least two students without an official FASD diagnosis who presented with typical FASD behavioral and academic challenges beyond my professional training and knowledge at the time. My experiences with these individuals led me to conclude that teachers need to have concrete and applicable strategies to work with

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students exhibiting typical FASD traits, despite the lack of diagnosis. I would like to gather a tool kit for teachers working with students with FASD traits and to find relevant research-based interventions that help students work through the various behaviors and traits manifested. FASD-linked behaviors may have research-based interventions that work for students without a diagnosis exhibiting similar behaviors.

Students with FASD are going to be in many of my classes as I continue my teaching career in Alaska. I anticipate that I will work with students who are eager, hopeful and hard working yet will need specific interventions to ensure success. It is imperative that I know if there are research-based interventions for students with FASD and what those interventions are.

With this meta-synthesis, I hope to investigate the following research questions:

1. We know that children with disabilities benefit from early intervention. What are early interventions for students with FASD?
2. Teachers working with students with disabilities rely on research-based interventions to help students reach goals, meet objectives, and generalize knowledge. What researched-based interventions can be used for students experiencing FASD in the classroom?
3. Individuals may exhibit FASD traits and characteristics. Does diagnosing and labeling FASD lead to supports and services?

1.3 Purpose of this meta-synthesis

This meta-synthesis focused on students with FASD, the teachers and support network who work with students with FASD, and the families who work with students with FASD. One purpose was to locate and identify journal articles that describe FASD and how FASD affects

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students. I was interested in finding articles that describe students with FASD. A second purpose was to locate journal articles relating to the implications for teachers working with students with FASD. I wanted to know specific strategies for working with students with FASD. A third purpose was to locate articles that provided research-based intervention strategies to use in the classroom to help students with FASD. A fourth purpose was to locate articles related to the education for families about FASD. A fifth purpose was to classify each article by publication type, to identify the research design, participants, and data sources of each study. The final purpose in conducting this meta-synthesis was to identify significant themes in articles and connect those themes to my own experiences as a teacher working with students with FASD.

2. Methods

2.1 Selection criteria

The 42 journal research studies, descriptive articles, guides and reviews of literature included in this meta-synthesis met the following selection criteria:

1. The articles explored issues related to students with fetal alcohol spectrum disorders.
2. The articles were published in peer-reviewed journals.
3. The articles were published between 1993 and 2013.

2.2 Search procedures

Database searches and ancestral searches were conducted to locate articles for this meta-synthesis.

2.2.1 Database searches

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I conducted searches of the databases: Educational Resources Information Center (ERIC, Ebscohost), W.H. Wilson Search (Ebscohost), Academic Search Premier (Ebscohost), ProQuest and Google Scholar using the following search terms:

1. (“fetal alcohol syndrome”) OR (“fetal alcohol spectrum disorders”)
2. (“fetal alcohol syndrome”) OR (“fetal alcohol spectrum disorders”) AND (“teaching”) AND (“interventions”)
3. (“teaching students with fetal alcohol spectrum disorder”)
4. (“fetal alcohol spectrum disorders”)

These database searches yielded a total of 34 relevant articles that met the selection criteria (Abele-Webster, Magill-Evans & Pei, 2012; Bohjanen, Humphrey & Ryan, 2009; Boulter, 2007; Brems, Boschma-Wynn, Dewane, Edwards & Robinson, 2011; Brown, Sigvaldason & Bednar, 2007; Carpenter, 2011; Clark, 2008; Coggins, Timler & Olswang, 2007; Duquette, 2006; Duquette, Stodel, Fullarton & Hagglund, 2006; Duval-White, Jirikowic, Rios, Deitz & Olson, 2013; Dybdahl & Ryan, 2009; Edmonds & Crichton, 2008; Franklin, Deitz, Jirikowic & Astley, 2008; Green, 2009; Jirikowic, Kartin & Olson, 2008; Kjellmer, Olswang, Oetting & Redmond, 2013; Kooistra, Crawford, Gibbard, Ramage & Kaplan, 2010; Lewis, 2011; Mcgee, Bjorkquist, Price, Mattson & Riley, 2009; Miller & Herpel, 2006; Murphy, 1993; Olswang, Svensson & Astley, 2010; O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006; Paley & O'Connor, 2009; Paley & O'Connor, 2011; Phillipot & Harrison, 1993; Rutman & Van Bibber, 2010; Ryan, 2006; Ryan & Ferguson, 2006; Ryan & Ferguson, 2006; Tanner-Halverson, 1993; Thorne, Coggins & Olson, 2007; Winick, 1993).

2.2.2 Ancestral searches

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An ancestral search involves reviewing the reference lists of previously published works to locate literature relevant to one's topic of interest (Welch, Brownell, & Sheridan, 1999).

Ancestral searches were conducted using the reference lists of retrieved articles. Ancestral searches yielded an additional eight articles that met the selection criteria (Ackerman, 1999; Burd, 2006; Green, 2007; Hanscom, 2008; Kalberg & Buckley, 2007; Laugeson, Paley, Schonfeld, Carpenter, Frankel & O'Connor, 2007; Premji, Benzies, Serrett & Hayden, 2006; Watson & Westby, 2003).

2.3 Coding procedures

I used a coding form to categorize the information presented in each of the 42 articles. This coding form was based on: (a) publication type; (b) research design; (c) participants; (d) data sources and (e) findings of the studies.

2.3.1 Publication type

Each article was evaluated and classified according to publication type (e.g., research study, descriptive article, guide, review of the literature). Research studies use a methodical research design to gather and/or analyze quantitative and/or qualitative data. Descriptive articles describe and explain experiences but do not use a methodical research design. Guides explain and list strategies that practitioners might implement in their work. Reviews of the literature analyze, summarize, and/or synthesize published works on a particular topic.

2.3.2 Research design

Each research study was classified by research design (i.e., quantitative research, qualitative research, mixed methods research). Quantitative research analyzes numerical data that has been collected. Qualitative research analyzes and describes people's experiences and tells stories using

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language. Mixed methods research merges both quantitative and qualitative research to share study findings.

2.3.3 Participants, data sources, and findings

I identified the participants in each of the studies (e.g., students with FASD, teachers of students with FASD and parents of student with FASD). I also identified the data sources used in each study (e.g., observations, surveys, interviews). Lastly, I summarized the findings of each study (Table 2).

2.4 Data analysis

I used a modified version of the Stevick-Colaizzi-Keen method previously employed by Duke (2011) and Duke and Ward (2009) to analyze the 42 research studies, articles, guides and literature reviews that I included in this meta-synthesis.

3. Results

3.1 Publication type

I located 42 articles that met my selection criteria. The publication type of each article is identified in Table 1. Twenty-three of the 42 articles (54.8%) included in this meta-synthesis were research studies (Abele-Webster, Magill-Evans & Pei, 2012; Boulter, 2007; Brems, Boschma-Wynn, Dewane, Edwards & Robinson, 2011; Brown, Sigvaldason & Bednar, 2007; Clark, 2008; Coggins, Timler & Olswang, 2007; Duquette, 2006; Duval-White, Jirikowic, Rios, Deitz & Olson, 2013; Dybdahl & Ryan, 2009; Edmonds & Crichton, 2008; Franklin, Deitz, Jirikowic & Astley, 2008; Green, 2009; Jirikowic, Kartin & Olson, 2008; Kjellmer, Olswang, Oetting & Redmond, 2013; Kooistra, Crawford, Gibbard, Ramage & Kaplan, 2010; Lewis, 2011;

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Mcgee, Bjorkquist, Price, Mattson & Riley, 2009; Olswang, Svensson & Astley, 2010; O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006; Rutman & Van Bibber, 2010; Ryan & Ferguson, 2006; Ryan & Ferguson, 2006; Thorne, Coggins & Olson, 2007). Nine of the articles (21.4%) were guides (Carpenter, 2011; Duquette, Stodel, Fullarton & Hagglund, 2006; Kalberg & Buckley, 2007; Laugeson, Paley, Schonfeld, Carpenter, Frankel & O'Connor, 2007; Miller & Herpel, 2006; Paley & O'Connor, 2009; Paley & O'Connor, 2011; Ryan, 2006; Watson & Westby, 2003). Six of the articles (14.3%) were descriptive articles (Ackerman, 1999; Burd, 2006; Murphy, 1993; Phillipot & Harrison, 1993; Tanner-Halverson, 1993; Winick, 1993). Four of the articles (9.5%) were reviews of the literature (Bohjanen, Humphrey & Ryan, 2009; Green, 2007; Hanscom, 2008; Premji, Benzies, Serrett & Hayden, 2006).

Table 1

Author(s) & Year of Publication	Publication Type
Abele-Webster, Magill-Evans & Pei, 2012	Research Study
Ackerman, 1999	Descriptive Article
Bohjanen, Humphrey & Ryan, 2009	Review of the Literature
Boulter, 2007	Research Study
Brems, Boschma-Wynn, Dewane, Edwards & Robinson, 2011	Research Study
Brown, Sigvaldason & Bednar, 2007	Research Study
Burd, 2006	Descriptive Article
Carpenter, 2011	Guide
Clark, 2008	Research Study
Coggins, Timler & Olswang, 2007	Research Study
Duquette, 2006	Research Study
Duquette, Stodel, Fullarton & Hagglund, 2006	Guide
Duval-White, Jirikowic, Rios, Deitz & Olson, 2013	Research Study
Dybdahl & Ryan, 2009	Research Study

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Edmonds & Crichton, 2008	Research Study
Franklin, Deitz, Jirikowic & Astley, 2008	Research Study
Green, 2007	Review of the Literature
Green, 2009	Research Study
Hanscom, 2008	Review of the Literature
Jirikowic, Kartin & Olson, 2008	Research Study
Kalberg & Buckley, 2007	Guide
Kjellmer, Olswang, Oetting & Redmond, 2013	Research Study
Kooistra, Crawford, Gibbard, Ramage & Kaplan, 2010	Research Study
Laugeson, Paley, Schonfeld, Carpenter, Frankel & O'Connor, 2007	Guide
Lewis, 2011	Research Study
Mcgee, Bjorkquist, Price, Mattson & Riley, 2009	Research Study
Miller & Herpel, 2006	Guide
Murphy, 1993	Descriptive Article
Olswang, Svensson & Astley, 2010	Research Study
O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006	Research Study
Paley & O'Connor, 2009	Guide
Paley & O'Connor, 2011	Guide
Phillpot & Harrison, 1993	Descriptive Article
Premji, Benzies, Serrett & Hayden, 2006	Review of the Literature
Rutman & Van Bibber, 2010	Research Study
Ryan, 2006	Guide
Ryan & Ferguson, 2006	Research Study
Ryan & Ferguson, 2006	Research Study
Tanner-Halverson, 1993	Descriptive Article
Thorne, Coggins & Olson, 2007	Research Study
Watson & Westby, 2003	Guide
Winick, 1993	Descriptive Article

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3.2 Research design, participants, data sources, and findings of the studies

As stated previously, I located 23 research studies that met my selection criteria (Abele-Webster, Magill-Evans & Pei, 2012; Boulter, 2007; Brems, Boschma-Wynn, Dewane, Edwards & Robinson, 2011; Brown, Sigvaldason & Bednar, 2007; Clark, 2008; Coggins, Timler & Olswang, 2007; Duquette, 2006; Duval-White, Jirikowic, Rios, Deitz & Olson, 2013; Dybdahl & Ryan, 2009; Edmonds & Crichton, 2008; Franklin, Deitz, Jirikowic & Astley, 2008; Green, 2009; Jirikowic, Kartin & Olson, 2008; Kjellmer, Olswang, Oetting & Redmond, 2013; Kooistra, Crawford, Gibbard, Ramage & Kaplan, 2010; Lewis, 2011; Mcgee, Bjorkquist, Price, Mattson & Riley, 2009; Olswang, Svensson & Astley, 2010; O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006; Rutman & Van Bibber, 2010; Ryan & Ferguson, 2006; Ryan & Ferguson, 2006; Thorne, Coggins & Olson, 2007). The research design, participants, data sources, and findings of each of these studies are identified in Table 2.

Table 2

Authors	Research Design	Participants	Data Sources	Findings
Abele-Webster, Magill-Evans & Pei, 2012	Mixed Methods	26 children diagnosed with FASD, age 5-10	Retrospective chart review of sensory processing and behavior ratings of students with FASD and ADHD	Sensory processing deficits are displayed often in children with FASD and in children with ADHD. This study shows that behavior manifestations of sensory processing deficits of FASD do not overlap with the behavior manifestations of ADHD. There are areas where modification to sensory stimulation would help children with FASD.

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Boulter, 2007	Quantitative	642 7 th and 9 th graders enrolled in health and PE class	Multiple choice questions on pre and post assessment	FASD informative presentations increase middle school and high school students knowledge of the effects of drinking alcohol during pregnancy and peer led presentations should begin as early as 6 th grade. Schools should partner with agencies to initiate these presentations.
Brems, Boschma-Wynn, Dewane, Edwards & Robinson, 2011	Quantitative	38 academic directors in Alaska	Online survey	Workers need more training in FASD for working with individuals with FASD and directors of programs in Alaska would like to offer that training but do not have the resources. Directors are open to educating their trainees in FASD education, but do not have the resources or program requirements to implement training or education.
Brown, Sigvaldason & Bednar, 2007	Qualitative	63 adult foster parents of children with FASD	Phone interviews and concept mapping process	Parents foster children with alcohol related disabilities to help children, make a contribution, influence positive change, utilize their parenting experience, and to build confidence. These are many of the same reasons that parents foster children with other disabilities.
Clark, 2008	Mixed Methods	66 clients with FASD older than age 17	AIMS interview, functional assessment	Adults with FASD face challenges across various domains in their life. Adults with FASD are integrated in some areas and domains but not others. The lack of formal support has a negative impact on an individual with FASD's community participation. Living with a caregiver has a positive impact on integration in community for an individual with FASD.

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Coggins, Timler & Olswang, 2007	Mixed Methods	573 students with FASD age 6-12	Clinical database results	Poor care giving conditions lead to stronger effects of prenatal alcohol exposure in individuals. Adverse environmental factors strongly correlate with FASD diagnosis. These factors compromise language and social skills.
Duquette, 2006	Qualitative	8 adolescents with FASD enrolled in high school or recently graduated between the ages of 15-20, and their adoptive parents	Case study, questionnaires, interviews	Having FASD influences the cognitive, social and emotional development of adolescents. Students with FASD can perceive themselves to be academically integrated and socially connected. Parents and friends keep these adolescents in school. Students with FASD benefit from emotional support, positive role models and an adult that will advocate for their accommodations and programs.
Duval-White, Jirikowic, Rios, Deitz & Olson, 2013	Quantitative	20 students in grades 1-6 with FASD age 4-12	Process assessment of the learner, standardized assessments	Children with FASD have challenges with writing legibly and have a slower handwriting speed. Children with FASD are at high risk for handwriting dysfunction.
Dybdahl & Ryan, 2009	Qualitative	13 teachers who work with students with FASD	Interviews, observations of classrooms, student records	Teachers feel like they have not received adequate training for working with students with FASD, but are enthusiastic about the idea of future trainings. Teachers state that providing individual attention, establishing positive relationships and promoting self-control help their students with FASD.
Edmonds & Crichton, 2008	Qualitative	5 students with FASD and LD, age 16-20	Observation, surveys, interviews	Offering individualized education, counseling and support is effective for the success of students with FASD.
Franklin, Deitz, Jirikowic & Astley, 2008	Quantitative	44 children with FASD, age 5-10	Sensory profile questionnaire	Children with FASD display problem behavior and sensory processing difficulties. Children with FASD with more sensory

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				processing difficulties have more problem behaviors. Deficits in sensory processing contribute to a range of behavioral problems.
Green, 2009	Quantitative	89 children with FASD, age 8-15	Neuropsychological battery	Children with FASD have executive function deficits, specifically in attention, planning, strategy use and working memory. Neurocognitive problems associated with FASD are widespread but special working memory is the greatest area of deficit.
Jirikowic, Kartin & Olson, 2008	Quantitative	48 children: 25 with FASD, 23 with typical development, age 5-8	Caregiver checklist report of behaviors	Children with FASD function more poorly in behavior related to social, personal living and community living. They also have more maladaptive behaviors than typically developing peers. It is crucial to address functional skills for students with FASD. Advocating for and providing early interventions is crucial for children with FASD.
Kjellmer, Olswang, Oetting & Redmond, 2013	Mixed Methods	24 children: 12 with FASD, 12 typically developing peers, ages 7-12	Observations in classrooms of cooperation and following school rules	Social communication varies more for children with FASD from day to day than their typically developing peers. Children with FASD are more variable in behavior changes from day to day. Variability in classroom social communication skills contributes to some of the difficulty students with FASD experience.
Kooistra, Crawford, Gibbard, Ramage & Kaplan, 2010	Quantitative	116 children: 47 with ADHD, 30 with FASD, 39 with typical development, age 7-10	Performance tasks and statistical analysis	Both FASD and ADHD are associated with attention deficits, which may have negative affects on work and school performance. Children with ADHD have difficulties with slow paced conditions, while children with FASD have

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				difficulties in fast paced conditions. This research shows that students with FASD have a specific behavior type.
Lewis, 2011	Mixed Methods	176 mothers of children referred to diagnostic clinics	Interviews	Alcohol consumption before knowledge of pregnancy combined with low socioeconomic status and high distress level in mothers is associated more with an FASD diagnosis than alcohol consumption alone. Future steps should include offering screening for distress during pregnancy, specifically for mothers who have low socioeconomic status.
Mcgee, Bjorkquist, Price, Mattson & Riley, 2009	Mixed Methods	52 children: 26 with FASD, 26 typically developing, age 7-11	Interview responses to 18 videos	Children with FASD demonstrate difficulties in social information processing and impaired performance in critical thinking and problem solving skills. Early intervention might lessen children with FASD experiencing social rejection and maladjustment later in life.
Olswang, Svensson & Astley, 2010	Mixed Methods	24 children: 12 with FASD, 12 typically developing, age 7-12	Classroom observations	Children with FASD spend a smaller percentage of their time engaged in prosocial behaviors and a larger percentage of their time engaged in disengaged behaviors. Children with FASD have more occurrences of prosocial behavior than typical developing peers but the duration of this prosocial behavior is less than typical developing peers. Children with FASD also have more occurrences of disengaged behavior than typically developing peers and these occurrences last longer than their typically developing peers.

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O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006	Qualitative	100 children with documented prenatal alcohol exposure, social skills deficits, and a verbal IQ of equal or less than 70, age 6-12	12 week child friendship training intervention and follow up assessment	Child friendship training/social skills training improve knowledge of appropriate social behavior for children with FASD and this knowledge is retained during a 3 month follow up period. Teachers of these children did not report improvements in class after treatment ended.
Rutman & Van Bibber, 2010	Qualitative	59 adults: 15 with FASD, 8 support people, 36 service providers	Video ethnography, interviews	General unawareness about FASD and support needs of adults with FASD have negative impacts on adults living with FASD. Parents with FASD often do not seek assistance for secondary disabilities because it might make them appear incompetent as parents.
Ryan & Ferguson, 2006	Qualitative	5 children with FASD, age 3-12	Interviews, observations	Students who are diagnosed with FASD do not automatically get supports and services that might be necessary. People working with children with FASD should focus on providing services and supports that promote a sense of competence and stability for children.
Ryan & Ferguson, 2006	Qualitative	5 students with FASD, age 3-19	Interviews, observations	There is higher awareness of FASD currently, but services and supports related to academics and behaviors are lacking for students with FASD. Experienced teachers are more likely to differentiate instruction for students with FASD than inexperienced teachers.
Thorne, Coggins & Olson, 2007	Mixed Methods	32 students: 16 with FASD, 16 typically	Narratives from previous studies	Children with FASD are more likely to use picture bound reference strategies during story

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		developing, age 8-11		telling than typically developing peers.
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3.2.1 Research design

Seven of the 23 studies (30.4%) included in this meta-synthesis used a quantitative research design (Boulter, 2007; Brems, Boschma-Wynn, Dewane, Edwards & Robinson, 2011; Duval-White, Jirikowic, Rios, Deitz & Olson, 2013; Franklin, Deitz, Jirikowic & Astley, 2008; Green, 2009; Jirikowic, Kartin & Olson, 2008; Kooistra, Crawford, Gibbard, Ramage & Kaplan, 2010). Eight of the 23 studies (34.8%) used a qualitative research design (Brown, Sigvaldason & Bednar, 2007; Duquette, 2006; Dybdahl & Ryan, 2009; Edmonds & Crichton, 2008; O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006; Rutman & Van Bibber, 2010; Ryan & Ferguson, 2006; Ryan & Ferguson, 2006). Eight of the 23 studies (34.8%) used a mixed methods research design (Abele-Webster, Magill-Evans & Pei, 2012; Clark, 2008; Coggins, Timler & Olswang, 2007; Kjellmer, Olswang, Oetting & Redmond, 2013; Lewis, 2011; Mcgee, Bjorkquist, Price, Mattson & Riley, 2009; Olswang, Svensson & Astley, 2010; Thorne, Coggins & Olson, 2007).

3.2.2 Participants and data sources

The majority of the 23 research studies included in this meta-synthesis analyzed data from students with FASD. Sixteen of the 23 studies (69.6%) analyzed data collected from students and children with FASD (Abele-Webster, Magill-Evans & Pei, 2012; Coggins, Timler & Olswang, 2007; Duquette, 2006; Duval-White, Jirikowic, Rios, Deitz & Olson, 2013; Edmonds & Crichton, 2008; Franklin, Deitz, Jirikowic & Astley, 2008; Green, 2009; Jirikowic, Kartin & Olson, 2008; Kjellmer, Olswang, Oetting & Redmond, 2013; Kooistra, Crawford, Gibbard,

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Ramage & Kaplan, 2010; Mcgee, Bjorkquist, Price, Mattson & Riley, 2009; Olswang, Svensson & Astley, 2010; O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006; Ryan & Ferguson, 2006; Ryan & Ferguson, 2006; Thorne, Coggins & Olson, 2007). Two of the 23 studies (8.7%) analyzed data from adults with FASD (Clark, 2008; Rutman & Van Bibber, 2010). Two of the 23 articles (8.7%) analyzed data from parents and foster parents raising children with FASD (Brown, Sigvaldason & Bednar, 2007; Lewis, 2011). One of the 23 articles (4.3%) analyzed data from students without FASD (Boulter, 2007). One of the 23 articles (4.3%) analyzed data from academic directors (Brems, Boschma-Wynn, Dewane, Edwards & Robinson, 2011). One of the 23 articles (4.3%) analyzed data from teachers working with students with FASD (Dybdahl & Ryan, 2009).

Most of the research studies analyzed for this meta-synthesis used interviews and observations to collect data from participants. Thirteen of the 23 studies (56.5%) used interviews and observations (Brown, Sigvaldason & Bednar, 2007; Clark, 2008; Duquette, 2006; Dybdahl & Ryan, 2009; Edmonds & Crichton, 2008; Jirikowic, Kartin & Olson, 2008; Kjellmer, Olswang, Oetting & Redmond, 2013; Lewis, 2011; Mcgee, Bjorkquist, Price, Mattson & Riley, 2009; Olswang, Svensson & Astley, 2010; Rutman & Van Bibber, 2010; Ryan & Ferguson, 2006; Ryan & Ferguson, 2006). Six of the 23 studies (26.1%) used a range of formal assessments (Boulter, 2007; Duval-White, Jirikowic, Rios, Deitz & Olson, 2013; Franklin, Deitz, Jirikowic & Astley, 2008; Green, 2009; Kooistra, Crawford, Gibbard, Ramage & Kaplan, 2010; O'Connor, Frankel, Paley, Schonfeld, Carpenter, Laugeson & Marquardt, 2006). Other data sources used included database reviews, online surveys, behavioral ratings, and narratives.

3.2.3 Findings of the studies

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The findings of the 23 research studies included in this meta-synthesis can be summarized as follows:

1. There are behavior characteristics unique to individuals with FASD. These behaviors along with sensory processing deficits lead to challenges for individuals with FASD.

2. Services and supports for individuals with FASD are essential, yet these supports and services are often unavailable or unidentified. Caretakers, teachers, parents and others working with individuals with FASD lack the training to effectively carry out necessary supports and services.

3. Early intervention and diagnosis are critical for the success of individuals with FASD.

3.3 Emergent themes

Seven themes emerged from my analysis of the 42 articles included in this meta-synthesis. These emergent themes (theme clusters) include: (a) behavior characteristics; (b) ideas related to services and supports; (c) learning and school-related challenges; (d) benefits of early intervention, training and knowledge for mothers (including future mothers), teachers, service providers and others; (e) sensory processing characteristics; (f) correlation between environment and FASD; and (g) teacher experience. These seven theme clusters and their formulated meanings are represented in Table 3.

Table 3

Theme Clusters	Formulated Meanings
Behavior Characteristics	<ul style="list-style-type: none"> ● FASD is associated with attention deficits; these attention deficits may have negative affects on work and school performance. ● More maladaptive behaviors are present in children with FASD than their typically developing peers. ● Social communication varies more for children with FASD from day

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	<p>to day than their typically developing peers. This contributes to some of the difficulty students with FASD experience.</p> <ul style="list-style-type: none"> ● It is crucial to address functional skills for students with FASD. ● Children with FASD also have more occurrences of disengaged behavior than typically developing peers and these occurrences last longer than their typically developing peers. ● Children with FASD function more poorly in behavior related to social, personal living and community living, and these behaviors have higher variability than typically developing peers. ● Children with ADHD have been compared to children with FASD. Research showed that children with ADHD have difficulties with slow paced conditions, while children with FASD have difficulties in fast paced conditions. This research suggests that students with FASD have a specific behavior type.
<p>Ideas Related to Services and Supports</p>	<ul style="list-style-type: none"> ● Awareness of and about FASD services and support needs is lacking, which has a negative impact on adults living with FASD. ● Parents with FASD often do not seek assistance, support and services for secondary disabilities because it might make them appear incompetent as parents. ● People working with children with FASD should focus on providing services and supports that promote a sense of competence and stability for children. ● Often, students who are diagnosed with FASD do not automatically get the supports and services that are necessary. ● The general lack of formal support has a negative impact on an individual with FASD's community participation. ● Students with FASD benefit from emotional support, positive role models and an adult that will advocate for their accommodations and programs. ● Living with a caregiver has a positive impact on integration in community for an individual with FASD. ● Research suggests that parent and friend support keep adolescents with FASD in school.
<p>Learning and School-Related Challenges</p>	<ul style="list-style-type: none"> ● Neuro-cognitive problems associated with FASD are widespread but special working memory is the greatest area of deficit. ● Children with FASD demonstrate difficulties in social information processing and impaired performance in critical thinking and problem solving skills. ● Students with FASD can perceive themselves to be academically integrated and socially connected. ● Children with FASD have challenges with writing legibly and have a slower handwriting speed. Children with FASD are at a high risk for handwriting dysfunction. ● Children with FASD have executive function deficits, specifically in attention, planning, strategy use and working memory.

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<p>Benefits of Early Intervention, Training and Knowledge for Mothers (including future mothers), Teachers, Service Providers and Others</p>	<ul style="list-style-type: none"> ● FASD informative presentations can increase middle school and high school student's knowledge of the effect of drinking alcohol during pregnancy and peer led presentations can help facilitate this increase in knowledge. Schools should partner with agencies to initiate these presentations. ● Advocating for and providing early interventions is crucial for children with FASD. ● Early intervention might lessen children with FASD experiencing social rejection and maladjustment later in life. ● Directors are open to educating their trainees in FASD education, but do not have the resources or program requirements to implement training or education. ● Offering individualized education, counseling and support is effective for the success of students with FASD. ● Workers need more training in FASD for working with individuals with FASD and directors of programs in Alaska would like to offer this training but do not have the resources.
<p>Sensory Processing Characteristics</p>	<ul style="list-style-type: none"> ● Sensory processing deficits are displayed often in children with FASD. These deficits in sensory processing contribute to a range of behavioral problems. ● Children with FASD with more sensory processing difficulties have more problem behaviors. ● Behavior manifestations of sensory processing deficits do not overlap with the behavior manifestations of ADHD. This indicates the sensory processing characteristics of children with FASD are unique. ● There are areas where modification to sensory stimulation would help children with FASD.
<p>Correlation Between Environment and FASD</p>	<ul style="list-style-type: none"> ● Alcohol consumption before knowledge of pregnancy combined with low socioeconomic status and high distress level in mothers is associated more with an FASD diagnosis than alcohol consumption alone. Future steps should include offering screening for distress during pregnancy, specifically for mothers who have low socioeconomic status. ● Adverse environmental factors strongly correlate with FASD diagnosis. ● Poor care giving conditions lead to stronger effects of prenatal alcohol exposure in individuals.
<p>Teacher Experience</p>	<ul style="list-style-type: none"> ● Experienced teachers are more likely to differentiate instruction for students with FASD than inexperienced teachers. ● Teachers feel like they have not received adequate training for working with students with FASD, but are enthusiastic about the idea of future trainings. ● Teachers state that providing individual attention, establishing

	positive relationships and promoting self-control help their students with FASD.
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4. Discussion

In this section, I summarize the emergent themes from my analysis of the 42 articles included in this meta-synthesis. I connect these emergent themes to my teaching practice and personal experience.

4.1 Behavior characteristics

A prevalent theme of this meta-synthesis is *children diagnosed with FASD have specific and unique behavior characteristics*. While some of the behavior manifestations of children with FASD match with other peers, the blend of manifestations is quite unique to children with FASD. For example, children with FASD have difficulties with social communication that lead to challenges in life and school, yet children with FASD are often prosocial and do quite well in slow paced environments. This characteristic blend of strengths and difficulty occurs less frequently among peers in other sub-categories of disability.

As a teacher, I have worked with children who have been identified as having symptoms similar to what would be expected of someone diagnosed with FASD. I worked with two students in particular who appeared to have many behavior traits that could be compared to the traits of other children with varying disabilities. Yet, both children also exhibited strengths and behavior struggles that contradicted these same categories of disability. Through this research, I learned that it is common to be unable to categorize behaviors of children with FASD with other disability behavior patterns. It is crucial then to observe the unique behavior patterns of an individual with FASD in order to meet needs rather than generalize patterns of behavior and

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apply generic interventions. Children with FASD have distinctive behaviors and a distinguishing behavior pattern that differs from any other disability. This information and research points to the uniqueness of FASD as a particular type of neurological impairment and will help teachers understand how to work with individual students with FASD.

4.2 Ideas related to services and supports

After a child has been diagnosed with FASD it is crucial for that child to receive supports and services that target specific needs. Research suggests that while teachers, parents and service providers seek to ensure that the needs of the children they work with are met, the services and supports available are often lacking. Unavailable methods of support does not equate to lack of desire to help individuals with FASD become successful in all domains of life. Parents, teachers and friends offer support in any way they can to encourage success for the individuals in their lives with FASD.

One critical problem concerning supports and services is the time between diagnosis and access to supportive care. Once diagnosed, children do not automatically receive supports and services. It requires extensive advocacy to obtain the correct services. The need for advocacy and lack of services often leads to inability to access supports. To ensure support to persons with FASD, a community wide action plan to promote local services and to provide readily available information about how to access appropriate services is necessary.

In my experience as an educator, I have not been able to find readily available information about how to best meet the needs of my students with FASD through local services. There are local agencies that have knowledgeable people but I have yet to find research-based supports that

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I can offer to students with FASD. The lack of services and supports makes long-term success difficult to ensure.

4.3 Learning and school-related challenges

Children with FASD have difficulties with critical thinking, problem-solving skills, working memory and executive function. These difficulties lead to challenges succeeding in school. Specific deficits in attention lead to further difficulties. In order for children with FASD to succeed, the adults in their lives must focus on teaching strategies that individuals with FASD can use.

The research I read did not offer specific how-to strategies to best help children experiencing these deficits. Instead research has only made it clear that these deficits exist. Because it has also been established that individuals with FASD have a specific behavior pattern, it is crucial to develop research studies that help to define effective environmental modifications and intervention strategies that make learning and school-related challenges less problematic for students with FASD.

4.4 Benefits of early intervention, training and knowledge for mothers (including future mothers), Teachers, service providers and others

The value of early identification and intervention might be the most important finding of my research. It will become increasingly difficult and less effective to implement successful behavioral interventions without early intervention for individuals with FASD.

Prevention and education to reduce the prevalence of FASD are key aspects of the research I reviewed and must occur in conjunction with early intervention and identification. Without the knowledge of how, why and what FASD is, it is challenging to make positive strides towards

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eradicating the prevalence of FASD. This knowledge must be shared with future parents, the public and all individuals who work with individuals who may have FASD. One main element made obvious through my research is the lack of training programs available. Directors of programs, teachers and parents would like more information and training to feel successful in their work.

4.5 Sensory processing characteristics

Sensory processing difficulties are a hallmark of FASD. The degree and number of sensory processing deficits present has a direct positive correlation to a higher number of problem behaviors displayed in students with FASD. According to research, limiting sensory stimulation would help individuals with FASD manage the difficulties and challenges they experience.

Research about the difficulties related to sensory processing for students with FASD helps me in my work with students. I can use this information to modify environments in ways that target specific sensory deficits and overstimulation.

4.6 Correlation between environment and FASD

The research and articles I reviewed indicate that adverse environmental conditions have a correlation to FASD diagnosis. Alcohol consumption during pregnancy can lead to a diagnosis of FASD; more than alcohol consumption alone, alcohol consumption combined with a low socioeconomic status and distress during pregnancy leads to higher risk of a child born with FASD. Furthermore, adverse environments can make manifested behaviors more apparent for children with FASD.

Understanding children in relation to their social experiences and backgrounds is fundamental to teaching effectively. This is especially true when working with the specific

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behaviors present in students with FASD. The research I analyzed in this meta-synthesis did not specifically offer ways to support children with FASD who experience other adversities.

4.7 Teacher experience

Teachers have varied experience when working with students with FASD. According to the research reviewed, experienced teachers are more willing to accommodate and differentiate their teaching for the learning and behavior challenges that students with FASD exhibit than inexperienced teachers. Inexperienced teachers are willing to learn how to best accommodate each of their students but they feel that they have not been given the opportunity.

In my personal experience as an educator I have often felt undertrained, especially when working with specific disabilities including FASD. It would be beneficial if there was research that explores the most effective training for teaching professionals and the content to focus on with students with FASD in the classroom.

5. Conclusion

The findings of this meta-synthesis show that there are behavioral characteristics and sensory deficits prevalent in individuals with FASD. Findings conclude that early identification and intervention are critical components in helping individuals with FASD meet their potential. FASD-specific services and supports are needed to ensure success in teaching environments. Once a child is identified as having FASD and is diagnosed, the right services and supports in the classroom are not apparent yet in the research. Research studies fall short of determining what works to support the potential of students once they are labeled with FASD. More research about effective supports is needed once individuals are identified and diagnosed.

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The amount of research dedicated to all aspects of prenatal exposure to alcohol leads me to believe that society recognizes the impact it has on our communities, families and children. Studies thus far have helped to spark public awareness, recognize FASD as a brain disorder, and address the stigmatizing effect of the FASD diagnosis on mothers and their children. Now, we need research that will lead us to effective ways to help empower students with FASD in classroom settings. As a teacher I will strive to incorporate any new strategies and interventions that can help serve the students I work with each day, diagnosed or undiagnosed.

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