Evaluating an Attributional Retraining Intervention to Increase Pre-service Teachers' Self-Efficacy in Working with Students with FASD: A Mixed Methods Study

by

Erin Marie Atkinson

A thesis submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in School and Clinical Child Psychology

Department of Educational Psychology
University of Alberta

Abstract

Children with fetal alcohol spectrum disorder (FASD) can experience complex social, emotional, behavioural, and academic needs at school that necessitate the support of prepared and efficacious teachers. Teacher self-efficacy, defined as the extent to which a teacher believes he or she can bring about positive change in a student (Gibson & Dembo, 1984), is associated with a multitude of positive classroom variables and teacher characteristics that may play a role in supporting these students. Among the many contributors to the development of self-efficacy, causal attributions (i.e. the perceived causes of events or outcomes; Weiner, 1985) are believed to play a role (Bandura 1977). In fact, researchers have found that the attributions teachers made about the difficulties experienced by a student with FASD predicted their self-efficacy in working with these children. Specifically, teachers who reported higher personal control attributions and lower stability attributions reported feeling more efficacious (Atkinson, 2012). These findings supported the development of an attributional retraining (AR) intervention for pre-service teachers.

Current Study: The purpose of this mixed-methods study was to develop, implement, and evaluate an AR intervention (see Haynes et al., 2009) aimed at modifying maladaptive attributions about the challenges experienced by students with FASD, with the goal of preparing pre-service teachers to work with these students by increasing their self-efficacy.

Methods: In this explanatory sequential mixed methods design, quantitative survey data (N=208) and qualitative interview data (N=8) were collected from pre-service teachers at a large Western Canadian university. Data were analyzed separately using inferential statistics and a thematic analysis, and then integrated to generate mixed inferences regarding the effectiveness of the intervention, and considerations for further supporting teachers in this area.

Findings: Quantitative results demonstrated that the AR intervention was successful at increasing pre-service teachers' attributions of personal control, but no significant corresponding increases in teacher self-efficacy were noted. Qualitative themes derived from participant interviews included evidence of *Shifting Thinking*, considerations for *Preparing for the Future*, and ideas for *Supporting Students* with FASD. Integrated learnings suggest that although the intervention did not significantly increase feelings of self-efficacy, pre-service teachers reported being motivated to learn more about FASD and a desire for experiences that have the potential to contribute to their self-efficacy in the future. Implications for theory, future research, and practice (i.e. teacher training programs) are discussed.

Preface

This thesis is an original work by Erin Marie Atkinson. The research study received ethics approval from the University of Alberta Research Ethics Board, Project Name "Attributional Retraining Intervention for Pre-Service Teachers to Improve Self-Efficacy in Working with Students with Fetal Alcohol Spectrum Disorders", Study ID Pro00050636, on September 9th, 2014. See Appendix A for approval notification details.

Acknowledgements

I would like to acknowledge a number of individuals and organizations who have contributed to the completion of this research, and my doctoral degree in general. First, thank you to Dr. Lia Daniels, my academic supervisor for both my masters and doctoral research, who has been an excellent source of support throughout this entire process. Lia, I appreciate your patience, flexibility, and guidance as we encountered and navigated the challenges of completing a study of this size from across the country. Furthermore, I am thankful for the supportive feedback of my supervisory committee members, Dr. Jacqueline Pei and Dr. Damien Cormier. Jacquie, thank you also for the passion and dedication that you bring to your work in the field of FASD and in the practice of psychology; it originally inspired me to pursue this line of research, and continues to fuel my interest in working with and advocating for individuals with FASD in my work. Thank you also to Dr. Bill Hanson and Dr. Tanya Berry for serving on my committee, and to Dr. Joelle Ruthig for kindly acting as my external reviewer for this dissertation.

I would like to acknowledge the financial support of the Social Sciences and Humanities Research Council (SSHRC), and additional funding provided by the University of Alberta through scholarships and graduate assistantships throughout my doctoral degree and the completion of this research.

I am so fortunate to have been supported by a wonderful network of family, friends, and colleagues throughout this process. Thank you to my parents for always supporting me in my academic goals, even while occasionally questioning whether I would ever “get a real job” and “actually start working”. I appreciate your patience and encouragement both leading up to and throughout this journey. Thank you to my sister, Katelyn, for offering support in the form of comedic relief during times of high stress.

To my dear friends Allyson, Amanda, Erin S., Jesse, Kristine, and Marnie, we've been through much together, and I cannot imagine a more supportive group of people with whom I would want to share this experience. As we go our separate ways, I am reminded of a quote that I have recently found to be very meaningful and comforting: *"You will never be completely at home again, because part of your heart will always be elsewhere. That is the price you pay for the richness of knowing and loving people in more than one place".* I look forward to continuing to support you and to be supported by you all in the future, as we continue our journeys.

Last, but certainly not least, I want to acknowledge the unparalleled contributions of my husband, Ben, in the completion of this dissertation. From preparing meals and tending to housework during tight deadlines, to lending an ear for theoretical discussions, and providing an occasional shoulder to cry on, you have been a constant and unwavering source of support throughout my undergraduate, masters, and doctoral degrees. More than once you've pushed your own desires and goals aside to support mine, and I don't have words for the level of gratitude and appreciation that you deserve. Thank you.

Table of Contents

List of Tables

List of Figures

Introduction

Fetal Alcohol Spectrum Disorder (FASD) is the result of maternal alcohol consumption during pregnancy and is an important issue facing our schools. It is estimated that approximately one percent of children born in Canada are affected by FASD, making it the leading national cause of developmental and cognitive disability (Popova, Lange, Burd, & Rehm, 2015; Stade et al., 2009). Given this prevalence, it is crucial that teachers be prepared to support these children in their classrooms, however, previous research has suggested that teachers do not feel adequately prepared to work with this population. Teachers have reported learning very little about FASD during their training, not nearly enough to prepare them for working with these children (Job, Poth, Pei, Caissie, Brandell, & Macnab, 2013). In speaking to teachers about supporting students with FASD in their classrooms, Dybdahl & Ryan (2009) found that many had not received training, and those who did receive some training (e.g., coursework, in-service workshops) felt it was largely ineffective at preparing them to work with these students. Therefore, how best to prepare incoming teachers to work with students with FASD is an ongoing concern in the field.

One promising avenue in preparing teachers may be supporting the development of their self-efficacy in supporting students with FASD. The critical role that teacher self-efficacy may play in fostering a positive classroom environment for these students necessitates the investigation of ways in which to foster it in teachers and particularly in those planning to become teachers (i.e., pre-service teachers). Although research on teacher self-efficacy most often focuses on practicing teachers, providing training and learning opportunities to pre-service teachers during their coursework, before they enter the classroom, may be an important step in setting them up for successful experiences supporting these students in their future careers.

Theory suggests there are a number of factors that contribute to the development of self-efficacy in a particular area, including causal attributions that individuals make about their experiences of success and failure (Bandura, 1977). Indeed, previous research has linked pre-service teachers' self-efficacy in working with students with FASD to the attributions they make about the challenges experienced by these students. Specifically, pre-service teachers who made personally controllable and unstable attributions about student difficulties reported higher self-efficacy in working with affected students (Atkinson, 2012). With these findings in mind, the current mixed methods study details the development, implementation, and evaluation of an attributional retraining intervention aimed at preparing pre-service teachers to work with students with FASD through increasing their feelings of self-efficacy.

Literature Review

Fetal Alcohol Spectrum Disorder

The term Fetal Alcohol Spectrum Disorder (FASD) is used to describe a range of impairment resulting from maternal alcohol consumption during pregnancy (Cook et al., 2016). Prenatal alcohol exposure has life-long implications for affected individuals, their families and caregivers, and the broader community due to the teratogenic effects that alcohol has on the developing brain (Chudley et al., 2005; Streissguth et al., 1994). Children with FASD can exhibit a range of symptoms and varying degrees of impairment, as the term "spectrum disorder" implies (Mukherjee, Hollins, & Turk, 2006). These include deficits in cognitive functioning (e.g., memory, processing speed, and executive functioning), as well as inattentive and hyperactive behaviours, learning disabilities, and poor social and adaptive skills (Burd et al., 2003; Jacobson & Jacobson, 2002; Kelly, Day, & Streissguth, 2000; Rasmussen, 2005). In

particular, executive functioning deficits can lead to difficulty with inhibition, impulse control, planning and organization, and challenges with emotional regulation (Green, 2007).

FASD in the Classroom. In school, children with FASD can experience a range of academic difficulties, and can present with behavioural challenges in the classroom that can be challenging for even the most experienced teachers. Similar to their neuropsychological profiles, the learning and behavioural profiles of children with FASDs can vary depending on the areas of the brain affected (Blackburn, Carpenter, & Egerton, 2010). Although not all children with FASD have learning difficulties (Streissguth, Randels, & Smith, 1991), researchers have found that they are more likely to demonstrate lower academic achievement and to struggle in specific academic areas such as reading, phonological processing, and arithmetic than their typically-developing peers (Goldschmidt, Richardson, Cornelius, & Day, 2004; Olson et al., 1997; Streissguth, Barr, Bookstein, Sampson, & Olson, 1999). Further compounding these challenges, children with FASD may not respond to traditional interventions implemented in the classroom due to their unique neuropsychological profiles (Blackburn, Carpenter and Egerton, 2012; Jonsson et al.,2009). Instead, they often require individualized programming and ongoing support from teachers and other school-based professionals (Green, 2007).

In addition to learning difficulties, children with FASD can present with behavioural challenges in the classroom. Hyperactive and impulsive behaviours can lead to disruptions in the learning environment, while difficulties understanding abstract concepts coupled with receptive language delays can result in misunderstanding of rules and directions (Kodituwakku & Kodituwakku, 2014; Mukherjee, Hollins, & Turk, 2006). Deficits in executive functioning (EF) skills can make understanding cause and effect relationships and learning from consequences difficult for these children (Rasmussen, 2005). They may therefore engage in the same disruptive

behaviours repeatedly, making their behaviour appear purposeful or defiant to observers who are unaware of the impacts of the disorder. Children with FASD can also experience challenges in social-emotional development (Jacobson et al., 1993), as they often lack social maturity and they can struggle with understanding non-verbal language cues and perspective-taking (Benton Gibbard, Wass, & Clarke, 2003; Kodituwakku, 2006). These difficulties make relationship-building with same-aged peers challenging, leading to frustration and emotional distress in the classroom.

Due to these academic, behavioural, and social-emotional concerns, children with FASD require ongoing support from teachers and other school professionals to ensure they are adequately supported as they progress through the school system. Given the prevalence of this disorder, and the move towards inclusive education across Canada (e.g., Alberta Education, 2010), teachers in regular education classrooms are increasingly involved in and responsible for supporting children with FASD. It is therefore important that teachers feel prepared and confident in their ability to work effectively with affected students. However, as previously stated, teachers have reported receiving little to no specific training in the area of FASD, and many have felt that any training they did receive did not adequately prepare them for working with this population (Dybdahl & Ryan, 2009). In preparing teachers to work with children with FASD, one of the many important factors to consider is their sense of efficacy in doing so.

Teacher Self-Efficacy

The construct of self-efficacy refers to a person's beliefs about his or her ability to perform the skills necessary to complete a task and produce a desired outcome (Bandura, 1977). Self-efficacy beliefs can influence an individual's thoughts, emotions, and behaviours, and can play a role in determining the goals individuals set for themselves, how much effort they expend

on tasks, how long they persist in the face of difficulty, and how resilient they are in times of failure (Bandura, 1993; Bandura, 1997). Self-efficacy is believed to influence behaviour in that people tend to seek out and apply themselves in situations in which they feel efficacious, while they tend to avoid or withdraw from situations in which they do not feel efficacious (Bandura, 1977).

Since self-efficacy is a perception of competence, rather than an objective measure of competence in a certain area, individuals with high self-efficacy are not necessarily highly competent, and vice versa. For example, researchers have found that self-efficacy is a stronger predictor of behaviour than actual competence (e.g. Bouffard-Bouchard, Parent, & Larivee, 1991). Therefore, although someone may possess certain skills and competencies, it is their perception of those skills that will influence if and how they choose to apply them. This is key in the consideration of how best to prepare teachers to feel efficacious in working with students with FASD in the classroom. It is not enough to teach information, strategies, and skills; teachers' perceptions of their ability to work with and meet the needs of these students must also be considered.

Specific definitions of teacher self-efficacy have varied and evolved over time. Gibson and Dembo (1984) provide a widely-accepted definition, conceptualizing teacher self-efficacy as the extent to which a teacher believes he or she has the skills necessary to bring about positive change in a student. In this way, teacher self-efficacy involves teachers' beliefs about their ability to influence student learning and overall success, even with those who are difficult to teach (Guskey & Passaro, 1994). Like self-efficacy in general, teacher self-efficacy is context-specific (Gist & Mitchell, 1992; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). For example, a teacher's self-efficacy might differ between teaching academics and managing behaviour in the

classroom. It may also differ depending on the population of students they are working with (e.g. students with learning difficulties vs. students with behaviour challenges). The specificity of teacher self-efficacy is particularly important in the context of this research. Because of the complexity of FASD, the increased needs of affected students, and teachers' overall lack of training and preparation to work specifically with this population (Dybdahl & Ryan, 2009), teachers' self-efficacy for working with these students may differ from their self-efficacy in working with typically-developing students or even students with other disabilities and special needs.

History and Development of Teacher Self-Efficacy. The construct of "teacher efficacy" was first examined in 1976 by the Rand Corporation, and was conceptualized as the extent to which a teacher believed that students' motivation and learning were in the hands of the teacher (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). The two-item measure employed by the researchers was based on Rotter's Locus of Control theory (1966), and examined teachers' beliefs about whether student outcomes were due to factors under their own control (i.e. internal) more so than factors outside their control (i.e. external).

Gibson and Dembo (1984) then created a measure of teacher self-efficacy based off the original two Rand research items, while considering some of the concepts inherent in Bandura's self-efficacy theory. Their scale measured two factors: Personal Teaching Efficacy (PTE) and General Teaching Efficacy (GTE). While PTE measured teachers' beliefs about their own personal abilities as an educator, GTE measured more global beliefs about what teachers in general can accomplish, without taking into consideration the individual teacher's perceptions of his or her own abilities. Teacher self-efficacy as researchers tend to conceptualize it today most closely aligns with the construct of PTE. Although a number of inconsistencies have been

recorded in the use of this measure, and its validity has been questioned (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998), it is a widely-used measure of teacher self-efficacy in the research literature.

Expanding on his own theory of self-efficacy, Bandura later created the Teacher Self-Efficacy Scale (Bandura, 1997). Since self-efficacy is understood to be context-specific, Bandura's measure included 30 items which loaded onto seven different self-efficacy subscales. With this measure, Bandura attempted to provide a multi-faceted approach to measuring teacher self-efficacy across various situations, without becoming too specific (Bandura, 1997). However, reliability and validity information for this scale is not readily available (Tschannen-Moran & Woolfolk Hoy, 2001). Plus, 30 items makes the scale rather cumbersome for use with teachers in an applied setting.

In light of the inconsistencies and questionable reliability and validity of previous scales, Tschannen-Moran and Woolfolk Hoy (2001) developed a new measure of teacher self-efficacy: the Teacher Sense of Efficacy Scale (TSES). The authors carefully considered strengths and weaknesses of previous measures in the development of the TSES, which measures teacher self-efficacy in the specific areas of instructional strategies, classroom management, and student engagement. The TSES conceptualizes teacher self-efficacy as "the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998, p. 22). The scale is thought to represent a good balance between generality and specificity in the measurement of teacher self-efficacy.

Overall, a number of measures have been developed and tested to measure self-efficacy throughout the years, with many stemming from similar theoretical backgrounds. Measuring

teacher self-efficacy has allowed researchers to identify its association with and potential impact on a number of variables relevant to the classroom environment.

Correlates of Teacher Self-Efficacy. Researchers have long focused on the importance of teacher self-efficacy because of the way in which it relates to a number of desirable student and teacher factors (e.g. achievement, motivation, attitudes, and behaviours) in the classroom. In terms of student factors, teacher self-efficacy is related to positive student outcomes such as overall academic achievement, reading achievement, and computer literacy skills (Armor et al., 1976; Caprara, Barbaranelli, Steca, & Malone, 2006; Gibson & Dembo, 1984; Ross, 1992; Ross, Hogaboa-Gray, & Hannay, 2001). Although causation (i.e., do teachers with higher efficacy promote student achievement, or do higher achieving students lead teachers to feel more efficacious?) cannot be established due to a lack of experimental research in this area, one longitudinal study found that students' computer literacy skills increased when they transferred from a teacher with lower self-efficacy to a teacher with higher self-efficacy (Ross, Hogaboa-Gray, & Hannay, 2001).

Teacher self-efficacy has also been shown to relate to teachers' behaviour in the classroom. Researchers have demonstrated that teachers with higher self-efficacy persist longer when working with struggling students, and are less likely to believe challenging students should be placed in special education settings (Gibson & Dembo, 1984; Meijer & Foster, 1988). They are also more willing to try new methods of teaching to meet the needs of their students, and are less critical of students who make mistakes (Ashton & Webb, 1986; Guskey, 1988; Stein & Wang, 1988). In contrast, teachers with lower self-efficacy have been found to experience more job-related stress and difficulties in teaching (Betoret, 2006). Another study found that teachers with high self-efficacy tended to direct their energy at resolving problems, while those with

lower self-efficacy tended to avoid dealing with problems (Chwalisz, Altmaier, & Russell, 1992). Academically, teachers with lower self-efficacy were more likely to spend classroom time in non-academic tasks, to more easily give up on students who did not learn things quickly, and to criticize students who were unsuccessful (Gibson & Dembo, 1984).

Many of the outcomes associated with teacher self-efficacy mentioned above have direct implications for working with students with special needs, and particularly those with FASD. For example, a teacher who is open and willing to try new instructional strategies and techniques may be successful in finding a method for effectively teaching their student with FASD, and in creating an organized and consistent classroom environment, which is critical for the success of these children (Green, 2007). Given the needs of students with FASDs, and the importance of having them supported by efficacious teachers in the classroom, it is essential that ways in which to foster the development of teacher self-efficacy for working with this population be examined.

Sources of Self-Efficacy. A number of factors have been hypothesized to contribute to the development of self-efficacy. Bandura (1977) largely focused on four sources of self-efficacy beliefs: mastery experiences, vicarious experiences, social persuasion, and physiological arousal. Mastery experiences, or situations in which an individual is successful, contribute to positive self-efficacy in that they create future mastery expectations, while repeated failures can lower expectations of future success. Consistent with social learning theory, self-efficacy beliefs can also be influenced through vicarious learning experiences, by observing the successes or failures of others. Additionally, social persuasion, or simply being told that one has the capabilities to bring about a desired outcome, is also considered to be a source of self-efficacy, though admittedly not to the same extent as the experiential sources. Finally, physiological or emotional arousal, such as anxiety or fear responses can play a role in the perception of self-efficacy in

specific situations. For example, perceiving physiological arousal as fear may lead to lower feelings of self-efficacy than perceiving that same arousal as excitement.

Although these four sources are most central to Bandura's theory of self-efficacy, he also acknowledges the role that attributions play in its development (Bandura, 1977, 1993, 1997). Specifically, it is not just the experiences one has, but the attributions one makes about successes and failures that influence the development of self-efficacy (Bandura, 1997). For example, if the cause of success is perceived as internal to the person and relatively stable, then self-efficacy is enhanced. In contrast, if a successful outcome is attributed to causes outside of one's control (e.g. luck, chance), then self-efficacy remains unaffected (Bandura, 1993; Pintrich & Schunk, 1996). Based on these findings, causal attributions as a potential source of teacher self-efficacy in working with students with FASD warrant further investigation.

Attribution Theory

Attribution theory is a theory of motivation that views individuals as "scientists" attempting to understand and make sense of their own experiences (Weiner, 2010). It centers around the premise that individuals tend to search for causation, particularly when faced with unexpected, negative, and/or important events and outcomes in their lives. Causal attributions are the perceived causes of these outcomes (Weiner, 1985). Although a number of attribution theories have been proposed, the current study focuses on Weiner's (1985) theory which posits that individuals make attributions about the causes of events or outcomes along three causal dimensions: locus of causality, stability, and controllability. The first dimension, locus of causality, refers to the extent to which an individual believes that the cause of an event or outcome is within themselves (i.e., internal) versus outside themselves (i.e., external). The stability dimension involves the perception of permanency, whether the cause of an event is

considered stable over time or open to change. Finally, the controllability dimension refers to the extent to which an individual perceives the causes of an event to be controllable, either by themselves or by another person. A layer of complexity is added to this control dimension in that a cause could be controllable by the self, but not others, or vice-versa. Therefore, attributions in Weiner's theory are commonly measured along four causal dimensions, rather than three: Locus of causality, stability, personal control, and external control (McAuley, Duncan, & Russell, 1992).

One key aspect of attribution theory is that it is not the actual cause of an event, but rather how that cause is attributed, that determines an individual's response to it (Weiner, 1985). In the case of this study, this means that although individuals may lack knowledge about FASD, it does not matter whether their beliefs are correct or misinformed. Rather, it is the underlying causal dimensions of the beliefs they do hold that will determine their response to the situation. This difference between the actual cause of an event and the attributions about that cause is also important when studying a complex topic like FASD because there are a number of factors that can contribute to the difficulties and challenges these children face. For example, primary disabilities associated with brain damage due to alcohol can be further complicated by the child's home environment, social relationships, and misunderstanding from others (Streissguth & Kanter, 1997), all of which are external to the child but may vary in the extent to which they are seen as controllable or stable by others. So according to attribution theory, it is not a teacher's beliefs about why a child with FASD is struggling that will determine his or her reaction to that struggle. Rather, how the teacher attributes the cause of those challenges along the various dimensions is anticipated to have an impact on his or her reaction and subsequent behaviour (Weiner, 2010).

Intrapersonal vs. Interpersonal Attributions. Individuals make attributions both about the causes of their own experiences (i.e., self-directed, or intrapersonal), and those of others (i.e., other-directed, or interpersonal). Weiner (2000) provides separate theories of interpersonal and intrapersonal attributions, suggesting they involve slightly different processes and outcomes. Weiner suggests these theories of interpersonal and intrapersonal motivation are distinct yet interrelated, as the way in which an observer responds to the success or failure of someone else is based on the observer's causal attributions, which can then play a role in their understanding and the attributions they make about their own circumstances. The difference between interpersonal and intrapersonal attributions are important to keep in mind for this study because of its focus on investigating the attributions pre-service teachers make about the challenges experienced by another person, namely a child with FASD.

In terms of intrapersonal attributions, Weiner (1985) posits that self-directed attributions for the causes of an event lead to specific emotions that influence behaviour in reaction to that event. For example, he explains that internal and controllable attributions for personal success can result in feelings of pride, while these same attributions for failure (e.g. lack of effort) may result in guilt (Weiner, 2010). These emotions then influence motivation for subsequent behaviour. For example, a student who attributes failure at school to be internal, stable, and uncontrollable (e.g. lack of intelligence) may expect to fail again in the future, feel hopeless about his or her education, and consequently drop out of school (Weiner, 2010).

Other-directed attributions can lead to different affective responses and behaviours. For example, attributions made about interpersonal events are likely to lead to feelings of anger (controllable attributions for another's failure) or sympathy (uncontrollable attributions for another's failure). In turn, anger can lead to negative social interactions, such as punishment and

reprimands, while feelings of sympathy tend to lead to more pro-social and helping behaviours (Weiner, 2006). The findings of a recent mixed methods study appear to support this theory, in which the attributions that caregivers made about the misbehaviour of their children with FASD were found to be related to parenting strategies (Petrenko, Pandolphino, Roddenbery, 2016). Caregivers who attributed their child's difficulties as being due to neurodevelopmental concerns (i.e. uncontrollable attribution) were more likely to employ antecedent-based strategies to help support the child and prevent problem behaviour. In contrast, caregivers who perceived that their child was purposefully being disobedient (i.e. controllable attribution) were more likely to react punitively with consequences for behaviour. Similarly, as reviewed in the following section, researchers have found that teachers' attributions about student difficulties predict their response and recommended interventions.

Teachers' Causal Attributions. Researchers have applied attribution theory to examine teachers' interactions with their students and their decision-making in the classroom. One study found that teachers who attributed a student's failure on a test as being due to controllable factors such as a lack of effort were more likely to react punitively, while those who attributed the failure to something uncontrollable (e.g. lack of ability or aptitude) were more likely to respond with the goal of supporting student improvement (Reyna & Weiner, 2001). These findings are consistent with a classic study conducted by Weiner and Kukla (1970). Using experimentally manipulated vignettes, researchers found that teachers were less likely to report intentions to punish students who did poorly on a test when they were perceived as motivated to learn (i.e. effort; internal, controllable), and were more likely to report intending to reward students whose failure was attributed as being due to low ability (i.e. internal, uncontrollable, stable) rather than low effort. Similarly, researchers in more recent studies have identified teachers' causal

attributions as important factors in the classroom environment, as they have been found to relate to teachers' responses to student behavioural problems (Bibou-nakou, Kiosseoglou, & Stogiannidou, 2000), their affective responses toward low-achieving students (Georgiou, Christou, Stavrinides, & Panaoura, 2002), and even their reports of burnout (Bibou-Nakou, Stogiannidou, & Kiosseoglou, 1999).

Attributions and Self-Efficacy. As previously noted, the attributions that individuals make about their personal experiences of success and failure are theorized to contribute to the development of self-efficacy (Bandura, 1977). However, the specific relationship between causal attributions and teacher self-efficacy has rarely been examined in the literature. In one study, researchers discovered that teachers' beliefs about the cause of a student's problem behaviour was related to the teacher's self-efficacy (Andreou & Rapti, 2010). Specifically, teachers who were more likely to report that a student's behaviour was caused by school-based factors reported higher self-efficacy in the area of classroom management. However, this study was limited because it examined only one specific area of teacher self-efficacy (classroom management), and it did not probe for the underlying causal dimensions of the attributions being made. Addressing these issues, Fontaine (2012) examined causal dimensions underlying teachers' attributions as predictors of expectancies for change and overall self-efficacy when working with students with behavioural difficulties. Fontaine found that the stability dimension was a significant predictor of teacher self-efficacy. Both Andreou and Rapti (2010) and Fontaine's (2012) work focused on practicing rather than pre-service teachers, and examined attributions for general behaviour difficulties, rather than focusing on a specific disorder such as FASD.

With the above limitations in mind, Atkinson (2012) examined causal attributions as predictors of teacher self-efficacy in working specifically with students with FASD, and found that attributions predicted self-efficacy in pre-service teachers. Specifically, pre-service teachers who reported that the difficulties experienced by children with FASD were less stable (i.e. open to change) and under their own control reported feeling more efficacious in working with these students. The findings from this research provide the foundation for the current study, as they support the development of an attributional retraining (AR) intervention for pre-service teachers to modify maladaptive attributions about students with FASD, with the goal of increasing self-efficacy for working with these students.

Attributional Retraining (AR)

Attributional retraining is a motivational intervention aimed at replacing maladaptive attributions with more adaptive ones, with the goal of influencing emotions, motivation, and behaviour (Haynes, Perry, Stupnisky, & Daniels, 2009). Sharing some commonalities with Cognitive Behaviour Therapy (CBT; Beck, 1972) interventions, AR employs a cognitive model of behaviour change, acknowledging that it is our cognitive processing (i.e. attributions) of events that determines our response, rather than the event itself. For example, failing a test does not lead directly to a specific emotional response. Rather, the way in which that failure is attributed mediates the emotional and subsequent behavioural responses to that situation. These interventions are therefore designed to help individuals restructure maladaptive attributions they have about the causes of negative events in their lives. The process involves educating participants about the target event while highlighting the attributional dimensions that are associated with increased positive outcomes, such as improved motivation and increased academic achievement (Haynes et al., 2009).

History and Development of AR. AR interventions were first employed in academic settings in the 1970s, with elementary school-aged children (e.g. Andrews & Debus, 1978; Chapin & Dyck, 1976). Since then, research on AR has largely focused on improving academic outcomes in a range of subjects and contexts, with populations including elementary, secondary (e.g., Ziegler & Stoeger, 2004), special education (Borkowski et al., 1988), and post-secondary students (e.g. Perry, Hechter, Menec, & Weinberg, 1993). For example, a common AR intervention involves re-attributing an academic failure from ability to effort (stable to unstable, uncontrollable to controllable) so that motivation and other related constructs are not undermined (Haynes, Perry, Stupnisky, & Daniels, 2009). Researchers have demonstrated academic AR interventions to be successful both at increasing positive academic outcomes such as improved course grades (e.g. Haynes et al., 2006), as well as preventing negative academic outcomes such as course failure and drop-out rates (e.g. Haynes-Stewart, et al., 2011).

Beyond academic achievement, other areas that have been targeted with AR include increasing athletic performance (e.g. Miserandino, 1998), influencing career decisions (e.g. Szabo, 2006), improving self-esteem and job interview performance (e.g. Hall, Jackson, Goetz, Musu-Gillette, 2011), and improving social skills (e.g. Carlyon, 1997). More than three decades of research has established AR as an effective intervention across a variety of contexts and for a variety of purposes, with the most research relating to improving academic achievement. Overall, AR interventions have strong theoretical underpinnings as motivation-enhancing interventions, and are supported by decades of research.

Process of change in AR interventions. The majority of AR research studies have focused on outcome variables, rather than the process through which AR attains those outcomes. In fact, early research in the field did not examine whether AR produced anticipated changes in

underlying causal attributions. Only more recently have researchers begun to examine process variables in AR. In an extensive review of the AR literature in the area of academic achievement, Haynes and colleagues (2009) highlight the importance of three interrelated processes that contribute to AR intervention outcomes: changes in attributions, perceived control, and motivation.

First, AR interventions are successful at achieving desired outcomes through shifting participants' causal attributions, as they were developed to do, by encouraging the replacement of maladaptive attributions with more adaptive ones (Haynes, Perry, Stupnisky, & Daniels, 2009). For example, in interventions focused on academic achievement, students are often taught to attribute poor performance to internal, unstable, and controllable factors (e.g. effort) rather than external, uncontrollable factors (e.g. luck). By shifting these causal dimensions, AR interventions are theorized to lead to individuals taking increased responsibility for their own achievement. Supporting this premise, both Hall and colleagues (2006) and Haynes and colleagues (2006) found systematic changes in Weiner's (1985) causal dimensions following AR interventions.

Changes in attributions are theorized to lead to increases in perceived control, an individual's perception of their ability to control or alter an outcome (Burger, 1989). Previous research has demonstrated that participants benefit from AR interventions in that they increase perceptions of control by changing attributions for failure (Struthers & Perry, 1996). For example, students who attribute failure to external and uncontrollable factors are likely to have low perceived control, and are therefore good candidates for an AR intervention that focuses on reattributing academic achievement to internal controllable factors. In fact, some research has shown (e.g. Hall et al., 2006) that AR interventions are most beneficial and show greatest

success for participants who begin with lower perceived control, or who are conceptualized as being vulnerable to the negative effects of what is being studied. The process of AR may be particularly helpful for participants who begin with lower perceived control, as it allows them to take advantage of future learning experiences by shifting their feelings of control and therefore responsibility for their learning.

Finally, AR interventions have been found to have a direct impact on student motivation in academic achievement AR studies. Haynes and colleagues (2008) found significant changes in mastery motivation (i.e. motivation to learn, understand, and master content), but not in performance motivation (i.e. motivation to get good grades) following an AR intervention for post-secondary students. Furthermore, they found that mastery motivation mediated the effects of AR on achievement, as measured by grade point average (GPA), indicating that increases in motivation are a key process variable in AR interventions.

Perceived Control and Self-Efficacy. Self-efficacy has not yet been examined as a process or outcome variable in the AR literature. However, in a detailed review of control-related constructs, Skinner (1996) explains that self-efficacy, along with a multitude of other constructs, can be conceptualized as falling under the umbrella of "perceived control". Furthermore, Bandura explains that, "self-efficacy is concerned with people's beliefs in their capabilities to exercise control over their own functioning and over events that affect their lives" (Bandura, 1994, pg. 13). Skinner (1996) suggests that perceived control and self-efficacy, especially as conceptualized in Bandura's later work, are both agent-ends constructs as they both refer to an individual's beliefs about their ability to influence outcomes. Although not identical in their conceptualization, the similarities between self-efficacy and perceived control suggest that AR interventions may have similar impacts on these two constructs. This similarity paired with the

focus on self-efficacy rather than perceived control in understanding teacher behaviour provides justification for further examining the influence of AR interventions on teacher self-efficacy.

AR Intervention Framework. Haynes and colleagues (2009) proposed a framework for AR interventions based on procedures that have been tested in both field and laboratory settings. This framework consists of five stages, outlined below: pre-assessment, activation, induction, consolidation, and post-assessment. AR interventions are delivered in a group format, and are expected to take between 30 and 90 minutes using this framework.

Stage 1: Pre-AR Diagnostic Assessment. Before beginning the intervention, data are collected from participants for the purpose of gathering baseline measurements on variables of interest. Haynes and colleagues also suggest that the diagnostic assessment can be used to identify individuals who are the most suitable candidates for AR (i.e. those who are considered vulnerable or "failure-prone" in the academic achievement AR literature).

Stage 2: Causal Search Activation. This second stage is often implemented concurrently with Stage 1, and can be included as a component of the pre-survey. Participants are asked to reflect on the topic and report their attributions of the event (e.g. academic failure). This intervention component acts as a primer, and prepares participants to receive the attributional information that will later be presented to them (Bargh, 2006; Bargh et al., 2001). It is important that the causal search activation occurs immediately before (e.g. within the same session) the delivery of the next intervention components, to maximize the induction of the AR content.

Stage 3: AR Induction. This third stage is the critical component of the intervention, in which specific content is provided to participants with the goal of replacing maladaptive attributions with more adaptive ones. The induction itself is typically done in one of two ways. One method involves presenting a videotaped scenario to participants, where individuals

describe their experience with an event, like failing a test (e.g. Hall et al., 2006; Haynes et al., 2008; Menec et al., 1994; Perry & Penner 1990). They discuss the different ways in which failure can be attributed, and the resulting impact of those attributions on future motivation and behaviour. They then reinforce how changes in their thinking could lead to improved outcomes (e.g. academic performance). After watching the video, an intervention facilitator summarizes key points and emphasizes the importance of adaptive attributions to participants.

A second method involves presenting participants with an AR handout that lists examples of both adaptive and maladaptive attributions for particular situations. Participants are asked to reflect on their own experiences while considering the different attributions and their impact on future motivation and behaviour. The handout is then displayed in a presentation to the entire group, and is reviewed using examples and encouraging students to join in the discussion (Hall et al., 2006, 2007; Haynes et al., 2009).

Stage 4: AR Consolidation. Following the induction, the goal of the fourth stage is to reinforce the presented attributional material. Four specific procedures have been previously developed to aid in the consolidation of information; they include group discussions, aptitude tests, writing assignments, and handouts. Although aptitude tests are relevant only to academic achievement AR, the other three approaches are more widely applicable to other areas.

Group discussions involve arranging students into smaller groups and encouraging them to reflect on their own attributions. These reflections are then shared with the larger class, examples are organized into adaptive and maladaptive attributions, and alternatives to the maladaptive ones are identified. Group discussions have been demonstrated to be successful in increasing academic performance (Perry & Struthers, 1994). Alternatively, individual writing assignments encourage participants to expand and elaborate on their own attributions in relation

to previous experiences in order to process the material in more depth. This may involve summarizing key points from the intervention, tying them to personal experiences, relating them to emotions, and reinterpreting previous failures (Entwistle, 2000). Writing assignments have been demonstrated to be effective at increasing participant's perceptions of control and academic performance (Hall et al., 2006). Finally, the AR handout used in the induction stage could itself be used as a consolidation technique if participants are encouraged to keep and reflect on how their own experiences related to its content.

Stage 5: Post-AR Assessment. The fifth and final stage of the AR intervention process is much like the pre-assessment stage in that it involves the completion of a survey with all the measures of interest. Haynes and colleagues (2009) recommend that the post-assessment take place several months after the intervention, to avoid immediate inflation and to get a more accurate picture of long-term intervention effects.

Considerations for AR about FASD. To date, AR interventions have focused on re-attributing the causes of events that are personal to the self (e.g., failing a test, losing a race), and have not yet been implemented to help individuals reattribute the cause of an event or outcome that happens to another person (i.e. the challenges experienced by a student with FASD at school). In fact, personal control attributions about external events are not addressed by Weiner's (2000) intrapersonal and interpersonal attribution theories of motivation. Weiner suggests that individuals make personal control attributions about personal events, which can lead them to feel guilt or shame in response to failure and pride in response to success. Interpersonally, observers make attributions about the external controllability (responsibility) of the causes of situations that others find themselves in, which can lead the observer to feel anger or sympathy for others

depending on the outcome of the situation. Theory has not yet addressed the personal control attributions that an observer may make about the situations of others.

The current study therefore contributes to this field of research on attributions of personal control and stability related to the experiences of others, namely children with FASD, and how modifying those attributions (i.e. increasing personal control and decreasing stability as per Atkinson, 2012) through AR may impact teacher self-efficacy. The complexity of FASD and the lack of previous research in this area will require careful consideration for the development of an AR intervention to address these issues with pre-service teachers.

Additionally, AR interventions to-date have largely been implemented and evaluated using only quantitative data collection methods, without investigating participants' experiences and perceptions of the intervention which could provide a deeper understanding of the processes that lead to change, and further considerations for designing effective AR interventions. With this in mind, the current study takes a mixed methods approach to data collection and analysis to determine the effectiveness of an AR intervention for pre-service teachers aimed at increasing self-efficacy in working with students with FASD.

Study Purpose, Design, and Research Questions

Study Purpose

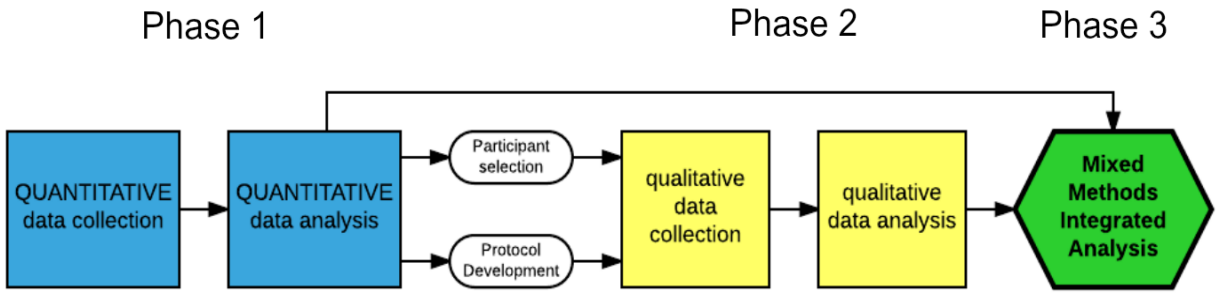
The overall purpose of this study was to develop, implement, and evaluate an AR intervention for pre-service teachers aimed at modifying maladaptive attributions about the challenges experienced by students with FASD. The goal was to prepare pre-service teachers to work with these students by increasing their self-efficacy. Although each of these three components (i.e. development, implementation, and evaluation) was undertaken as part of this program of research, the focus of this document is on the data collected for the evaluation of the

AR intervention. In turn, this evaluation data provides key insights and learnings into the development, implementation, and evaluation of future AR and similar interventions for pre-service teachers in this area.

Study Design

An explanatory sequential mixed methods design was employed to evaluate the AR intervention, in which data were collected and analyzed in three phases. An explanatory sequential design allows for qualitative findings to further enrich and explain quantitative results (Creswell & Plano Clark, 2011). A visual summary of the quantitative, qualitative, and mixed methods phases of this study is presented in Figure 1.

Figure 1. Visual Summary of Explanatory Sequential Study Design



In the first phase of this explanatory sequential design, quantitative survey data were collected and analyzed. The results of that analysis informed the selection of participants for the qualitative phase, and the development of an interview protocol with which to collect the qualitative data. In the second phase, participants were interviewed and qualitative data were collected and analyzed. Finally, in the third phase, findings from both strands of data were integrated to gain insights not possible with quantitative or qualitative data alone. The final discussion draws on these integrated insights to highlight considerations for developing,

implementing, and evaluating interventions to prepare pre-service teachers to work with children with FASD.

Mixed Methods Rationale. Mixed methods research (MMR) is rooted in a pragmatic approach to data collection, analysis, and integration, with a focus on choosing the methods that best answer the research questions (Creswell & Plano Clark, 2011). Tashakkori and Teddlie (2003), in discussing pragmatism in MMR, suggested that research questions should be of primary importance, and that a practical and applied philosophy should guide methodology in an MMR study. A pragmatic worldview focuses on solving problems, and is particularly interested in the consequences that research can have on real-world practices (Creswell & Plano Clark, 2011). Pragmatism is therefore particularly relevant to the conceptualization of this study, given the focus on preparing real future teachers to support real students with challenges in their classrooms. Within this worldview, MMR values both objective (i.e. traditionally postpositivist) and subjective (i.e. traditionally constructivist) knowledge, and acknowledges that the combination of quantitative and qualitative data can capitalize on the strengths and address the limitations inherent in each method alone, providing a more comprehensive understanding of the topic being studied.

As a practicing clinician, I identify strongly with a pragmatic approach and the focus on doing "what works", whether it be in research or in clinical applications. Therefore, mixed methods research fits well for me as a researcher. I believe it is particularly suited for research in the complex field of FASD, where understanding personal experiences, perceptions, and possible stigma related to the disorder may be key to preparing our teachers to work with affected children, beyond anticipated quantitative increases in self-efficacy. My worldview, previous

experiences, and potential biases as a researcher are further discussed in the qualitative methods section, as they pertain to my collection and thematic analysis of the data.

Given that this study sought to answer questions both about the effectiveness of the intervention as well as the experiences of participants (see Research Questions below), an MMR approach allowed for the creation of a more complete understanding than either method in isolation would have allowed. Furthermore, in MMR, one strand of data (e.g. quantitative or qualitative) is sometimes highlighted or given more emphasis than the other. In explanatory sequential designs, quantitative data is often considered the focus of the study, while qualitative data serves to confirm or explain findings (Hanson, Creswell, Plano Clark, Petska, & Creswell, 2005). However, Teddlie and Tashakkori (2006) acknowledge that it is not always possible to predetermine where the emphasis should be placed in an MMR study, as the process can be emergent, and the relative importance of each data strand cannot be fully appreciated and understood until data are collected and analyzed. Following the analysis of data for this study, the decision was made to place a slight emphasis on the qualitative data surrounding participants' experiences of the intervention and their perceptions of students with FASD, rather than on the quantitative survey data measuring intervention effectiveness.

Research Questions & Hypotheses

Five unique research questions provided the basis for this study: two quantitative, two qualitative, and one overarching mixed methods question, presented in Table 1.

Table 1. Quantitative, Qualitative, and Mixed Methods Research Questions

Phase 1 (Quantitative)	1. *Does participation in the AR intervention modify pre-service teachers' attributions about the challenges experienced by children with FASD?*
	2. *Does participation in the AR intervention increase pre-service teachers' self-efficacy in working with children with FASD?*
Phase 2 (Qualitative)	3. *What are pre-service teachers' experiences of participating in the AR intervention?*
	4. *What perceptions do pre-service teachers hold about working with students with FASD?*
Phase 3 (Integrated)	5. *How do learnings from the quantitative and qualitative data inform our understanding of how best to develop, implement, and evaluate interventions to prepare pre-service teachers to work with students with FASD?*

The quantitative research questions focused on the evaluation of the effectiveness of the AR intervention at influencing pre-service teachers' causal attributions and self-efficacy. The qualitative research questions focused on exploring participants' experiences of the intervention and more generally their perceptions of working with students with FASD in their future classrooms. Finally, the overarching mixed-methods question sought to integrate findings from the quantitative and qualitative data to inform our understanding of how best to prepare pre-service teachers for working effectively with these students.

In terms of hypotheses, for the quantitative phase it was hypothesized that the AR intervention would significantly modify the targeted attributional dimensions (e.g. decrease stability, increase personal control). It was also hypothesized that the AR intervention would significantly increase pre-service teachers' self-efficacy in comparison to control groups, given previous research on the relationship between attributions and self-efficacy, and the demonstrated effectiveness of AR interventions for other populations (e.g. Andreou & Rapti, 2010; Haynes, Perry, Stupnisky, & Daniels, 2009). The qualitative data and mixed methods

analyses were not approached with any preconceived hypotheses in mind, due to the inductive nature of the data analysis procedure that was undertaken with the qualitative data. In the remainder of this document, each phase is presented separately in terms of methodology, results, and a brief discussion. Limitations, implications, and directions for future research are reserved until all three phases of the research have been presented.

Phase One: Quantitative Data Collection and Analysis

Quantitative Methods

Participants and Procedure. Participants for the quantitative phase of this study were 208 undergraduate students enrolled in the Bachelor of Education program (i.e. pre-service teachers) at the University of Alberta. Participants were 27% men and 72% women (1% undisclosed), aged 18 to 54 years old (M = 23.7). Ethnicity data were not collected. The sample was largely composed of pre-service teachers intending to work with older students, as 76% were in secondary education, and the remaining 24% were in elementary education. Overall, participants reported very little practical teaching experience, as only 12% had completed their introductory teaching practicum, and 4% had completed their advanced practicum.

The majority (61%) of participants reported having no previous experience working with individuals with FASD, 38% reported very little or some experience, and only 1% of participants reported that they have been "very much" involved in working with individuals with FASD in the past. Most participants reported at least some expectations of working with students with FASD in their future careers as teachers. The majority (65%) reported that they expected to be "somewhat" involved, while approximately a quarter of participants believed they would have "very little involvement", and only 8% expected to be "very much" involved in working with FASD. A summary of this description of the sample is provided in Table 2.

Table 2. Descriptive Statistics for Demographic Variables

Variables	Items	Anchors	*M*	*SD*
Age	1	n/a	23.65	5.20
Gender	1	1 = male; 2 = female	1.76	.50
Program	1	1 = elementary; 2 = secondary	1.77	.45
Introductory Practicum	1	1 = yes; 2 = no	1.88	.32
Advanced Practicum	1	1 = yes; 2 = no	1.96	.19
FASD Experience	1	1 = very little; 4 = very much	1.51	.72
Future Expectations	1	1 = very little; 4 = very much	2.80	.58

Participants were recruited through the educational psychology participant pool, and two other undergraduate education courses, EDPY 304 and EDPY 442. Participants from the participant pool received course credit for their participation. Pre-service teachers in this study represent a convenience sample of participants (Collins, Onwuegbuzie, & Jiao, 2007), as this population is readily accessible and easily engaged in research opportunities at the University of Alberta. Although it is acknowledged that this convenience sample may not be representative of all pre-service teachers across Canada, this is a feasible method for sampling, and is common in educational research (Creswell, 2009).

The research design was a pre-post quasi-experimental design in which participant assignment was a mixture of self-selection and group assignment. Students from the participant pool selected one of several timeslots without knowing which condition they were signing up for. The remaining participants from the EDPY 304 and 442 classes were assigned by the researcher to one of the three conditions in an attempt to balance group sizes for analysis. This procedure resulted in 71 participants in AR intervention, 57 in the FASD information session, and 80 in the control group. All participants in each of the three conditions reviewed an

information letter about the study and completed a consent form (see Appendix B). Participants began by completing an online survey at Surveymonkey.com, to collect demographic information and pre-measures for self-efficacy and causal attributions, immediately before participating in their condition. Descriptions of the three conditions are presented under *Independent Variables.* Three to four weeks following the session, participants were emailed a link to complete a second online survey to measure self-efficacy and causal attribution beliefs. One week later, a reminder email was sent to all participants to encourage participation.

Quantitative Measures. Pre- and post-intervention surveys measured demographics and target variables (i.e. causal attributions, and teacher self-efficacy). Independent variables were the three treatment conditions (i.e. AR intervention, FASD information session, and control group), and time (i.e. pre- and post-intervention).

Demographics. Participants were asked to indicate their age, gender, and program (i.e. elementary or secondary education), in addition to other variables used for the purpose of describing the sample (see Participants and Procedure, above). These demographic variables were used in descriptive analyses to determine whether it is characteristic of a typical group of pre-service teachers, and some (i.e. age, gender, and program) served as covariates for the main analyses. Student numbers were also collected under demographic information to match pre- and post-surveys, and to award course credit for students from the participant pool. See Appendix C for specific demographic questions posed in the pre-survey.

Target Variables. The target variables in this study were causal attributions and teacher self-efficacy measured both before (pre-test) and after (post-test) the intervention.

Causal Attributions. Two subscales of the Revised Causal Dimension Scale (CDS-II; McAuley, Duncan, & Russell, 1992) were modified to assess pre-service teachers' attributions

for the causes of difficulties experienced by children with FASD along the two causal dimensions of interest: stability and personal control. The original CDS-II is a 12-item questionnaire, with three questions pertaining to each of the four causal dimensions (i.e. stability, locus of causality, personal control, and external control). Items are presented to participants along a 9-point semantic differential scale, with opposite constructs appearing on each end (e.g., 1 = controllable vs. 9 = uncontrollable).

The developers of the CDS-II have tested its factor structure across four studies (McAuley, Duncan, & Russell, 1992). Average internal consistency reliabilities across studies were .79 for Personal Control, and .67 for Stability (McAuley, Duncan, & Russell, 1992). In my previous research (Atkinson, 2012), internal consistency with a sample of pre-service teachers was .82 for Personal Control and .70 for Stability. For the current study, reliability analyses for the Personal Control dimension of the CDS-II revealed strong coefficient alphas ($\alpha = .87$ for both Time 1 and Time 2). However, the 3-item Stability dimension of the CDS-II originally demonstrated a weak coefficient alpha value ($\alpha = .56$ at time 1, and $\alpha = .68$ at time 2). Upon further investigation, the second item from the stability dimension, "The difficulties associated with FASD are stable over time/not stable over time" showed poor reliability with the remaining two items and was removed from the scale, resulting in acceptable alpha coefficients for Time 1 ($\alpha = .79$) and Time 2 ($\alpha = .83$).

The developers of the CDS-II have also found that the dimensions are often inter-correlated. In particular, the personal control and stability dimensions have been found to be negatively correlated. Attributing the cause of an event as being highly under one's own control was associated with considering a cause to be more unstable ($r = -.33$, $p < .05$; McAuley, Duncan, & Russell, 1992).

Modifications were made to the personal control and stability dimensions of the CDS-II, which included changing the wording of each item from a general to specific prompt: "The primary cause *of the difficulties experienced by children with FASD*" in order to remind participants of the outcome for which they were making attributions. The original CDS-II asks respondents to make attributions about their own performance at a specific task, and so items were modified to reflect participants making attributions about someone else, in this case, a student with FASD. A list of modified CDS-II items is provided in Appendix D. The other two dimensions, locus of causality and external control, were not examined in this study, as they have not previously been found to relate to teachers' self-efficacy, and were therefore not attributions that were targeted in the AR intervention.

Teachers' self-efficacy. A modified version of the short form of the Teacher Sense of Efficacy Scale (TSES), developed by Tschannen-Moran and Woolfolk Hoy (2001), was used to measure teacher self-efficacy. The TSES consists of 12 questions that measure teachers' self-efficacy in a variety of teaching situations, with rating scale responses ranging from 1 (nothing) to 9 (a great deal). All TSES items were modified to focus specifically on pre-service teachers' sense of efficacy in working with children with FASDs in their classrooms, by adding the words "these students" or "students with FASD" into the question. For example, item 1, which originally read "How much can you do to control disruptive behaviour in the classroom?" was changed to "How much can you do to control the disruptive behaviour of students with FASD in the classroom?" For a detailed list of modified TSES items, see Appendix E. A total sense of efficacy score, computed as the mean of all 12 items, was used to measure pre-service teachers' self-efficacy in this sample of pre-service teachers, as previous research has suggested that the TSES subscales (i.e. self-efficacy for classroom management, student engagement, and

instructional strategies) are not distinct in pre-service teachers (Atkinson, 2012; Duffin, French, & Patrick, 2012; Tschannen-Moran and Woolfolk Hoy, 2001). The developers therefore recommend that only the total score be used with this population.

In terms of reliability, the developers found that the internal consistency for the full 12-item scale was .90 (Tschannen-Moran & Woolfolk Hoy, 2001). My previous research supported these findings in that the reliability for the 12-item scale was .97 (Atkinson, 2012), suggesting that the total TSES score is a reliable way to assess self-efficacy for pre-service teachers. In terms of validity, moderate evidence of construct validity for the TSES has been demonstrated by its correlation with items on a scale developed by the Rand Corporation that measure teacher efficacy ($r = .52$, $p < .001$; Armor et al., 1976), as well as both the Personal Teacher Efficacy (PTE) factor and the General Teacher Efficacy (GTE) factor from Hoy and Woolfolk's (1993) adaptation of the Gibson and Dembo Teacher Efficacy Scale ($r = .61$ and .16, $p < .001$). The weaker correlation ($r = .16$) with the GTE provides evidence of discriminant validity for the TSES, by demonstrating that it more closely aligns with measures of teacher self-efficacy as opposed to the more general teacher efficacy described by Gibson and Dembo (1984). Alpha coefficients calculated for the current study were .89 for Time 1 and .90 for Time 2, indicating strong internal consistency.

Independent Variables. Independent variables for this study are time (2 levels) and treatment condition (3 levels). Treatment conditions were Attributional Retraining, FASD Information Session, and Control.

Attributional Retraining Condition. The AR treatment was developed using a framework proposed by Haynes, Perry, Stupnisky, and Daniels (2009) and consisted of three main components administered in person with a group facilitator during a 45-minute session: Causal

Search Activation, AR Induction, and AR Consolidation. Considerations for the development and implementation of this FASD-specific AR intervention are provided in Appendix F. The causal search activation was included within the pre-survey, as participants were asked to think about the difficulties that students with FASD may experience in the classroom, with the help of a vignette (see CDS-II in Appendix D), and to identify a primary cause of these difficulties. This search for a cause was a critical first component of the intervention, as it primed participants to receive the attributional information that was presented to them (Bargh, 2006; Bargh et al., 2001). A PowerPoint presentation was used to guide the AR session (See Appendix G for an outline of content). After briefly introducing the topic of FASD, the next component, the AR Induction, involved teaching participants about attribution theory and reinforcing how changes in the way they attribute situations can result in changes to their thoughts, feelings, and behaviours. At this point, participants were provided with a handout (see Appendix G) that presented examples of both adaptive and maladaptive attributions that could be made about the difficulties experienced by children with FASD in the classroom. The facilitator reviewed the examples and encouraged participants to discuss their own attributions and ask questions about the content (Hall et al., 2006, 2007; Haynes et al., 2009).

Finally, an AR Consolidation activity was completed at the end of the session, where participants were divided into groups of 4-6 individuals and asked to complete a group activity (see Appendix G) that involved identifying potential attributions that could be made about vignette situations. The attributions were then reviewed with the whole group, and the facilitator guided participants in determining whether these attributions were adaptive (i.e. unstable and personally controllable) or maladaptive, and how maladaptive attributions could be shifted to more adaptive ones. The goal of the consolidation phase was to provide participants with the

opportunity to review and apply what they had learned (Haynes et al., 2009). At the end of the session, participants were provided with a handout containing suggestions for further FASD resources and information (See Appendix G), as one of the induction items targeting stability referred to research on FASD interventions and supports.

A critical consideration in examining the effectiveness of this newly-developed AR intervention was to ensure fidelity in its delivery. Implementation fidelity refers to the extent to which an intervention's core components are implemented as designed (O'Donnell, 2008), and when assessed, can allow researchers to have greater confidence in their findings. In discussing considerations for implementation fidelity, Dumas and colleagues (2001) discuss the importance of both content fidelity (i.e. the extent to which each intervention component was delivered to the participant) and process fidelity (i.e. how the intervention was delivered). To ensure content fidelity, I used scripted PowerPoint slides and distributed handouts to all participants covering the core components of the intervention. Process fidelity was enhanced by having all intervention sessions delivered by the same interventionist, (i.e. the researcher), for the same amount of time, in similar classroom settings, and with similar-sized groups of participants. All sessions were audio-recorded and reviewed to further ensure that all core components (i.e. causal search activation, AR induction, AR consolidation) were delivered across sessions.

FASD Information Condition. The FASD Information session consisted of a 45-minute lecture format presentation on FASD. Topics included diagnostic information, a review of primary disabilities (e.g. cognitive delays, executive functioning deficits, memory and attention concerns) and secondary disabilities (e.g. social difficulties, risk of victimization, disrupted school experiences), and how they may lead to difficulties in the classroom. The purpose of the presentation was to provide pre-service teachers with factual information about FASD, without

targeting underlying attributions and attempting to modify their thinking about these children in any way.

Control Condition. Participants in the control group attended the session in person, and completed unrelated surveys for approximately 30 minutes following their completion of the Time 1 survey. They were then dismissed, and were emailed a post-survey at the same time as the other two groups.

Quantitative Analysis. Following the online collection of quantitative survey data, these data were imported to SPSS (IBM Corp., 2015), organized, cleaned, and missing data and attrition rates were addressed.

Data Cleaning. Participants completed a total of 234 pre-surveys and 174 post-surveys on SurveyMonkey.com. Data cleaning resulted in the removal of a number of cases from the data set before analyses were completed. I removed twelve participants who completed only a post survey, as their attendance at the intervention could not be verified, and demographic information was not collected from them. An additional two surveys were removed because they appeared to be duplicates (i.e., same student number and demographic information). In addition, 5 participants completed the study twice, as it was presented in multiple classes in the Faculty of Education. In this case, I kept their original survey responses, and deleted the second survey they completed. I then removed 17 of the remaining participants from the dataset because they did not meet the pre-requisite of being a pre-service teacher (i.e., registered in the Bachelor of Education program). Finally, I tested for outliers and removed two individuals from the data set, both of whom were extreme outliers (i.e. more than 5 standard deviations from the mean) on teacher self-efficacy; they reported unusually low self-efficacy at both time points. There were no significant outliers on the causal dimension scales. The final working data set included 208

cases, of which 139 were matching pairs of pre- and post-survey data that were included in the main analyses. Of the participants with both pre- and post-survey data, 36 were in the AR intervention group, 47 were in the FASD information group, and 56 were in the control group.

Attrition Rate. There was a 28% attrition rate for this study, as 65 participants who completed a pre-survey failed to participate in the post-survey. Independent samples t-tests comparing these 65 individuals to the remaining dataset did not reveal any statistically significant differences between groups on the causal dimensions of stability ($t(206) = -1.09$, $p = .28$), personal control ($t(206) = -.55$, $p = .58$) or on teacher self-efficacy ($t(206) = 1.06$, $p = .29$), the variables of interest in this study. There did not appear to be any systematic differences that may explain why these individuals chose not to complete the post-survey. Therefore, pre-survey data from these participants remained in the dataset and were included in descriptive, correlational, and reliability analyses for Time 1 variables.

Missing Data. Where individual data points required for scale calculations were missing, missing items were replaced with the mean value of that item across the entire data set, through a process known as item mean imputation, or item mean substitution (Bono, Ried, Kimberlin, & Vogel, 2007; Downey & King, 1998). In total, only seven individual items on the TSES and CDS-II, from seven different participants were missing from the entire data set, and were believed to be missing completely at random (MCAR; Rubin, 1976) as the absence of the data points did not appear to be systematically related to other values or conditions in the data set. The amount of missing data is therefore well below 20% of the data set, where researchers have reported that item mean imputation is an effective method for dealing with small amounts of missing data (Downey & King, 1998).

Preliminary Analyses. First, I performed psychometric (e.g. reliability) analyses on the target variables: attributions of stability and personal control, and teacher self-efficacy. Second, I ran correlational analyses between all variables of interest in this study, to provide an overview of relationships between constructs.

Main Analyses. For the main analyses, to answer the research questions, "Does participation in the AR intervention modify pre-service teachers' attributions about the challenges experienced by children with FASD?" and "Does participation in the AR intervention increase pre-service teachers' self-efficacy in working with children with FASD?" data were analysed using three Two-Way Mixed Repeated Measures Analyses of Covariance (ANCOVA) with stability, personal control, and teacher self-efficacy as the dependant variables. Time (pre- and post-intervention) was the within-subject factor, and group membership (AR Intervention, FASD Information Session, and control) was the between-subjects factor. All ANCOVAs included age, gender, and program level of the participants as covariates.

Quantitative Results

Descriptive statistics were calculated for outcome variables, and are presented in Table 3.

Table 3. Descriptive Statistics for Self-Efficacy and Causal Dimensions

	Variables	No. Items	Anchors	*M*	*SD*	Skew[a]	Kurt[b]
Time 1	Causal Dimensions						
	Stability	2	1 = stable; 9 = unstable	5.23	2.01	-.05	-.46
	Personal Control	3	1 = controllable; 9 = uncontrollable	4.69	1.91	-.13	-.63
	Teacher Self-Efficacy	12	1 = nothing; 5 = a great deal	3.85	.50	-.28	.34
Time 2	Causal Dimensions						
	Stability	2	1 = stable; 9 = unstable	5.33	2.35	-.18	-.84
	Personal Control	3	1 = controllable; 9 = uncontrollable	5.09	1.96	-.24	-.46
	Teacher Self-Efficacy	12	1 = nothing; 5 = a great deal	3.91	.48	-.21	.96

[a]Skew = Skewness, [b]Kurt = Kurtosis

Correlational Analyses. Bivariate correlations were calculated between all study variables, and are presented below in Table 4. Pre-intervention ratings of self-efficacy were positively correlated with age, meaning that older participants reported feeling more efficacious than younger participants. As expected given previous research (see McAuley & Duncan, 1992), there were strong negative correlations between the stability and personal control dimensions at both Time 1 and Time 2. As participants' attributions of stability increased, they reported lower personal control beliefs.

Table 4. Correlation Matrix for all Study Variables

	Variables	1	2	3	4	5	6	7	8	9
Demographics	1. Age	1								
	2. Gender	-.205*	1							
	3. Program	.114	-.177*	1						
Pre-Measures (Time 1)	4. Stability	.024	.101	.034	1					
	5. Personal Control	.082	-.135	.095	-.530*	1				
	6. Self-Efficacy	.166*	-.013	-.050	-.153*	.205*	1			
Post-Measures (Time 2)	7. Stability	.080	-.017	-.004	.527*	-.390*	.046	1		
	8. Personal Control	-.026	-.066	-.008	-.437*	.415*	.123	-.568*	1	
	9. Self-Efficacy	.034	.130	.024	-.069	.116	.518*	-.077	.145	1

*$p < .05$

Main Analyses. A total of three two-way mixed repeated measures ANCOVAs were completed to examine the AR intervention's impact on attributions of personal control and stability, and teacher self-efficacy. Age, gender, and program (i.e. elementary or secondary education) were included as covariates in each analysis.

ANCOVA Assumptions. For each ANCOVA, I tested assumptions of normality and homogeneity of variance. Outliers were addressed and removed previously. In the analysis of homogeneity of variance (i.e. Levene's test), significant differences were noted for the stability dimension, indicating that equal variances between groups could not be assumed for this variable. Acceptable homogeneity of variance was found for personal control and teacher self-efficacy. I proceeded with all three ANCOVAs, given that they are relatively robust to violations of assumptions (Tabachnick & Fidell, 2007).

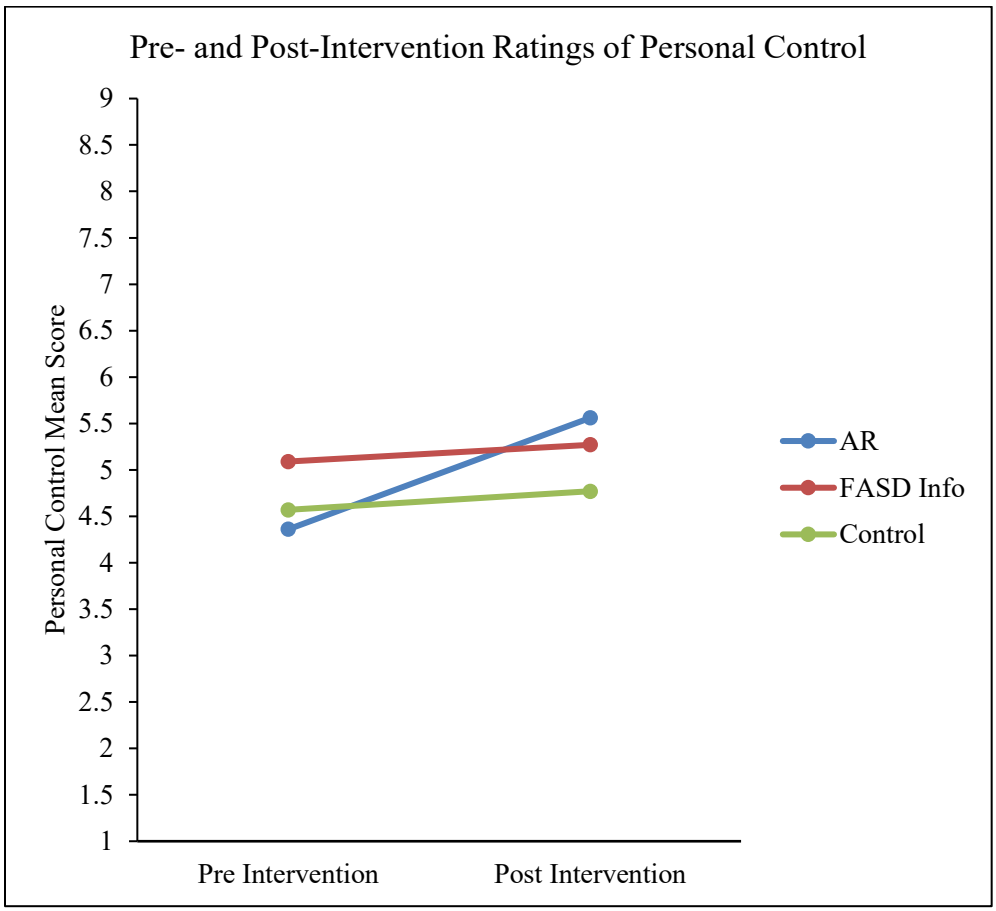
Attributions of Personal Control. There was a significant interaction between intervention group and time on ratings of Personal Control, $F(2,133) = 3.030$, $p = .052$, partial $\eta^2 = .044$. Details for ANCOVA presented in Table 5.

Table 5. Two Way Mixed ANCOVA Main and Interaction Effects for Personal Control

Effects	*df*	*M*s	*F*	*p*	Partial η^2
Between Subject					
Treatment	2	6.59	1.25	.291	.018
Error	133	5.29	-	-	-
Within Subject					
Time	1	3.12	1.50	.223	.011
Time*Treatment	2	1.49	3.03	.052	.044
Error	133	2.12	-	-	-

A simple main effects analysis revealed no significant differences between groups at pre-assessment or post-assessment, however there was a significant effect of time on ratings of personal control for the AR group, $F(1, 37) = 7.603$, $p = .009$, partial $\eta^2 = .170$, in that participants reported higher personal control post-intervention ($M = 5.44$) than pre-intervention ($M = 4.50$; see Figure 2, below). No significant differences between pre-intervention and post-intervention were noted for the FASD information group and the control group.

Figure 2. Pre- and Post-Intervention Ratings of Personal Control.



Attributions of Stability. The ANCOVA revealed no significant changes in attributions of stability between time points for any of the three groups. There were no significant interaction effects between intervention group and time for stability, nor were there any significant main effects for either time or group.

Teacher Self-Efficacy. The ANCOVA revealed no significant changes in self-efficacy over time for each of the three groups. There was no statistically significant interaction between intervention groups and time on reported self-efficacy. There was however a main effect for group, which showed a statistically significant difference in mean teacher self-efficacy scores between the groups, $F(2, 133) = 6.533$, $p = .002$, partial $\eta 2 = .089$. Post-hoc analyses revealed that mean self-efficacy scores were significantly higher in both the AR group ($M = 4.03$) and the

Information Group (M = 3.98) when compared to the control group (M = 3.75), collapsed across pre- and post-time points.

Quantitative Brief Discussion

Data collected and analyzed during the quantitative phase of this study were intended to answer two key research questions: *(1) Does participation in the AR intervention modify pre-service teachers' attributions about the challenges experienced by children with FASD?* and *(2) Does participation in the AR intervention increase pre-service teachers' self-efficacy in working with children with FASD?* Findings related to these two research questions are briefly discussed here, and are then further considered in the integrated mixed-methods analysis.

Results suggest that the AR intervention was successful at modifying one of the two targeted attributional dimensions: personal control. Participants who received the AR intervention reported greater increases in personal control following the intervention than did those who received the FASD information lecture, and those in the control group. This means that pre-service teachers perceive that they personally have more control over the difficulties experienced by students with FASD at school following their participation in AR. That the intervention was successful in modifying attributions of personal control suggests it was successfully developed following the guidelines of Haynes and colleagues (2009), who have had similar outcomes in modifying personal control attributions for academic performance in college students. In contrast, the intervention did not demonstrate intended impacts on the stability dimension; participants did not report significant shifts in attributions of stability following the AR intervention. Given this finding, future research may consider the possibility of adapting Mindset interventions for use with this topic. Mindset interventions are commonly used in

educational settings, and may more directly target attributions of stability, by shifting thinking from a fixed mindset to a growth mindset (Dweck, 2006).

Contrary to the hypotheses, the AR intervention was not successful at increasing pre-service teachers' self-efficacy in working with students with FASD. However, a significant main effect of group was found, indicating that pre-service teachers in the AR intervention and FASD information session reported overall higher levels of self-efficacy than did those in the control group. Since participants came from a variety of points in their training (i.e. second year, third year, and fourth year courses), and were not randomly assigned, this finding suggests that inherent differences between groups may have been present before the beginning of the intervention.

Further considerations for the development of interventions for pre-service teachers are discussed in the integrated analysis section, drawing from mixed inferences informed by both the quantitative and qualitative phases of this study. Next, participants' experience of the intervention and their perceptions of FASD were further investigated in the following qualitative phase, to further explore potential impacts of the intervention and with the goal of explaining why the intervention may have failed to produce increases in self-efficacy.

Phase Two: Qualitative Data Collection and Analysis

The qualitative phase of this study involved the collection of interview and focus group data from select AR intervention participants to answer two key research questions: *(3) What are pre-service teachers' experiences of participating in the AR intervention?* And *(4) What perceptions do pre-service teachers hold about working with students with FASD?*

Qualitative Methods

Participant Selection. Following a preliminary quantitative data analysis, participants were identified for the qualitative phase of this study through purposeful sampling, and specifically maximum variation sampling, with the intention to collect data from a wide range of cases, to capture any variation on the topics of interest (Patton, 2005). Three groups of participants were identified: those whose self-efficacy increased following the intervention (SE Increased), those whose self-efficacy decreased following the intervention (SE Decreased), and those who started the intervention with a high level of self-efficacy which was maintained following the intervention (SE Unchanged). Membership in the SE Increased and SE decreased groups was determined by a difference score (e.g. post self-efficacy – pre self-efficacy) of at least .48 on a 5-point scale, equal to a change of 1 standard deviation. Membership in the SE Unchanged group was determined by both pre- and post- self-efficacy scores being above 4.35, or one standard deviation above the mean. Using these criteria, 23 participants were identified for invitation to participate in focus groups (8 SE Increased, 8 SE Decreased, 7 SE Unchanged). Of these, 18 had consented to being contacted for follow-up (6, 7, and 5 respectively). In total 8 participants responded to email invitations and completed the focus group/interview process (5 from the SE Increased group, and 3 from the SE Decreased group). None of the participants from the SE Unchanged group responded to the invitation to participate.

These eight participants had a mean age of 27 (ranging from 22-34 years), and all but one were female. Two were from elementary education, five were from secondary education, and one did not disclose her program of study. Only one participant had completed the introductory teaching practicum, and none had completed the advanced teaching practicum, indicating that this group had very little practical teaching experience, similar to the overall quantitative sample.

The majority (6 participants) reported little to no previous experience with individuals with FASD, while two indicated "some" experience. Finally, all participants indicated "very little" to "some" expectations of working with students with FASD in their future classrooms prior to the AR intervention, with little change following the intervention. None expected to be greatly involved in supporting students with FASD.

Qualitative Measures. A semi-structured focus group protocol was developed with input from an expert in the area of FASD, and was reviewed by colleagues in a lab group. Observations and information collected during the AR intervention sessions were also taken into consideration as questions were developed. Although the original purpose of the qualitative component of this study was to collect feedback regarding experiences of the intervention, the importance of further examining participants' beliefs and attitudes about FASD was identified based on the emerging data and observations made by the researcher during the AR intervention sessions. For example, participants struggled to answer basic questions about FASD, reported not learning about FASD in their coursework, and had low expectations for working with children with FASD in the future. Therefore, several questions relating to their perceptions of working with students with FASD in their future classrooms were included in the interview protocol to collect richer data, with the goal of understanding the ongoing training needs of pre-service teachers. A complete interview/focus group protocol including key questions and prompts for elaboration is provided in Appendix H.

Qualitative Procedure. All participants in the quantitative phase indicated their interest in being invited to participate in further focus groups, and provided their email if they consented to follow-up. Participants identified for the qualitative phase and who gave their consent to be contacted were emailed to gauge their interest and to schedule focus groups. Due to limited

availability of participants at the end of the semester, only one focus group with three participants could be scheduled. The remaining five participants completed individual interviews at a time that was convenient for them, using the same focus group protocol to guide the discussion. Participants' group membership was not recorded on their interview protocol, but rather linked to their student number in the original data set, with the intention of minimizing interviewer bias due to any possible expectations for how those whose self-efficacy increased or decreased could have experienced the AR intervention differently.

All interviews and focus groups were held in a conference room at the university, and refreshments were served to create a relaxed and inviting atmosphere. The focus group was completed by one facilitator and one note-taker, while subsequent individual interviews were completed by a lone facilitator to avoid overwhelming or intimidating the participant. In that case, the facilitator also took on the role of the note taker, keeping notes on key words and themes to summarize for the participant at the end of the process. Participants read a letter of information detailing this phase of the study, were given the opportunity to ask questions, and signed consent forms (see Appendix I). The facilitator began the interview by reviewing the details of the intervention with participants, to ensure they had an adequate recollection of the session to engage in conversation about it. When necessary, the facilitator reviewed the presentation slides with participants to refresh their memory. The facilitator then led the group or individual through six key questions, utilizing prompts and asking for elaboration as necessary to ensure richness and depth of the qualitative data.

At the end of the discussions, the note-taker (or facilitator during individual interviews) summarized key points and the participants were invited to clarify, correct, or provide additional details. Further member-checking was conducted by providing a summary email to each

participant, in which they were thanked for their participation and invited to contact the researcher should they have anything more to add to their data. Member checking is an important component in the collection of qualitative data to ensure that interpretations of the data collected are reflective of participants' experiences (Yin, 2011), and is an important component in establishing the trustworthiness and credibility of qualitative data. The researcher did not receive responses to the summary emails from any of the participants.

Participants received a $20 gift card from an establishment of their choice for participating in the interview. A value of $20 was considered appropriate compensation for approximately hour of their time, and deemed not to be too high a value as to be considered coercive (i.e. participants feeling they must participate because the cost of not participating is too great). The gift card was presented to them at the beginning of the session, and was not conditional on them completing the entire interview. Finally, the focus group and each interview were audio-recorded with the permission of the participant, and later transcribed for analysis. Participants were assigned a pseudonym during transcription, and once again their group membership (i.e. SE Increased vs. SE Decreased) was not apparent during the data analysis to limit the potential for biased interpretations.

Researcher Disclosure. As researchers, we all hold our own values, beliefs, cultural background, and previous experiences that can play a role in our collection and interpretation of the data, and provide a lens through which we view the research process. Although our research lens is relevant and influences decision-making across methodologies (Johnson & Onwuegbuzie, 2004), it is particularly important to consider when conducting qualitative research, given that the researcher is the main "instrument" through which data is collected (Morrow, 2005). In fact, a researcher's personal characteristics may have an impact not only on the lens through which

they collect and interpret data, but also on the way in which participants interact with the researcher, including their choice of responses and topics of conversation during interviews (Yin, 2011). While no lens can be free of bias, by providing information about ourselves and our backgrounds to our audience, we allow them to make their own assessment of the potential impacts of our research lens on the study at hand. Yin (2011) recommends that characteristics such as cultural orientation, age, gender, motivation, prior interests, and experiences with the topic be communicated in a transparent and reflexive manner to the audience. Morrow (2005) further recommends that reflexivity (i.e. researchers' understanding of how their own experiences of the world affect the research process) in qualitative research be sought through identifying and making explicit the assumptions and biases that we bring to the research on this topic, including our attempts to manage these throughout the research process. Therefore, I present some information about my own background, approach, and assumptions as a researcher below.

I am a 28-year-old Caucasian female, currently completing my doctoral degree in school and clinical child psychology. I have been interested in the field of FASD and have been conducting quantitative, qualitative, and mixed methods research and program evaluation in the area of FASD, and FASD prevention for over five years. I believe that my varied research experiences, in combination with my extensive literature review on the topic has provided me with a well-rounded perspective on the topic of FASD, and specifically the preparation of teachers to work with students with FASD.

In addition to being the primary researcher, interventionist, and interview facilitator in this study, I am a practitioner in the area of psychology, and I am in the process of becoming a licensed psychologist. I have worked in both clinical and educational settings with children with

FASD, their teachers, and their families, and I consider myself an advocate for individuals with FASD and their needs in the school system and beyond. In my practice as a resident in psychology, I also work closely with teachers to provide professional development and support surrounding children with social-emotional and behavioural difficulties, including FASD.

I bring with me to this research a basic assumption that teachers want what is best for their students, that they are interested and willing to work hard to support their students, and that when given the proper training and opportunities, they can succeed in supporting and improving the lives of their students with FASD. I also hold an assumption that pre-service teachers are not being adequately prepared to work with students with specific needs, and in particular those with FASD, based on my review of the literature and my own interactions with practicing teachers. Finally, I believe I hold a bias toward being sympathetic to the realities faced by women who drink alcohol during pregnancy, given my previous work in FASD prevention, and I believe that others in the general population are not always appreciative of the complexity that surrounds this topic. Therefore, I come from a place of wanting to increase awareness, educate others, and advocate for persons with FASD and their families. To manage the impacts of these assumptions and potential biases on the research process, I kept a journal with research notes during the process of data collection and analysis to track reactions to participant interviews, feelings of disagreement with some interview statements, and drawing connections between content and my own experiences. Colleagues and members of a research team were also consulted throughout the process to create meaningful questions, debrief interviews, discuss assumptions and expectations, and challenge my interpretations of the data, as recommended by Morrow, 2005.

Qualitative Analysis. A content analysis (Creswell, 2013), using a largely inductive approach, was undertaken to derive themes from the focus group and interview data. The

framework for the textual analysis was general, but most closely aligns with an Interpretive Phenomenological Analysis (IPA) approach, as the goal was to understand how participants are experiencing a particular phenomenon (Yin, 2011). In this case, the analysis endeavoured to understand participants' experiences of the AR intervention, and their perceptions, experiences, and future expectations for working with students with FASD. The analysis was undertaken inductively, as the data were not approached with any pre-conceived assumptions, theories, or hypotheses about what would be found. Following this initial inductive analysis, one theme was further investigated and organized deductively, as it related to specific intervention feedback, which was an area in which I was seeking specific information to further improve the intervention.

A constant comparison method was employed to code transcripts, as it is a useful approach for comparing emerging themes between multiple data sources (Onwuegbuzie, Dickinson, Leech, & Zoran, 2009). To begin this multi-step process, I open-coded all six transcripts. Open coding involves paraphrasing and summarizing participant statements, making notes, and suggesting early interpretations of the data. Codes were compared across transcripts, in keeping with the constant comparison approach. This was an iterative process, and involved reviewing transcripts multiple times and becoming intimately familiar with participants' account of their experiences. Once open-coding was completed for all transcripts, I compared, merged, and organized the codes into groups, as higher-level themes emerged. During this time, some codes were dropped because they did not fit well within the emerging structure and/or were not very prevalent within the transcripts (Smith & Osborne, 2003).

A code chart was created including themes, codes, definitions, and examples of supporting participant quotes. I then reviewed this code chart with a colleague with experience in

FASD research. As part of this process, themes were further refined, collapsed, and re-organized. This resulted in the creation of a finalized code chart to be used in the next stage of the analysis. In the final stage of data analysis, the code chart was used to formally code all transcripts using the data analysis software NVivo (QSR International, 2015). During the coding process, the titles of a number of codes and themes were once again refined, and some codes were removed or merged with others depending on their representation in the data.

Qualitative Findings

Three key themes related to participants' experiences of the intervention and their views about working with children with FASD in the future emerged from the inductive analysis of interview and focus group data. These themes were *Shifting Thinking, Preparing for Practice,* and *Supporting Students*. Participants also provided *Intervention Feedback*, a more deductively-coded theme which included intervention components that were well-received, as well as recommendations for future improvements. These four themes are explored in more detail, below.

Shifting Thinking. Participants spoke directly about how their perceptions of students with FASD had changed or evolved following the intervention, and more indirectly about an understanding of the role their own thoughts and attributional beliefs play in their work with students.

Awareness of FASD. Although some reported feeling that the AR intervention increased their knowledge about FASD, for many participants, the intervention brought this topic into their awareness for the first time, as it was not something they had previously been exposed to or considered relevant to their future careers. As one participant reported, *"I didn't really think about it. I knew that there would be difficult students in classrooms and that was always a*

concern for me, but I never thought of specifics about FASD or anything like that." Before this point, participants had not learned about FASD in any detail in their coursework. One participant, discussing the content of her classes on inclusion, explained: *"It was a lot of emphasis on special needs and autism, and that… but they don't really talk that much about [FASD]."* Another participant described her realization that FASD was an important topic that is not being taught:

> *It was kind of something that just like, poked me like 'you need to learn about this!' This is important! And then after I left I was thinking about it some more and was like this is really important. They have this whole entire class on aboriginal studies, is there a class that undergrads have to take on FASD? There should be.*

For many, the AR intervention was their first exposure to the topic of FASD as something relevant to their future teaching careers. For some, increased awareness of the potential difficulties faced by students with FASD in the classroom was troubling, *"It's concerning a little bit. The session opened my eyes up to what a variety… and how different days can be completely different. One thing that […] scares me a lot is that I won't be able to reach the students the way I want to."* Regardless of the surprise that participants reported feeling surrounding FASD as relevant to their future work, a number of participants spoke about the prospect of working with students with FASD as a welcome challenge, and one they looked forward to with a positive outlook. As one participant summarized:

> *So my view has changed that yeah there is probably a lot I could do to actually help these students, it's up to me and it's up to my attitude. What I want to put in is probably what these students are going to get out, so I do think about them differently as not just a student with FASD in my class I have to deal with, but as a student with FASD in my classroom that I can help and together we can improve their life in the classroom. That's how I think about them differently now. They are not just an obstacle to overcome you know.*

Another participant acknowledged the role that adaptive (i.e. unstable and personally controllable) attributions will play in his ability to maintain a positive outlook in working with students with FASD, saying *"I am looking forward to having a positive influence on a child and trying to work with some of these controllable, unstable aspects of the disorder. Trying to make a difference is something I look forward to."*

Attributional Thinking. Throughout the interviews, participants spoke in ways that suggested they had incorporated aspects of the AR intervention into their understanding of their role as a teacher, and even more generally in their interactions with others beyond the topic of FASD. Participants reported being more aware of how their thinking impacts their actions in the classroom, and spoke about the potential difficulties experienced by children with FASD using less stable and more personally controllable language. For instance, one participant spoke about stability, *"I'm thinking like hey […] there's some change, there's some development, there's ways to approach these children and their needs that's going to allow them to move more to the other side [of the scale]."*

Another participant spoke about both causal dimensions, and how holding more adaptive attributions may allow her to feel less frustrated when working with challenging students. She explained that, *"it was good to recognize the control and stability [dimensions]. And so thinking about how I'm framing my approach, how I'm thinking about students with FASD, was helpful. And it's very likely that I would get frustrated [with these children]. If so, how can I control things, and not get frustrated?"* One participant explained how making more unstable attributions about a child with FASD could help teachers to see the child through the diagnosis, and improve their ability to work with them effectively:

> *You want to make sure that you're not thinking of FASD as like "oh, that student has FASD", but rather if you consider that as something that can be*

> *changed or something that can be helped or improved you're always going to be working as a teacher towards the success of your student and if your student understands that you can believe [in them], then they will be more effective in the classroom.*

Others spoke more generally about an overall change in their attitudes following the intervention. As one participant explained, *"I just feel prepared with my attitude and that's probably a huge thing, attitude I think is a huge component when feeling prepared."* Still others explained how being aware of their attitudes allows for self-reflection and growth as a teacher. As one participant said, *"just being aware of my attitudes and having that reminder that as teachers we bring our own assumptions into the classroom, [it] kind of makes you look at yourself a little bit more and a little deeper."*

Finally, a number of participants noted that their learnings about causal attributions from the AR intervention were more broadly applicable beyond the topic of FASD. As one participant explained, *"I kind of thought [the intervention] applied to a whole bunch of situations, not just kids with FASD. Like you could use that chart thing for a whole bunch of different issues".* One participant also reported that thinking about our attributions may help us to understand why others may respond differently in a variety situations. She explained that *"just understanding that different people have different perspectives […] and knowing that everyone will see that same situation slightly differently".*

Preparing for Practice. A second theme emerged relating to pre-service teachers' perceptions of what more they would require to feel prepared to work with students with FASD in their future classrooms. Participants reported a number of ongoing training needs, including a need for more basic information about FASD, hands-on practical learning opportunities, and a desire to learn from those with personal experience and connection to the topic of FASD.

Need for Information. The importance of having a basic understanding of FASD to provide a solid foundation on which to build skills was highlighted by participants, who felt that they had not previously been provided with the information they needed to successfully work with affected children. As one participant explained, *"Basically, your presentation is the most information I've ever had about students with FASD. So I need to know the student, […] but that's another concern, just knowing what FASD is."* Overall, participants demonstrated an openness to receiving more information about FASD, *"I wouldn't have any problem with reading up on the issue, […] I would be more than happy to get all of that background information",* but they seemed to differ in their desire or motivation to actively expand their knowledge base.

For some, the intervention and associated materials (e.g. list of additional resources) encouraged some degree of self-directed learning, as they sought out more information about FASD on their own. One participant reported, *"I did go online to resources available for working with children with FASD and I did some internet searches just because I felt I still knew not enough."* Others reported understanding that gaining more knowledge about FASD would be beneficial, but were unsure how to access that information. One participant explained:

> *I need background knowledge […] I mean everything from the internet, I don't know how qualified that would be, but definitely something because you need background knowledge before you can do anything. I don't know what kind of information that would be or where I would find it though.*

One participant was able to provide suggestions for potential sources of information about FASD, *"I guess like talking to profs, talking to any instructor, talking to anyone who has that experience I suppose. Internet, books, textbooks, my textbook might have something. I don't know. I don't know where I'd find that information actually."* However, an uncertainty of where to begin was evident in her report, and was similarly echoed by other pre-service teachers.

Overall, a theme of not knowing enough about FASD to even recognise what information would be important to know was expressed by a number of participants.

Need for Practical Opportunities. For many participants, learning by doing was expressed as playing a larger role in preparing them for the future than reading textbooks and being lectured on the topic of FASD. It was acknowledged that learning theoretical information is important, but sometimes disconnected from the realities of real-life practice. One participant described not being able to feel confident in her skills until she has the opportunity to apply them, *"[There is] a disconnect from theoretical to real world and because school is very much about the theoretical and not so much about the real world, its hard to feel confident until you actually do it. I don't know how I actually would do it until I actually do it, and then I'll know."* Another participant echoed this sentiment, saying *"I think until you've really been in the situation it's hard to know how you're going to deal with that, and how well all these theories are actually working in practice."*

This group of pre-service teachers had limited hands-on experience, as many had not yet completed either of their teaching practicum placements. One participant described her feelings using a metaphor that captured the complexity of attempting to build confidence and feel prepared without that practical experience:

> *I think I'm still swimming in that pool of lack of confidence as someone who has not had real world experience. I think I was able to move one step closer to the deep end of the pool, which is the scarier part, because I know a little bit more and have a few more skills. I'm going to stick with this pool metaphor. Because I feel I still don't have enough skills to swim all the way to the deep end, I'm still uneasy to say. I don't think [the AR intervention] changed me a lot but I think every new piece of knowledge is always beneficial.*

In this example, she acknowledges the AR intervention as one piece of a much larger picture involving both information and practical experiences to prepare her for her role as a teacher.

Although participants emphasized the importance of attaining hands-on learning opportunities, few were able to suggest ways in which they could gain the necessary experience to feel confident in working with children with FASD. As one participant explained, even during a practicum placement, there is no guarantee that pre-service teachers will have the opportunity to work with an affected child while under the supervision of an experienced teacher, "*I think I need actual practical experience. I guess the function of the field experience course, and in that scenario […] you may or may not encounter a student with FASD [in that setting]".* The possibility of seeking out volunteer opportunities to gain exposure and build skills for working with children with FASD was raised, however, some participants expressed potential ethical concerns as a barrier to seeking out experiences specifically with children with FASD. As one participant articulated, *"there's nothing like actually putting that into practice, but then I have absolutely no idea how you would just find FASD kids to work with. I mean that can't even really be ethical to just practice your skills with [them]. I mean, that would be awful.* Similarly, another participant did not believe it would be possible to find FASD-specific experiences,

> *[I could] find ways to get experience in a classroom. So whether that's volunteering or tutoring or maybe not even in a formal classroom setting but just working with young people, […] Although once again you never can be like "I'd specifically like to work with this student" that's not going to happen.*

Overall, participants reported that having access to hands-on practical learning opportunities would be critical for preparing them to work successfully with children with FASD. However, similarly to the need for more information about FASD, they were unsure about how to access

these opportunities, and lacked confidence that the experiences provided to them during their practicum placements would be sufficient.

Desire to Learn from Experienced Others. In addition to reporting a need for more basic information and hands-on learning experiences, pre-service teachers expressed a desire to learn about important topics like FASD from those who have experience and a personal connection to the topic. This could include experienced teachers who have taught students with FASD, and even children with FASD themselves, to ensure their perspective is present in the information and skills being learned.

Participants had a number of suggestions for how this perspective could be incorporated into their learning, including bringing practicing teachers into their classes to present their approaches for working with specific children, and watching videos or observing real-life interactions between experienced teachers and students with FASD. For example,

> *You could show videos of how a teacher works with [students with] FASD, or kind of show how the child interacts with other children, and you know what kind of interventions they do in that class, and you know maybe even get, have interviews with the [other] students about how they think of that student with FASD. You know, get their perspective on that. And the teacher's perspective.*

Another participant echoed, *"observing other teachers or aids who may work with students with FASD to see their pedagogies on how they handle students like that might be beneficial for me."* Throughout the discussions, a desire to learn from model teachers was evident, to have the learning and implementation of skills scaffolded for them, potentially as a bridge between their textbook information and their own experiences of working with students with FASD.

Participants also spoke of a desire to have the voices of students with FASD included in their learning. One participant explained the importance of considering students' perspectives, stating that *"[hearing from] a student who has FASD might be useful. Asking them some of the*

same questions that you asked us, maybe. Just flipped around and where they might get frustrated with teacher ability or lack of ability." Overall, the desire to learn from people, and from the experiences of others, rather than from textbooks and lectures was evident. As one participant summarized, *"personally, I like resources that are more about stories and real life experiences, […] I feel like personal connections or professional connections is something that I would be wanting to get right now".*

Supporting Students. A third theme of wanting to support all students, including those with FASD, emerged from the data. Pre-service teachers reported a number of ideas, considerations, and concerns for supporting the needs of students with FASD in general education classrooms. Subthemes in this area included the importance of building relationships, the availability of supports and resources in schools, advocating for students with FASD, engaging with parents, and creating a positive learning environment for all students.

Building Relationships. Participants reported a desire to connect with all their students, and emphasized the importance of getting to know students with FASD on a personal level, rather than defining them by their diagnosis. In order to know how to best support students, teachers must get to know them and establish trusting relationships with them. One participant explained that she would want to be *"looking at them as an actual person and seeing what qualities help them learn, rather than what their diagnosis has proven to help them learn",* which speaks to a desire to give children a chance to demonstrate their skills rather than making assumptions about them based on their disorder.

One participant recognized the importance of building strong relationships with children with FASD in her classroom, but also expressed fear about what that could mean for her ability to meet the needs of the rest of her students. She explained, *"I am also really scared that my*

relationship with someone with a disability in my class might affect or hinder the learning of other students, which sucks to say but I think it's a huge reality with teaching, you have to be able to juggle both and […] it's a big thing that concerns me about teaching."

Uncertainty about their ability to develop relationships with students was also raised as a concern by participants. One participant explained, *"I worry about not being able to teach them. […] I want to create a positive atmosphere and I want them to learn and I want to be the one to do that but the thing that scares me is not being able to able to relate to the students [with FASD] so that they don't take anything out of my class."* Nonetheless, a note of positivity was evident in many participant responses, who demonstrated a commitment to building those relationships with students, *"right now I'm really eager to find ways to connect with students and build relationships and I think in any interaction relationship is super important."*

Advocating for Students. Participants also felt that a large part of supporting students with FASD is acting as an advocate for their needs. Some saw the AR intervention as helping to prepare them to not only address their own attitudes about FASD, but also those of others. As one participant suggested, *"you can help change the attitudes of the people around you. If I have an attitude that is positive about students with FASD in the school and everyone else has a negative one, [I can] try to change it because students aren't going to succeed if everyone around them has a negative idea about FASD."*

Although many reported that their own perceptions and attitudes about students with FASD had shifted following the AR intervention, they were concerned with their ability to impact the perceptions of others. One participant explained that the intervention *"helped me address more individual concerns, and bring to light what I can do individually, but I'm still afraid of how to work with other people who may have maladaptive attributions."* The difficulty

of addressing the maladaptive attitudes of others was a common theme, with some participants believing that shifting others' thinking would be impossible. One participant explained that *"it's really about your own personal thinking, you can't change the mind of someone else."*

Others acknowledged the importance that knowledge plays in their ability to advocate for students; it is difficult to be an effective advocate without coming from a position of being knowledgeable on the topic. One participant described the role of knowledge in advocating for students using a fencing metaphor:

> *This metaphor that I'm thinking of right now sounds really combative, but I'm thinking of fencing, like [being] a defender. If someone says something that is harmful to that student that's like a jab, but you have to be able to […] deflect it with a really good piece of knowledge and a good comment and something that they have to think about that's going to stop that jab and redirect that energy.*

Although many agreed that knowledge played an important role in advocating for students, participants once again expressed uncertainty about their own level of knowledge about FASD impacting their ability in this area. One participant summarized this point, saying *"I think knowledge is a powerful weapon in advocacy and I don't think I know enough, specifically about FASD, to have those really great defenses."* Overall, pre-service teachers see the value and importance in advocating and challenging the maladaptive attributions of others, but appear to lack confidence in their ability to do so.

Engaging with Parents. Participants anticipated difficulties in communicating with and engaging parents of children with FASD. Specifically, a number of participants reported concerns about being able to keep their own feelings of judgment toward parents in check, and how that may impact the development of a collaborative relationship. One participant expressed her concerns about feelings of judgment toward parents:

> *I think it would be more difficult to approach it with the parents […] because this is going to sound awful, but autistic kids, and kids with ADHD, who knows*

> *what causes that? But everybody knows what causes FASD. It's alcohol, and it's because you drank it while you were pregnant. And I don't want to be judge-y, but that's probably what I'm scared about. Just judging people.*

Another participant echoed this sentiment of concern that judgment and negative feelings toward parents could impact her ability to work with them, explaining "*in the back of my mind I would have this feeling. […] I don't want to just permanently blame the parent but I definitely would feel an emotion of angst against them […]and handling that situation could be a concern of mine in the future."* Although many of participants' general concerns about supporting students with FASD were similar to their concerns about working with all students with disabilities, this issue of feeling judgement toward parents of affected children was identified as being a unique concern related to FASD, given its etiology.

Beyond feelings of judgment, some participants indicated concerns about the level of engagement of parents of children with FASD in their child's education and well-being. They anticipated challenges in working with *"parents that maybe weren't that bothered when they were pregnant, and maybe still aren't that bothered now. I know that really... that's not a very nice thing to say, but like my experience with kids that have FASD is because their parents liked drinking alcohol more than they liked being pregnant."* Some participants reported concerns about being able to engage parents in open communication and building consistency between home and school to support the child. As one participant noted, *"one of my biggest concerns is if I'm making an effort in school to make sure that child is having their educational needs met and is being provided with education in a way that benefits them, is that happening at home?"* Another participant reported feeling a lack of control over parental engagement, reporting that *"you can send home newsletters and you can phone and host things in your class, but they really ultimately make the choice to engage or not."*

Others acknowledged that in reality, children with FASD are not always living in the care of their biological parents, and seemed more optimistic about building working relationships with other caregivers. One participant explained, *"the thing is, these children are not always under the guardianship of their parents anyway, so whoever is a guardian of them is probably the same as me… having to deal with the same issues at home, and so just keeping that dialogue open [is important]."*

Accessing Supports and Resources. Pre-service teachers expressed concerns about the availability of supports and resources in schools to help them in supporting children with FASD and other special needs in their classrooms. One participant explained, *"Maybe having the school support could be a concern. I don't know, because you might not have the training to work with a student like that, or you might not have the knowledge. It might be something new for you, and they might just throw you out there".* The fear of being "thrown in" to situations without proper support, training, or resources was evident in several participant responses, given the current realities of the education system. In particular, participants stressed the importance of human resources; knowledgeable others who could support them in successfully meeting student needs:

> *I would be concerned with support systems in place for me as a teacher for example who do I have access to, who can be an expert and guide me through that. So that would be the next thing I hope I have access to, whether that is another teacher who is more experienced or a counselor or someone at the school who can help make sure I am doing best for the student, and providing the resources that student needs to be successful.*

Concerns regarding access to resources included discussion of direct classroom supports such as teaching assistants, and closely tied to pre-service teachers' thoughts about their ability to create and maintain a positive learning environment for students.

Creating a Positive Learning Environment. Pre-service teachers were candid in sharing their own concerns and feelings of being unprepared to enter the classroom and support the diverse needs of students while creating and maintaining a positive learning environment. Many participants acknowledged that their concerns were not specific to FASD, but more general feelings of being unprepared to meet the needs of a diverse classroom. One participant explained, "*I kind of feel unprepared across the board. Like it's not just in relation to FASD, I kind of feel like in relation to different needs across the classroom and meeting all those needs. I don't know how I'm going to do that."* Another participant expressed her worry that her skills will not be strong enough:

> *I worry about not being able to help the student or reach the student, and it's not because of the student it's because of me. I worry that my abilities and my skills are not up to par to help not just FASD students but any students, so that's just like a worry I have. A common worry. It's nothing really about the student it's just me… Do I have the knowledge to be able to help this student?*

The majority of participants shared very similar worries regarding their skills and the expectations placed up them to support the diverse needs of students, and many acknowledged that this was at least partially a function of where they are currently in their training. One participant spoke about preparation as an ongoing process, as she explained, *"I don't yet feel prepared. It's just going to take a little more time."*

Specifically related to students with FASD, some participants reported concerns with managing behaviour in the classroom. For example, *"how can you manage them in your class without always sending them out of the class? How can you keep them in the community in the classroom right? I'd like to learn that but I don't know."* Similarly, others were concerned about how the difficulties experienced by students with FASD may negatively impact other children in the classroom, "*the main thing would be their inability to really focus on the task and how that*

can distract from the learning of other students… How can I funnel that energy and help them in some way to be able to focus so that everyone in the class can learn?" One participant reported feeling less prepared following the intervention, stating *"I already did feel unprepared, and now there's another layer of students that I have to be aware of."*

Intervention Feedback. Participants provided feedback on their experience of the AR intervention, specific Intervention components, and made specific recommendations for improving future delivery of the intervention. Overall, the intervention was well-received, and a number of participants noted that they were surprised by how engaging and relevant it was for a "research session". As one participant explained, "*Because I happened to sign up for that section, and sat in your lovely room, I learned about something that I needed to learn about but I wasn't expecting to learn about".* A summary of participant feedback regarding the components of the AR intervention is provided in Table 6.

Useful Intervention Components. Participants identified the balance of information to practice activities, the opportunity to work in a group, the FASD vignettes provided as examples, and the pre-survey as being important components of the AR intervention that benefitted their learning and engagement. By far the most positive reactions from participants were regarding the group activity that comprised the consolidation phase of the intervention. Participants reported that the group activity was both engaging and key to solidifying their learning. One participant described being surprised by how engaging the session was, largely due to the embedded group work:

> *A lot of research that I help out with is "oh do this survey on the computer", but this one I was surprised… I was like wow we actually get to interact with people, and that was really new for me to do a research participation where you can do some group work on the information. Yea it was a lot more engaging than just reading a text and assessing your knowledge of it.*

Table 6. Intervention Feedback and Suggestions for Improvement

Useful Intervention Components	
Group Work	*Participants acknowledged the group activity as being the most helpful and engaging aspect of the intervention.*
Vignettes	*The vignettes used during the group activities, which provided examples of two students with FASD, were perceived as useful given that many participants lacked personal experience with FASD.*
Balanced Content	*Participants commented that the time spent on instruction and hands-on practice activities was well-balanced given the short 45-minute timeframe.*
Pre-Survey	*Participants saw value in completed the pre-survey before the AR session, as it gave them a chance to consider their perceptions and knowledge about FASD.*
Suggestions for Improvement	
Electronic Resources	*Paper-based handouts provided during the session were of limited use to participants. They would have preferred electronic resources for ease of storing and later accessibility.*
Relevant Examples	*One participant suggested that the examples given to explain attribution theory were not relevant to her personally, and multiple examples would have been more helpful to illustrate the theory.*
Increase Session Length	*Many participants felt that the session could have been much longer than 45 minutes, with more time spent on experiential activities to consolidate learning.*
Reduce Complexity	*It was noted that attribution theory is complex, as is the topic of FASD. Combining the two topics within a 45-minute session may have overwhelmed some participants, as some confusion was reported.*

In terms of learning, participants reported learning best from group work due to exposure to the ideas and perspectives of others, *"the most helpful for me is always doing things in group work, so doing that activity as a group that always helps me with my learning so that was the most helpful to me being able to discuss with others".* Similarly, another participant explained *"I like the small group setting… you are kind of getting input from everybody else which I think is*

beneficial because its not just your interpretations, you are getting to know other teachers' opinions on that as well so I liked how that was set up".

The basic information provided about FASD and the overview of attribution theory was also noted as a positive component, and overall participants reported feeling like the session was well-balanced given the 45-minute timeframe. One participant explained:

> *I think it was a good balance because we needed to have the instruction before we went into the group work. If we just went off into the group work without having any idea it wouldn't have been helpful at all. I think it was the right balance. Because we had the background knowledge we needed, we were able to do the group work and to have different ideas. So I think that shows we had the right amount of instruction in order to have that conversation.*

Participants also expressed appreciation for the vignettes provided during the practice activity, as many of them have not previously worked with students with FASD. One participant reported, *"I liked the vignettes where you gave us a scenario where we could think about it more practically and kind of draw on these theories we've learned in other classes. I think it was definitely set up in a way that I could learn."*

Finally, one participant reported that completing the pre-survey just before the session was helpful in prompting her to think about FASD. She explained, *"I think doing the survey first allowed me to see like 'oh I don't really know much about this subject', and then you went through the presentation and then I realized that I am thinking of some of these things wrong, or not in the best way."* Although the primary purpose of the pre-survey was to collect data for the quantitative analysis, its secondary purpose was to act as the Causal Search Activation component of the AR intervention. This participant's report suggests that it achieved this goal.

Suggestions for Improvement. Some participants provided recommendations for improving the intervention in the future. The most commonly noted suggestion was to provide

electronic copies of all session resources. One participant explained the relevance of electronic resources, *"I think there was an information sheet given out to us. I didn't look at that. I'm using google drive a lot to store documents and since that [printed] one is now lost in whoever knows what pile, it might be more helpful to send [it] out electronically."* In fact, one participant did not recall receiving the printed resources at all, stating "*I would just like some resources. After the session, we didn't have a follow up email that I can recall where you were like 'just if you're curious check out these really great resources if you want to know more about FASD'".* Electronic resources provided via follow-up email may therefore be more relevant and useful to participants in the future.

One participant struggled with feeling like the attribution theory examples provided early in the session were not relevant to her, and interfered with her learning of the content. The example provided illustrated possible attributions for failing a test, as is commonly used in the literature. However, she explained, *"I'm kind of a smart girl so I don't know if there were more illustrative examples or something to kind of improve that part of it so its easier for people to really get into".* Providing several different examples to illustrate the basics of attribution theory would help to ensure that all participants are provided with information that is relevant to their experience, but would also require more time to include.

Several participants noted that the 45-minute session felt rushed, and that the content could have better been explored during a longer session. For example, one participant felt that the group activity felt rushed, and interfered with his learning *"the vignettes felt very rushed, and because it felt so rushed, it didn't feel like something I understood at all… It was a real-world scenario which I think is probably the most useful part, and it felt a bit more pressed for time and I didn't totally understand the best ways to change my attribution."*

Suggestions for session length varied from a couple of hours to a full day workshop. One participant recommended a full day workshop to focus more time on the group activities, "*I would have enjoyed a day workshop on it. You presented us with those different case studies and scenarios and we only had the chance to work on one. I would have liked to do 5 or 6 of those".* There was also some disagreement between the content that could be included if the session was longer. For example, one participant reported being interested in learning more about FASD, while another participant suggested that providing definitions of FASD and related concerns in the session was already too much information, because *"unless we are getting tested on it specifically lots of people don't pay attention to the definitions. Unless we can relate it directly to a situation then there's not much point in knowing them."*

Participants also noted that the complexity of attribution theory made it a difficult topic to understand in a 45-minute session. Some reported being confused, and not understanding the basics of attribution theory, which made extending that to the topic of children with FASD difficult. As one participant explained, *"I like really concrete things so it's hard for me to give something a direct attribution when I'm not quite sure myself because I've just been introduced to it… [That] was the most confusing because it was brand new."* Another participant noted some difficulties understanding attribution theory:

> *I had difficulties grasping the concept of attributional theory. It seems like it's not a difficult concept but once you know it you know it, and I was having a hard time knowing it… I think a large part of the reason was because I wasn't sure of my answers because I felt like things could go either way and I felt like if I understood the theory completely it would be a lot easier to be a lot more sure of my answers, but I just wasn't and that's why I think I struggled with the concept of it.*

Overall, some participants found that the overview of attribution theory provided was not enough for them to feel confident in applying it to FASD, which is itself a

complex topic. A longer session may provide time for more examples, and opportunities to check participant understanding before moving on.

Qualitative Brief Discussion

The qualitative phase of this study was completed with the goal of answering two key research questions: *(3) What are pre-service teachers' experiences of participating in the AR intervention?* and *(4) What perceptions do pre-service teachers hold about working with students with FASD?* A summary of findings related to each question is presented below, and qualitative learnings are further discussed and incorporated in the *Integrated Analysis and Discussion* section, as they pertain to preparing teachers to work with students with FASD.

Experiences of the AR Intervention. Overall, pre-service teachers reported positive experiences of the intervention. They reported being engaged, informed, and encouraged to learn more about FASD, and some were pleasantly surprised by how much they enjoyed the session. Participants were able to identify the most helpful components of the intervention, which unanimously focused on the experiential group work activities that allowed them to practice what they had learned, and to learn from their peers. They also provided thoughtful recommendations for intervention improvement, including a desire for a longer and more in-depth session to allow for more learning about FASD. Some confusion was reported throughout participant interviews, given the complexity of the topic and the intervention itself, and an overall unfamiliarity with the topic of FASD. Although the intervention was perceived as enjoyable and beneficial, it appears that participants' ability to benefit fully from the AR intervention may have been hindered by their lack of a basic understanding and previous exposure to FASD.

At a basic level, the AR intervention appeared to increase pre-service teachers' awareness of FASD as a significant topic that will be relevant to their future work in the classroom. In addition to increased awareness, participants spoke about students with FASD using language that evidenced more adaptive attributions following the AR intervention. They also spoke about how the foundations of AR and understanding attribution theory could be helpful to them in their daily lives, outside of the classroom and beyond the topic of FASD.

Perceptions of FASD. Pre-service teachers overwhelmingly reported not feeling knowledgeable about FASD, suggesting a lack of FASD-focused material in their coursework. Participants were forthcoming with details about their concerns for teaching students with FASD in the future, and were candid in sharing some of their feelings of judgement toward biological parents of children with FASD. They articulated considerations for supporting and advocating for students, and expressed larger concerns about their lack of preparedness to teach in general.

Overall, participants reported a desire to learn more about FASD to prepare themselves for their future careers, and they noted the importance of practical experiences and the opportunity to learn from those with personal experience in the field. They expressed an interest and an openness to learning more about FASD, but their responses suggest a need to be guided, or to have learning opportunities provided to them, because their very limited knowledge of FASD makes it difficult for them know where to start. Simply stated, they do not know enough about FASD to identify what they need to know. These findings suggest that pre-service teachers require more explicit instruction and guidance in seeking meaningful learning opportunities to prepare them to work with students with FASD, beyond a brief AR intervention.

Phase 3: Integrated Interpretation and Discussion

Thoughtful and intentional integration of qualitative and quantitative data is of paramount importance in quality mixed-methods research. The integration of multiple strands of data allows for the generation of mixed inferences not otherwise possible with each methodology alone (Creswell & Plano Clark, 2011). In this explanatory sequential design, quantitative and qualitative data were connected throughout the research process. Participants for the qualitative phase were selected based on a key quantitative variable: their response to the intervention, operationalized as a quantitative increase or decrease in self-efficacy. In this third and final phase, the findings were reviewed and interpreted to determine how the qualitative findings (i.e. participants' experiences of the intervention and perceptions of FASD) may explain the quantitative results (i.e. no corresponding increases in self-efficacy following the intervention). Integrated inferences were developed to address the 5th, final, and overarching mixed methods research question: (5) *How do learnings from the quantitative and qualitative data inform our understanding of how best to develop, implement, and evaluate interventions to prepare pre-service teachers to work with students with FASD?* This question aligns with the study's purpose statement, and allows for a broader discussion of ongoing training needs and considerations for preparing future teachers.

Integrated Analysis Procedures

Following the qualitative analysis in Phase 2, themes were further examined for potential differences and alignment between the two participant groups (i.e. SE Increased and SE decreased). This analysis was undertaken using the NVivo data analysis software, where frequency counts of codes from both groups were tallied, and the content within each theme was reviewed to examine potential differences (e.g. were individuals with lower and higher self-

efficacy talking about *Supporting Students* in different ways?). At the end of this analysis process, very few meaningful differences that would explain response to the AR intervention were found between groups. Further analysis and representation of this mixed analysis was therefore abandoned, and the focus shifted to a broader discussion of how mixed inferences generated from this study could inform future interventions to prepare teachers to work with students with FASD. In the development of mixed inferences, emphasis was placed on the qualitative data due to its ability to provide rich and detailed accounts of participant experiences and perceptions, and to provide a fuller picture of the needs of pre-service teachers in this area, considering the limited significant quantitative results from the intervention.

Assessing the Quality of Mixed Inferences. The ability to draw meaningful mixed inferences in an MMR study must be carefully considered, given the relative newness of mixed-methods approaches to research and the complexity and diversity that exists within and between these research designs. In many ways, the process of assessing the quality of a mixed-methods study is more complex than in traditional quantitative or qualitative studies. Separate considerations for the validity and trustworthiness of both data strands must be considered in addition to unique considerations for integrating the two in a mixed methods analysis. Tashakkori and Teddlie (2009) propose an integrative framework for ensuring quality inferences are drawn from MMR studies, which recommends consideration of both the quality of the design (i.e. methodological rigor), and the quality of the interpretations (i.e. interpretive rigor). Design quality refers to the extent to which appropriate procedures were chosen and followed to answer the research questions, while interpretive rigor refers to the extent to which interpretations made are grounded in the data. All ten criteria proposed by Tashakkori and Teddlie were reviewed and

reflected upon in the development of meaningful integrated inferences in this third phase of the research process.

In consideration of the importance of methodological rigor, this study was carefully designed to answer the key research questions, following a framework for explanatory sequential designs outlined by Creswell & Plano Clark (2011). The quantitative phase employed empirically validated and reliable measures, and the qualitative phase followed established procedures for data collection and analysis. Any methodological limitations are addressed transparently in the *Limitations* section. Overall, quantitative and qualitative phases were implemented with the rigor that would be expected in a single-method study, and the data strands were linked in a meaningful way, through participant selection for the qualitative phase.

In terms of interpretive rigor, or the extent to which interpretations are grounded in the data, separate and comprehensive data analyses were conducted for both the quantitative and qualitative data before the process of integration began. Integrated inferences were developed through both an inductive and deductive process, and were informed by established theories in this area (i.e. self-efficacy, attribution theory). Overall, the quality indicators proposed by Tashakkori and Teddlie were considered throughout the process of designing this study and interpreting the data, and I have confidence in the quality of the mixed inferences generated below.

Integrated Discussion

As previously noted, the purpose of this study was to develop, implement, and evaluate an AR intervention for pre-service teachers aimed at modifying maladaptive attributions about the challenges experienced by students with FASD, with the goal of preparing them to work with these students through increasing their self-efficacy. Although the intervention was not

successful at significantly increasing teacher self-efficacy, mixed inferences from the quantitative and qualitative phases of this study provide a wealth of considerations for the development, implementation, and evaluation of interventions and other programming to support the preparation of teachers to work with students with FASD.

Developing Interventions. In considering the development of effective interventions to prepare pre-service teachers to work with students with FASD, both quantitative and qualitative evidence from this study suggests that their level of awareness, knowledge, and experience with the topic must be taken into consideration. The majority of participants (88%) reported that they had not yet completed even their introductory practicum placement, suggesting this group had little to no practical teaching experience. Furthermore, 61% reported no previous experience with FASD, and only 1% reported having been "very much" involved with individuals with FASD in the past, indicating that this group also had very little personal experience with the topic of the AR intervention.

In interviews, participants reported that before the intervention, they had not considered that they would be working with students with FASD, and expressed concern that they did not feel knowledgeable in this area. This suggests that pre-service teachers do not know enough about FASD to even conceptualize it as being a topic relevant to their future careers. They reported that the very basic information provided about FASD at the beginning of the AR session was helpful, and suggested that future interventions focus more on teaching the basics. They also acknowledged that FASD had not yet been covered in any depth in their coursework. Lack of general knowledge about FASD is therefore a concern for the development of future interventions. This lack of knowledge calls into question the appropriateness of an AR

intervention for this population at this time. Specifically, can cognitive beliefs about difficulties related to a diagnosis be meaningfully shifted without a basic understanding of that disorder?

To date, AR interventions have been used to modify attributions about events that are personal to participants (i.e. intrapersonal attributions). That personal connection plays a critical role in the reattribution process, as participants are asked to draw upon their own experiences during the AR consolidation phase, in order to reinforce the learned material (Haynes, Perry, Stupnisky, & Daniels, 2009). This would not have been possible for many pre-service teachers in this study, given their lack of experience in the area of FASD. Although this was anticipated, and attempts were made to mitigate these concerns (e.g. vignettes of students with FASD were used as examples during the consolidation activity), a lack of personal connection to the topic may have presented a barrier to engagement and limited the potential for long-term consolidation of the intervention material. Further evidence of this may be inferred from the observation that some interview participants did not remember details of the intervention approximately six to eight weeks after the intervention, and needed to review the content before participating in a meaningful discussion about their experience.

Although AR interventions may not be the most effective approach at preparing teachers given their lack of familiarity with the topic, participants provided critical insight into additional issues that could be addressed using AR. Specifically, pre-service teachers reported feelings of judgement toward parents of children with FASD which they perceived as potentially interfering with their ability to work collaboratively with them. Participants reported perceiving parents, and particularly mothers, as continuing to drink purposefully throughout pregnancy, and did not provide considerations for elements such as addiction, mental health concerns, or poor living circumstances that could potentially contribute to their situation. In other words, pre-service

teachers seem to be making controllable attributions about parents' role in the difficulties experienced by children with FASD. External control attributions were not addressed in this AR intervention, as it was developed based on findings from a previous study that found only the personal control and stability dimensions predicted teacher self-efficacy (Atkinson, 2012). However, in considering the stigma associated with FASD, and that controllable external attributions can lead to feelings of anger toward the other person (Weiner, 2010), there may be a role for shifting attributions of external control in future AR interventions with pre-service teachers.

Finally, although participants reported an overall lack of awareness of FASD, and did not have personal experiences to draw on during the intervention, a number of pre-service teachers reported that they believed their learnings from the AR intervention were applicable beyond the context of FASD. This raises an important question regarding whether focus should be placed on developing AR interventions that target specific diagnoses (i.e. FASD), or whether AR should focus on more functional aspects (e.g. behavioural difficulties, memory challenges) that any number of children may face in the classroom. Further research would be required in this area to more completely consider the practical implications of each approach, and potential next steps are outlined in the *Implications for Future Research* section.

In summary, integrated findings paint a picture of inexperienced pre-service teachers who are feeling unprepared to teach in general, to such an extent that FASD has not even been considered. They have not learned enough about FASD in their coursework and through their own experiences to even see it as an issue concerning their future practice. It may therefore be necessary to take a step back from a specific intervention like AR and focus more broadly on increasing awareness and knowledge of FASD in pre-service teachers. Based on their

suggestions, this should include hands-on learning opportunities, and learning from those who have personal experience and connection to the topic.

It will be important that ongoing efforts to prepare teachers to work with children with FASD start with building a solid foundation of knowledge and awareness of FASD as a relevant issue. Although feedback from participants suggests that the AR intervention was engaging, it is not likely to be the most effective way to prepare teachers to work with students with FASD, unless it is part of larger effort to increase overall awareness and specific knowledge about FASD in pre-service teachers. While I do believe, based on my interactions with participants, that the AR intervention was impactful and that similar interventions could play a role in preparing teachers to work effectively with students with FASD, the development of a solid knowledge base and relevant experience will be important to ensure that the intervention has sufficient material to build on. However, quantitative results demonstrated that teaching pre-service teachers about the basics of FASD (i.e. FASD Information session) was not enough in itself to shift attributions. Future research could therefore examine the possibility of a combined information session and AR intervention, to provide the foundational knowledge about FASD while also engaging participants in a discussion surrounding their perceptions of these students. In addition to these considerations for developing effective interventions, integrated findings provide additional insights into their implementation.

Implementing Interventions. Beyond careful development, considerations must be made for how, where, and when interventions should be implemented in order to prepare pre-service teachers to support students with FASD. Qualitative data from participants included thoughtful feedback regarding the AR intervention that provides a starting point for this discussion. Considerations for implementing general intervention with pre-service teachers to

increase knowledge of FASD are presented along with specific recommendations for any future implementations of AR interventions, specifically.

First, to address the "how" of implementation, findings support the importance of providing learning opportunities for pre-service teachers that include experiential components, as participants unanimously reported a desire, and sometimes even a need, to learn by doing. In addition to being requested by pre-service teachers, learning from peers and experienced others could provide vicarious learning experiences for pre-service teachers, which are considered key to the development of self-efficacy (Bandura, 1977). Practical learning opportunities could include facilitated group work, presentations from experienced teachers who have worked with students with FASD, and even volunteer opportunities that allow pre-service teachers to interact with or observe children with FASD.

Second, in terms of where these interventions should be implemented, a strong argument can be made for the integration of FASD content into teacher training programs. Similar to learning about autism spectrum disorders, learning disabilities, and other conditions that students may present with, pre-service teachers could be exposed to content related to FASD and how to support these students in the classroom. Ideally, this would be completed as a component of their coursework, which would ensure that everyone has equal exposure to the information. It would also allow for more time to be spent delivering the information, ongoing reinforcement and discussion of the content, addressing follow-up questions, tying FASD into learnings in other areas, and providing clarification as needed.

If pre-service teachers were provided with basic information about FASD as part of their coursework, interventions such as the AR approach in the current study could be offered as workshops or seminars outside of class time. A number of participants reported feeling that

learning more about FASD was so important to them that they would be willing to attend longer and more detailed sessions on it during their own time. Furthermore, since participants emphasized the importance of electronic resources, there may be room for online modules offering basic information about FASD, strategies for working with students, and even AR material specifically directed at teachers. This could be facilitated through collaboration between teacher training programs and other agencies who have developed a growing repertoire of online videos and training materials related to FASD, such as the FASD Learning Series (Government of Alberta, 2013), which presents monthly topics in the area of FASD to support professional learning and discussion. Other online FASD resources include the Canada FASD Research Network (CanFASD, n.d.), and Professionals Without Parachutes (2016), which provide access to practical resources, training, and up to date research on FASD.

Finally, the timing (i.e. the "when") of implementing an intervention must also be considered. If implementing future AR interventions, integrated findings from this study suggest that waiting until teachers are practicing in schools and have experience in working with students with FASD may provide a more effective platform for supporting adaptive attributions about these children. However, there also exists a need to prepare pre-service teachers for the reality of their work, and to set them up for success by providing realistic expectations and encouraging adaptive attributions related to working with children with FASD. One source of self-efficacy is previous mastery experiences; situations in which success was experienced in the past (Bandura, 1997). It can therefore be expected that initial successful experiences working with students with FASD will foster self-efficacy and contribute to further success. Conversely, being unprepared to work with students with FASD because of a lack of information about their needs, may set early career teachers up for a series of negative interactions and experiences with children with FASD,

perhaps contributing negatively to a poor sense of efficacy. Therefore, a need exists to prepare teachers to work with these children by providing access to quality course content regarding their needs. Then, once in the school system and experienced in working with students with FASD, an AR intervention may be helpful in further supporting and expanding their capacity to work effectively with these students.

Evaluating Interventions. Evaluating the effectiveness of this AR intervention using a mixed methods approach was invaluable in forming an understanding of the broader training needs of pre-service teachers to prepare them to work with students with FASD. For example, from a strictly quantitative perspective, the AR intervention had limited success at achieving desired outcomes. Although attributions of personal control were successfully increased, corresponding impacts on self-efficacy were not observed. However, qualitative data allowed for an understanding of the broader context of teacher training needs in this area. Specifically, participants indicated in their interviews that they are searching for hands-on, practical learning opportunities (i.e. mastery experiences), and opportunities to learn from experienced others (i.e. vicarious learning), both of which are considered sources of self-efficacy (Bandura, 1977). This is a promising finding, as it demonstrates that pre-service teachers are seeking experiences that will play a role in helping them to develop self-efficacy for working with students with FASD in the future. Although an AR intervention may play a role in this process, any one 45-minute-long intervention may be limited in its ability to demonstrate a direct impact on self-efficacy in isolation, given the multiple sources of self-efficacy beliefs, and the relative inexperience of pre-service teachers in this area. Understanding that pre-service teachers are seeking these experiences that may in turn help with the development of their self-efficacy allows for

consideration of a broader conversation about how pre-service teachers could be supported in obtaining these important, efficacy-enhancing experiences.

Mixed inferences from this study also suggest that intervention research in this area must continue to carefully consider outcome variables by which to measure the effectiveness of an intervention. Specifically, qualitative data collection may help target future outcome variables that could be measured quantitatively. Teacher self-efficacy was chosen as an outcome variable for this study because previous research has established that it is related to a number of desirable teacher behaviours and classroom outcomes that are important for supporting students with FASD (Ashton & Webb, 1986; Betoret, 2006; Chwalisz, Altmaier, & Russell, 1992; Gibson & Dembo, 1984; Guskey, 1988; Meijer & Foster, 1988; Stein & Wang, 1988). However, qualitative data from this study suggested that variables such as engagement with the topic, awareness of FASD, and future expectations for working with students could all be further examined as potential short-term outcomes of AR intervention. Overall, mixed-methods research in this area lends itself to continued discussion surrounding intended outcomes and indicators for intervention effectiveness

Study Limitations

The findings from the current study must be considered in light of a number of limitations. Specific limitations relate to participant sampling and assignment, psychometric concerns for some of the variables of interest, the multiple roles of the researcher, and the short and constricted timeframe for the study.

Participant sampling and assignment. Participants for this study represented a convenience sample, and they were not randomly assigned to treatment conditions. While measures were taken to mitigate selection bias, (e.g. participant pool participants signed up for

time slots without knowing which treatment they were committing to), issues remain regarding the generalizability of findings.

Psychometric Issues. Two potential issues with the measurement of quantitative constructs for this study must be noted, as they had the potential to limit the variability of the data and therefore the potential to discover significant results. First, the modified TSES completed by participants was measured on a 5-point scale, rather than a 9-point scale used by the original developers, due to an error during the creation of the online survey. The smaller number of possible options likely limited the potential variability in teacher self-efficacy data, making it more difficult to identify significant differences pre- and post-intervention.

Second, the stability dimension of the CDS-II demonstrated poor reliability, and resulted in one of the three items being dropped, leaving only a two-item scale to measure participants' attributions of stability. This led to further issues regarding the stability variable violating the assumption of homogeneity of variance for the ANCOVA. Even the original research on the CDS-II by the scale developers found the stability dimension had the lowest internal reliability of the four scales (r = .67; McAuley, Duncan, & Russell, 1992), which suggests some ongoing concerns for reliability of this measure.

Role of the researcher. The researcher was also the interventionist and the interview facilitator for this study. This issue was addressed with participants, and I introduced myself and spoke about my own background and investment in the study to participants in a transparent manner, as recommended by Morrow (2005). I encouraged participants to speak freely, and reminded them that even negative feedback regarding the intervention would be welcomed as an important component in my understanding of its impact. Efforts were made to make participants comfortable and the interview was conducted in a casual manner, during which time I

endeavoured to present myself in a genuine way, with curiosity about their experiences and without judgment or their responses. Regardless, being interviewed by the same person who delivered the intervention may have limited participants' willingness to speak freely about any negative experiences, and may have led them to feel the need to over-report positive impacts of the intervention. This could be mitigated in future studies by having a third-party facilitator interview participants following the intervention. However, having the same individual deliver all intervention components and treatment conditions may also improve process fidelity, and consistency in the delivered content (Dumas, Lynch, Laughlin, Phillips Smith, & Prinz, 2001).

Potential validity issues must also be considered as they relate to having the researcher deliver all components of the intervention (i.e. AR intervention, FASD information session, and the control group session), in addition to the data collection procedures. Although I endeavored to deliver each component of this study with the same level of enthusiasm and with an openness to the chance of effects across intervention groups, being the primary researcher and being aware of the research hypotheses may have had subtle impacts on my delivery of the interventions. Recommendations for future research that may mitigate or more closely examine these potential validity concerns are presented in the *Implications for Future Research* section.

Study Timeframe. The timeframe in which this study was completed presented a number of potential limitations. First, to take advantage of the participant pool, the intervention and associated surveys needed to be completed within an hour timeframe. This limited the amount of content that could be included, and the time devoted to each of the components of the AR intervention. This limitation was echoed by participants, who reported that they would have appreciated more time to review examples and discuss adaptive attributions about FASD.

Second, undertaking this study within the academic year was necessary in order to recruit pre-service teachers. However, working within semesters led to the scheduling of interviews and focus groups during the first week of April, as courses were ending and exams were approaching. This led to difficulties scheduling focus groups, and may have contributed to a lower response rate from participants, who may have been overwhelmed by other commitments and responsibilities during this busy time of year.

Third, working with university students limits the potential for more long-term follow up with participants. Ideally, the qualitative research process would involve a participatory approach in which emerging interpretations of the data are shared with participants throughout the process and their feedback is continuously sought (Yin, 2011). This was not possible given the study timeframe and semester constraints. Participant feedback was sought through summary emails, but none responded. This is a further limitation of using a participant pool or intact classes, as students participate in studies as part of their course or in exchange for nominal course credit, and so there exists little incentive for participation beyond the end of the semester.

Implications for Future Research

Findings from this innovative mixed-methods study provides a number of implications for future research in this field. In particular, it provides rationale for continued mixed-methods approaches in intervention research, so as to continue to gather important information about why interventions may not achieve intended outcomes, and what alternative or unintended impacts they might have. In this area in particular, researchers in future studies could adopt exploratory sequential designs in which pre-service teachers are interviewed first and the qualitative data collected informs the quantitative phase of the study. This could allow for identification of important variables to consider in the measurement of intervention effectiveness, or inform the

development of entirely new interventions based on the needs that participants are reporting. In addition, the complexity of FASD lends itself well to ongoing investigation using mixed methods research.

Future research could also examine the possibility of implementing AR interventions with practicing teachers, and specifically with those who have experience working with children with FASD. Those personal experiences to draw on, as well as a basic understanding of the difficulties experienced by their students with FASD, may provide the appropriate environment for targeting maladaptive attributions. Furthermore, AR interventions with teachers who are currently working with one or more students with FASD could provide a unique opportunity for follow-up, and allow for the collection of observational data or teacher behaviours, rather than self-reports of internal processes like self-efficacy. This could allow for a more applied analysis of the direct impacts of AR interventions with this population.

Specific to further exploring the processes and effects of AR interventions in this area, future research could more closely examine interventionist effects, sequencing effects, and counterbalancing. For example, multiple interventionists could be trained to deliver the intervention, and data collected could further tease out the impact of interventionist vs. intervention, which was not possible in the current study given that the research delivered all AR interventions and control sessions. In addition, research could be conducted with a merged FASD information session and AR intervention, and the sequencing of these components (e.g. information followed by AR, or AR followed by information) could be further examined to determine the ideal combination of components needed to best serve pre-service teachers. In terms of counterbalancing, vignettes in future studies could be manipulated to include the FASD

diagnosis at the beginning, at the end, or not at all, to determine any implications for teacher perceptions.

Finally, future AR intervention in this area could consider whether diagnostic-focused interventions (i.e. AR for FASD) or functional-focused interventions (i.e. AR for children with behaviour challenges, learning difficulties, social skills deficits, etc.) may be most effective at preparing teachers to work with children with FASD. Since many children with FASD are undiagnosed, and participants in this study reported very little awareness of FASD as a topic relevant to their teaching, an AR intervention using a more functional approach may be well-received by pre-service teachers. Even so, there are unique considerations regarding stigma associated with the diagnosis of FASD, which might require a more targeted AR approach. Future studies could compare AR approaches to determine the effects of targeting attributions about the diagnosis of FASD, versus targeting attributions about the functional difficulties these children may encounter.

Implications for Theory

Findings from this study make a meaningful contribution to the AR literature, and have implications for attribution theory itself. Specifically, findings suggest that AR interventions can be successful in modifying personal control attributions about interpersonal situations (i.e. events/outcomes experienced by someone else), a unique area not yet covered by attribution theory. Weiner's (2000) attributional theory of intrapersonal and interpersonal motivation distinguishes between attributions made about events that are personal to the self (i.e. intrapersonal), and attributions made about the experiences of others (i.e. interpersonal). However, Weiner's theory does not address instances of personal control attributions that an observer makes about the experiences of another person. In contrast to established theory, in this

study, AR was successfully used to modify intrapersonal attributions (i.e. feelings of personal control) about an interpersonal situation (i.e. the difficulties experienced by a child with FASD). This study has demonstrated the importance of considering the existence of a third area in between these two previously established categories, and to consider more broadly the implications of observers making personal control attributions about the situations of others. Weiner (2010) explains that attributions lead to affective responses, and impact motivational processes and behavioural responses to situations. Further research and theory development is therefore needed to examine the implications of individuals making attributions of personal control about events in the lives of others.

In terms of contributions to the AR literature, this intervention was the first of its kind to use AR to target attributions being made by an observer about someone other than themselves, and its success in modifying one of the underlying causal dimensions provides a starting point to consider further applications of AR in interpersonal situations. Since interpersonal attributions play a role in the experience of emotions such an anger and sympathy toward others (Weiner, 2001), future research may consider employing AR interventions targeted toward increasing adaptive attributions for the behaviour and circumstances of others. Potential goals of such interventions may include reducing stigma, or increasing pro-social and helping behaviours.

Implications for Practice

To summarize implications for practice in terms of preparing teachers to work with students with FASD, this study has demonstrated a need for a more comprehensive and "big picture" approach to teacher preparation. While the AR intervention endeavoured to modify pre-service teachers' attributions and increase their self-efficacy in working with students with FASD, the mixed-methods findings revealed a much more complex understanding of teacher

training needs. Researchers must advocate for the inclusion of FASD-specific content in teaching training programs in order to provide a solid foundation of information upon which to build more complex interventions, such as AR. This study has demonstrated that AR interventions can play a role in shifting attributions about children with FASD along at least one of the causal dimensions, even in pre-service teachers with little to no personal experience in this area. However, the development of self-efficacy is much more complex, and involves many more sources that must be considered beyond a 45-minute AR intervention.

This study also suggests that AR and attribution theory could be applied more widely to pre-service teacher education. Participants reported enjoying the intervention, being engaged, and found that their learnings could be generalized to multiple areas of their lives. Any concerns with the intervention were centered around the complexity of the FASD content, rather than the process of AR itself. Training teachers to understand how attributions impact their emotional responses and subsequent reactions toward themselves and others (e.g. students, parents, colleagues), and providing them with tools for evaluating and shifting those attributions could be an important step in preparing effective, thoughtful, and resilient teachers for success in our school systems. Perhaps most importantly, this research suggests there are aspiring teachers who are engaged and interested in learning about how best to support their future students. They need to be supported, and provided with the tools and information necessary to be successful in working with children with complex needs, such as those with FASD.

References

Alberta Education. (2010). Province moves forward on inclusive education system. Retrieved from http://www.teachers.ab.ca/Publications/ATA%20News/Volume%2044%202009-10/Number19/Pages/Province-moves-forward-on-inclusive-education-system.aspx

Andreou, E., & Rapti, E. (2010). Teachers' causal attributions for behaviour problems and perceived efficacy for class management in relation to selected interventions. *Behaviour Change, 27*, 53-67. doi: 10.1375/bech.27.1.53

Andrews, G., & Debus, R. (1978). Persistence and the causal perception of failure: Modifying cognitive attributions. *Journal of Educational Psychology,70*, 154-166. doi: 10.1037/0022-0663.70.2.154

Armor, D., Conroy-Oseguera, P., Cox, M., King, N., McDonnell, L., Pascal, A., Pauly, E., & Zellman, G. (1976). Analysis of the school preferred reading programs in selected Los Angeles minority schools, REPORT NO. R-2007-LAUSD. Santa Monica, CA: Rand Corporation. Retrieved from http://www.rand.org/pubs/reports/2005/R2007.pdf

Ashton, P., & Webb, R. (1986). *Making a difference: Teachers' sense of efficacy and student achievement.* New York: Longman.

Atkinson, E. (2012). Pre-Service Teachers' Causal Attributions about FASD and Their Teaching Self-Efficacy. (Unpublished Masters Thesis). University of Alberta.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215. doi: 10.1037/0033-295X.84.2.191

Bandura, A. (1993). Received self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*, 117-148. doi: 10.1207/s15326985ep2802_3

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71-81). New York: Academic Press.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.

Bargh, J. (2006). What have we been priming all these years? On the development, mechanisms, and ecology of nonconscious social behavior. *European Journal of Social Psychology, 36*, 147–168. doi: 10.1002/ejsp.336

Bargh, J., Gollwitzer, P., Lee-Chai, A., Barndollar, K., & Troetschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014–1027. doi: 10.1037/0022-3514.81.6.1014

Beck, A. (1972). *Depression: Causes and treatment.* Philadelphia, PA: University of Pennsylvania Press.

Benton Gibbard, W., Wass, P., & Clarke, M. (2003). The neuropsychological implications of prenatal alcohol exposure. *Canadian Child and Adolescent Psychiatry Review, 12,* 72–76. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2582737/pdf/0120072.pdf

Betoret, F. D. (2006). Stressors, self-efficacy, coping resources, and burnout among secondary school teachers in Spain. *Educational Psychology, 26,* 519–539. doi: 10.1080/01443410500342492

Bibou-Nakou, I., Stogiannidou, A., & Kiosseoglou, G. (1999). The relation between teacher burnout and teachers' attributions and practices regarding school behaviour problems. *School Psychology International, 20*, 209-217. doi: 10.1177/0143034399020002004

Bibou-Nakou, I., Kiosseoglou, G., & Stogiannidou, A. (2000). Elementary teachers' perceptions regarding school behavior problems: Implications for school psychological services. *Psychology in the Schools, 37,* 123-134. doi: 10.1002/(SICI)1520-6807(200003)37:2<123::AID-PITS4>3.0.CO;2-1

Blackburn, C., Carpenter, B., & Egerton, J. (2010). Shaping the future for children with foetal alcohol spectrum disorders. *Support for Learning, 25,* 139-145. doi: 10.1111/j.1467-9604.2010.01452.x

Bono, C., Ried, D., Kimberlin, C., & Vogel, B. (2007). Missing data on the Center for Epidemiologic Studies Depression Scale: A comparison of 4 imputation techniques. Research in Social and Administrative Pharmacy, 3, 1-27. doi: 10.1016/j.sapharm.2006.04.001

Borkowski, J. G., Weyhing, R. S., & Carr, M. (1988). Effects of attributional retraining on strategy-based reading comprehension in learning-disabled students. *Journal of Educational Psychology, 80*, 46–53. doi: 10.1037/0022-0663.80.1.46

Bouffard-Bouchard, T., Parent, S., & Larivee, S. (1991). Influence of self-efficacy on self-regulation and performance among junior and senior high-school age students. *International Journal of Behavioral Development, 14,* 153-164. doi: 10.1177/016502549101400203

Burd, L., Klug, M. G., Martsolf, J. T., & Kerbeshian, J. (2003). Fetal alcohol syndrome: Neuropsychiatric phenomics. *Neurtoxicology & Teratology, 25,* 697-705. doi: 10.1016/j/ntt.2003.07.014

Burger, J. M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology, 56*, 246–256. doi: 10.1037/0022-3514.56.2.246

CanFASD (n.d.). CanFASD: Canada FASD research network. Retrieved from: https://canfasd.ca/

Caprara, G., Barbaranelli, C., Steca, P., & Malone, P. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology, 44,* 473-490. doi:10.1016/j.jsp.2006.09.001

Carlyon, W. (1997). Attribution retraining: Implications for its integration into prescriptive social skills training. *School Psychology Review, 26*, 61–73. Retrieved from http://www.nasponline.org/publications/spr/index.aspx?vol=43&issue=1

Chapin, M., & Dyck, D. (1976). Persistence in children's reading behavior as a function of N length and attributional retraining. *Journal of Abnormal Psychology, 85*, 511–515. doi: 10.1037/0021-843X.85.5.511

Chwalisz, K., Altmaier, E., & Russell, D. (1992). Causal attributions, self-efficacy cognitions, and coping with stress. *Journal of Social and Clinical Psychology, 11,* 377-400. Retrieved from http://pao.chadwyck.com/PDF/1336619085467.pdf

Chudley, A. E., Conry, J., Cook, J. L., Loock, C., Rosales, T., & LeBlanc, N. (2005). Fetal alcohol spectrum disorder: Canadian guidelines for diagnosis. *Canadian Medical Association Journal, 172,* 1-21. doi: 10.1503/cmaj.1040302

Collins, K., Onwuegbuzie, A., & Jiao, Q. (2007). A mixed methods investigation of mixed methods sampling designs in social and health science research. *Journal of Mixed Methods Research, 1,* 267-294. doi: 10.1177/1558689807299526

Cook, J. L., Green, C. R., Lilley, C. M., Anderson, S. M., Baldwin, M. E., Chudley, A. E., & ... Rosales, T. (2016). Fetal alcohol spectrum disorder: A guideline for diagnosis across the

lifespan. *CMAJ: Canadian Medical Association Journal*, *188*(3), 191-197. doi:10.1503/cmaj.141593

Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixed methods approaches (3rd ed.). Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2013). *Qualitative inquiry & research design (3rd ed).* Thousand Oaks, CA: Sage Publications.

Creswell, J., & Plano Clark, V. (2011). *Designing and conducting mixed methods research (3rd ed).* Thousand Oaks, CA: Sage Publications.

Downey, R., & King, C. (1998). Missing data in Likert ratings: A comparison of replacement methods. *The Journal of General Psychology, 125,* 175-191. doi: 10.1080/00221309809595542

Duffin, L., French, B., & Patrick, H. (2012). The Teachers' Sense of Efficacy Scale: Confirming the factor structure with beginning pre-service teachers. *Teaching and Teacher Education, 28*, 827-834. doi: 10.1016/j.tate.2012.03.004

Dumas, J., Lynch, A., Laughlin, J., Phillips Smith, E., Prinz, R. (2001). Promoting Intervention Fidelity: Conceptual Issues, Methods, and Preliminary Results from the EARLY ALLIANCE Prevention Trial. *American Journal of Preventive Medicine, 20,* 38-47. doi: 10.1016/S0749-3797(00)00272-5

Dweck, C. (2006). *Mindset.* New York, NY: Random House

Dybdahl, C. & Ryan, S. (2009). Inclusion for students with fetal alcohol syndrome: Classroom teachers talk about practice. *Preventing School Failure, 53,* 185-195. doi: 10.3200/PSFL.53.3.185-196

Entwistle, N. (2000). Approaches to studying and levels of understanding: The influences of teaching and assessment. In J. Smart (Ed.), *Higher education: Handbook of theory and research*, (Vol. 15, pp. 156–218). New York: Agathon Press.

Fontaine, J. (2012) Teacher attributions for behavior disorders and their relationship to expectations and self-efficacy. (Unpublished doctoral dissertation). University of Alberta, Edmonton.

Georgiou, S., Christou, C., Stavrinides, P., & Panaoura, G. (2002). Teacher attributions of student failure and teacher behavior toward the failing student. *Psychology in the Schools, 39*, 583-595.

Gibson, S. & Dembo, M., (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*(4), 569-582. doi: 10.1037/0022-0663.76.4.569

Gist, M., & Mitchell, T. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *The Academy of Management Review, 17,* 183-211. doi: 10.2307/258770

Goldschmidt, L., Richardson, G., Cornelius, M., Day, N. (2004) Prenatal marijuana and alcohol exposure and academic achievement at age 10. *Neurotoxicology and Teratology, 26*, 521-532. doi: 10.1016/j.ntt.2004.04.003

Government of Alberta. (2013). *FASD Learning Series*. Retrieved from: http://fasd.alberta.ca/fasd-learning-series.aspx

Green, J. (2007). Fetal alcohol spectrum disorders: Understanding the effects of prenatal alcohol exposure and supporting students. *Journal of School Health, 77,* 103-108. doi: 10.1111/j.1746-1561.2007.00178.x

Guskey, T. (1988). Teacher efficacy, self-concept, and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education, 4,* 63-69. doi: 10.1016/0742-051X%2888%2990025-X

Guskey, T., & Passaro, P. (1994). Teacher efficacy: A study of construct dimensions. *American Educational Research Journal, 31*(3), 627-643. doi: 10.3102/00028312031003627

Hall, N. C., Jackson, S. E., Goetz, T., & Musu-Gillette, L. E. (2011). Attributional retraining, self-esteem, and the job interview: Benefits and risks for college student employment. *Journal of Experimental Education, 79*(3), 318-339. doi: 10.1080/00220973.2010.503247

Hall, N., Perry, R., Chipperfield, J., Clifton, R., & Haynes, T. (2006). Enhancing primary and secondary control in achievement settings through writing-based attributional retraining. *Journal of Social and Clinical Psychology, 25*, 361–391. doi: 10.1521/jscp.2006.25.4.361

Hall, N., Perry, R., Goetz, T., Ruthig, J., Stupnisky, R., & Newall, N. (2007). Attributional retraining and elaborative learning: Improving academic development through writing-based interventions. *Learning and Individual Differences, 17*, 280–290. doi: 10.1016/j.lindif.2007.04.002

Hanson, W., Creswell, J. W., Clark, V., Petska, K., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology, 52,* 224-235. doi: 10.1037/0022-0167.52.2.224

Haynes, T., Daniels, L., Stupnisky, R., Perry, R., & Hladkyj, S. (2008). The effect of attributional retraining on mastery and performance motivation among first-year college

students. *Basic and Applied Social Psychology, 30*, 198–207. doi: 10.1080/01973530802374972

Haynes, T., Perry, R., Stupnisky, R., & Daniels, L. (2009). A review of attributional retraining treatments: Fostering engagement and persistence in vulnerable college students. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 24, pp. 227-272). The Netherlands: Springer Publishers.

Haynes, T., Ruthig, J., Perry, R., Stupnisky, R., & Hall, N. (2006). Reducing the academic risks of over-optimism: The longitudinal effects of attributional retraining on cognition and achievement. *Research in Higher Education, 47*, 755–779. doi: 10.1007/s11162-006-9014-7

Haynes-Stewart, T., Clifton, R., Daniels, L., Perry, R., Chipperfield, J., & Ruthig, J. (2011). Attributional retraining: Reducing the likelihood of failure. *Social Psychology of Education, 14,* 75-92.

IBM Corp. (2015). IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.

Jacobson, J., & Jacobson, S. (2002). Effects of prenatal alcohol exposure on child development. *Alcohol Research and Health, 26,* 282-286. Retrieved from http://pubs.niaaa.nih.gov/publications/arh26-4/282-286.pdf

Jacobson, S., Jacobson, J., Sokol, R. , Martier, S., Ager, J. & Kaplan Estrin, M. (1993). Teratogenic effects of alcohol in infant development. *Alcoholism: Clinical and Experimental Research, 17,* 174–183. doi: 10.1111/j.1530-0277.1993.tb00744.x

Job, J, Poth, C., Pei, J., Caissie, B., Brandell, D., & Macnab, J. (2013). Toward better collaboration in the education of students with fetal alcohol spectrum disorders:

Integrating the voices of teachers, administrators, caregivers, and allied professionals. *Qualitative Research in Education, 2,* 38-64. doi:10.4471/qre.2013.15

Johnson, R., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33,* 14-26. doi: 10.3102/0013189X033007014

Kelly, S., Day, N., & Streissguth, A. (2000). Effects of prenatal alcohol exposure on social behavior in humans and other species. *Neurotoxicology and Teratology, 22*, 143-149. doi: 10.1016/S0892-0362(99)00073-2

Kodituwakku, P., Coriale, G., Fiorentino, D., Aragon, A., Kalberg, W., Buckley, D., et al. (2006). Neurobehavioral characteristics of children with fetal alcohol spectrum disorders in communities from Italy: preliminary results. *Alcoholism: Clinical Experimental Research, 30*, 1551–1561. doi: 10.1111/j.1530-0277.2006.00187.x

Kodituwakku, P., & Kodituwakku, E. (2014). Cognitive and behavioral profiles of children with fetal alcohol spectrum disorders. *Current Developmental Disorders Reports, 1*, 149-160.

McAuley, E., Duncan, T., & Russell, D. (1992). Measuring causal attributions: The Revised Causal Dimension Scale (CDSII). *Personality and Social Psychology Bulletin, 18*, 566-573. doi: 10.1177/0146167292185006

Meijer, C. & Foster, S. (1988). The effect of teacher self-efficacy on referral chance. *Journal of Special Education, 22,* 378-385. doi:10.1177/002246698802200309

Menec, V. H., Perry, R. P., Struthers, C. W., & Schonwetter, D. J. (1994). Assisting at-risk college students with attributional retraining and effective teaching. *Journal of Applied Social Psychology, 24*, 675–701. doi: 10.1111/j.1559-1816.1994.tb00607.x

Miserandino, M. (1998). Attributional retraining as a method of improving athletic performance. *Journal of Sport Behaviour, 21,* 286-297.

Morrow, S. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology, 52*, 250. doi: 10.1080/10503300802702113

Mukherjee, R., Hollins, S. and Turk, J. (2006). Fetal alcohol spectrum disorder: an overview. *Journal of the Royal Society of Medicine, 99,* 298–302. doi: 10.1258/jrsm.99.6.298

Olson, H., Streissguth, A., Sampson, P., Barr, H., Bookstein, F., & Thiede, K. (1997). Association of prenatal alcohol exposure with behavioral and learning problems in early adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*, 1187-1194. doi: 10.1097/00004583-199709000-00010

Onwuegbuzie, A. J., Dickinson, W., Leech, N. L., & Zoran, A. G. (2009). A qualitative framework for collecting and analyzing data in focus group research. *International Journal of Qualitative Methods, 8,* 1-21. doi: 10.1177/160940690900800301

O'Donnell, C. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78,* 33–84. doi: 10.3102/0034654307313793

Patton, M. Q. (2005). *Qualitative Research.* Hoboken, NJ: John Wiley & Sons, Ltd.

Perry, R., Hechter, F., Menec, V., & Weinberg, L. (1993). Enhancing achievement motivation and performance in college students: An attributional retraining perspective. *Research in Higher Education, 34*, 687–720. doi: 10.1007/BF00992156

Perry, R., & Penner, K. (1990). Enhancing academic achievement in college students through attributional retraining and instruction. *Journal of Educational Psychology, 82*, 262–271. doi: 10.1037/0022-0663.82.2.262

Perry, R. P., & Struthers, C. W. (1994, April). Attributional retraining in the college classroom: Some causes for optimism. Paper presented at the American Educational Research Association annual meeting, New Orleans, LA.

Petrenko, C., Pandolfino, M., & Roddenbery, R. (2016). The association between parental attributions of misbehavior and parenting practices in caregivers raising children with FASD: A mixed methods study. *Research in Developmental Disabilities, 59,* 255-267. doi: 10.1016/j.ridd.2016.09.005

Pintrich, P., & Schunk, D. (1996). *Motivation in education: Theory, research, and applications.* Englewood Cliffs, NJ: Merrill/Prentice-Hall.

Popova, S., Lange, S., Burd, L., & Rehm, J. (2015). *The burden and economic impact of fetal alcohol spectrum disorder in Canada*. Toronto, Ontario: Centre for Addiction and Mental Health.

Professionals Without Parachutes. (2016). Professionals without parachutes: Building successes together. Retrieved from: http://professionalswithoutparachutes.com/

QSR International Ltd. (2015). NVivo Version 11 [Computer software]. Available from: http://www.qsrinternational.com/nvivo-support/downloads

Rasmussen, C. (2005). Executive functioning and working memory in Fetal Alcohol Spectrum Disorder. *Alcoholism: Clinical and Experimental Research, 29*, 1359-1367. doi: 10.1097/01.alc.0000175040.91007.d0

Reyna, C. & Weiner, B. (2001). Justice and utility in the classroom: An attributional analysis of the goals of teachers' punishment and intervention strategies. *Journal of Educational Psychology, 93*, 309-319. doi: 10.1037/0022-0663.93.2.309

Ross, J. A. (1992). Teacher efficacy and the effect of coaching on student achievement. *Canadian Journal of Education, 17,* 51-65. doi: 10.2307/1495395

Ross, J., Hogaboa-Gray, A., & Hannay, L. (2001). Effects of teacher efficacy on computer skills and computer cognitions of Canadian students in grade K-3. *The Elementary School Journal, 102*, 141-156. doi: 10.1086/499697

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, *80*, 1-28.

Rubin, D. (1976). Inference and missing data. *Biometrika, 63*, 581-592. doi: 10.2307/2335739

Skinner, E. A. (1996). A guide to constructs of control. Journal of personality and social psychology, 71(3), 549-570. doi: 10.1037/0022-3514.71.3.549

Smith, J. & Osborn, M. (2003). *Interpretive phenomenological analysis.* In J.A. Smith (Ed.) Qualitative psychology: A practical guide to research methods (pp.51-80). London, UK: Sage Publications.

Stade, B., Ali, A., Bennett, D., Campbell, D., Johnston, M., Lens, C., Tran, S., & Koren, G. (2009). The burden of prenatal exposure to alcohol: Revised measurement of cost. *Canadian Journal of Clinical Pharmacology, 16,* 91-102. Retrieved from www.cjcp.ca/far8010-e91-e102_stade-r101738

Stein, M., & Wang, M. (1988). Teacher development and school improvement: The process of teacher change. *Teaching and Teacher Education, 4,* 171-187. doi: 10.1016/0742-051X%2888%2990016-9

Streissguth, A., Barr, H., Bookstein, F., Sampson, P., & Olson, H. (1999) The long-term neurocognitive consequences of prenatal alcohol exposure: a 14-year study. *Psychological Science, 10,* 186-190. doi: 10.1111/1467-9280.00131

Streissguth, A. & Kanter, J. (Eds.). (1997). Primary and secondary disabilities in fetal alcohol syndrome. In *The challenge of Fetal Alcohol Syndrome: Overcoming secondary disabilities*, pp. 25-39). Seattle, WA: University of Washington Press.

Streissguth, A., Randels, S., & Smith, D. (1991) A test–retest study of intelligence in patients with the fetal alcohol syndrome: implications for care. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*, 584–587. doi: 10.1097/00004583-199107000-00009

Streissguth, A., Sampson, P., Olson, H., Bookstein, F., Barr, H., Scott, Feldman, J., & Mirsky, A. (1994). Maternal drinking during pregnancy: Attention and short-term memory in 14-year-old offspring—A longitudinal prospective study. *Alcoholism: Clinical & Experimental Research, 18,* 202-218. doi: 10.1111/j.1530-0277.1994.tb00904.x

Struthers, C. W., & Perry, R. P. (1996). Attributional style, attributional retraining, and inoculation against motivational deficits. *Social Psychology of Education, 1*, 171–187. doi: 10.1007/BF02334731

Szabo, Z. (2006). The influence of attributional retraining on career choices. *Journal of Cognitive and Behavioral Psychotherapies, 6*, 89–103. Retrieved from http://jcbp.psychotherapy.ro/

Tabachnick, B., & Fidell, L. (2007). *Experimental designs using ANOVA.* Pacific Grove, CA: Thomson/Brooks/Cole.

Tashakkori, A., & Teddlie, C., (Eds.). (2003). Handbook on mixed methods in the behavioral and social science. Thousand Oaks, CA: Sage Publications.

Tashakkori, A. & Teddlie, C. (2009). *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioural Sciences*. Thousand Oaks, CA: Sage Publications.

Teddlie, C., & Tashakkori, A. (2006). A general typology of research designs featuring mixed methods. *Research in the Schools, 13*, 12-28. Retrieved from: http://www.msera.org/docs/rits-v13n1-complete.pdf#page=19

Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68,* 202 - 248. doi: 10.3102/00346543068002202

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783–805. doi: 10.1016/S0742-051X(01)00036-1

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92,* 548-573. doi: 10.1037/0033-295X.92.4.548

Weiner, B. (2001). Intrapersonal and interpersonal theories of motivation from an attribution perspective. In Student motivation (pp. 17-30). New York, NY: Springer Publishing.

Weiner, B. (2006). *Social motivation, justice, and the moral emotions: An attributional approach.* Mahwah, NJ: Lawrence Erlbaum Associates.

Weiner, B. (2010). The development of an attribution-based theory of motivation: A history of ideas. *Educational Psychologist, 45,* 28-36. doi: 10.1080/00461520903433596

Weiner, B. & Kukla, A. (1970). An attributional analysis of achievement motivation. *Journal of Personality & Social Psychology,15*,1-20. doi: 10.1037/h0029211

Yin, R. (2015). *Qualitative research from start to finish.* New York, NY: Guilford Publications.

Ziegler, A., & Stoeger, H. (2004). Evaluation of an attributional retraining (modeling technique) to reduce gender differences in chemistry instruction. *High Ability Studies, 15*, 63–83. doi: 10.1080/1359813042000225348

Appendix A: Research Ethics Board Approval Details

Notification of Approval

Date:	September 09, 2014
Study ID:	Pro00050636
Principal Investigator:	Erin Atkinson
Study Supervisor:	Lia Daniels
Study Title:	Attributional Retraining Intervention for Pre-Service Teachers to Improve Self-Efficacy in Working with Students with Fetal Alcohol Spectrum Disorders
Approval Expiry Date:	September-08-15

Approved Consent Form:	Approval Date	Approved Document
	09/09/2014	Study Information Letter & Consent
	09/09/2014	Focus Group Information Letter & Consent

Thank you for submitting the above study to the Research Ethics Board 2. Your application has been reviewed and approved on behalf of the committee.

A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Research Ethics Board does not encompass authorization to access the staff, students, facilities or resources of local institutions for the purposes of the research.

Sincerely,

Stanley Varnhagen, PhD
Chair, Research Ethics Board 2

Appendix B: Letter of Information & Consent Form (Quantitative Phase)

INFORMATION LETTER

Study Title: *Pre-Service Teachers' Attributions in Working with Students with FASD*

Research Investigators:

Erin Atkinson, M.Ed.
6-102 Education North
University of Alberta
ematkins@ualberta.ca

Lia Daniels, Ph.D. (Supervisor)
6-123F Education North
University of Alberta
lia.daniels@ualberta.ca

Background

- You are being asked to participate in this study because you are a pre-service teacher.
- The results of this study will be used to inform how pre-service teachers are prepared for working with students with fetal alcohol spectrum disorders (FASD) in the future.

Purpose

- The purpose of this research is to evaluate the effectiveness of an intervention for pre-service teachers aimed at preparing them to work with students with FASD.

Study Procedures (Text below customized for each of the three treatment groups)

- Group 1 (Attributional retraining) – You will be asked to participate in a small group intervention that will include a presentation and group discussion lasting approximately 40 mins. You will also be asked to complete a pre- and post-survey, each taking approximately 10 mins, for a total investment of your time of approximately one hour.
- Group 2 (FASD Info) – You will be asked to participate in an FASD information session lasting approximately 40 mins. You will also be asked to complete a pre- and post-survey, each taking approximately 10 mins, for a total investment of your time of approximately one hour.
- Group 3 (Control) – You will be asked to complete a number of surveys for one hour.

- The data will be collected via paper and online surveys. Today you will complete paper-based surveys. Approximately 6 weeks from today, you will be emailed a link to your university email address to complete one final survey.
- Research assistants will comply with the University of Alberta Standards for the Protection of Human Research Participant http://www.uofaweb.ualberta.ca/gfcpolicymanual/policymanualsection66.cfm

Benefits

- You may gain awareness of how to work with students with FASD.
- The information gathered from this survey will help us to better understand pre-service teachers' understanding of FASD and how we can prepare teachers for working with these students in the classroom.

- You will receive one 1-hour research credit for participating in this research.
- There are no costs involved in this research.

Risk

- There are no anticipated risks of participation in this study. However, it is possible that there may be risks to participating that are currently unknown. If at any point in the research process the researchers learn of a potential risk that may affect your willingness to continue participating in the study, you will be notified via email immediately.

Voluntary Participation

- You are under no obligation to participate in this study. Your participation is completely voluntary
- You are under no obligation to complete this session. You can opt out or withdraw at any point without penalty. You may choose to withdraw your participation by not completing your survey and/or leaving the session. After the session, you may choose to have your data withdrawn up until the end of the semester (December 10, 2014) by emailing the researcher and requesting that you be removed from the study.

Confidentiality

- The data collected from this study will be used to create research presentations and publish academic articles. A summary will be posted on the following website: http://albertacentre4me.wordpress.com/ by June 2015. You will not be personally identified in this summary or in any publications or presentations.
- All of the data collected will be handled in compliance with the University of Alberta Standards
- Data will be kept confidentially and your anonymity for completed surveys is certain. Research assistants will sign confidentiality agreements. Your student number is being collected for purposes of matching your survey data, but will not be used to identify you in any way.
- Data will be kept on a password-protected computer in a locked office space for a minimum of 5 years after the survey is completed. .

Further Information

- If you have any further questions regarding this study, please do not hesitate to contact Erin Atkinson (ematkins@ualberta.ca) or Lia Daniels (lia.daniels@ualberta.ca)
- If you have any questions or concerns about your rights as a participant, or how this study is being conducted, you may contact the Research Ethics Office at 780-492-2615. This office has no affiliation with the study investigators.
- You can keep this page for your records.

CONSENT FORM

Title of Project: Pre-Service Teachers' Attributions in Working with Students with FASD

Principal Investigator: Erin Atkinson; University of Alberta, (ematkins@ualberta.ca)
Co-Investigators: Lia Daniels, University of Alberta (lia.daniels@ualberta.ca)

Please answer the following questions:

• Do you understand that you have been asked to participate in a research study?	Yes	No
• Have you read and received a copy of the attached Information Letter?	Yes	No
• Do you understand the benefits and risks involved in taking part in this research study?	Yes	No
• Have you had an opportunity to ask questions and discuss this study?	Yes	No
• Do you understand that you are free to refuse to participate, or to withdraw from the study at any time, without consequence?	Yes	No
• Has the issue of confidentiality been explained to you? Do you understand who will have access to your information?	Yes	No
• This study was explained to me by the information letter	Yes	No

Please sign this copy of the consent form and return to the researcher.

I HAVE READ AND UNDERSTOOD THE LETTER OR INFORMATION AND THIS CONSENT FORM, AND I AGREE TO PARTICIPATE IN THE STUDY.

Participant's Name: _____

Signature: _____

Date: _____

Appendix C: Demographic Survey Items

1. Age: _____

2. Sex: ___Male ___Female ___Other

3. Program:
    a. ___ Elementary
    b. ___ Secondary
    c. ___ Special Ed
    d. Other – Please specify: _____

4. Have you completed your IPT? ___Yes ___No

5. Have you completed you APT? ___Yes ___No

6. To what extent have you been involved in working with individuals with FASD in the past?
    a. ___Not at all
    b. ___Very little
    c. ___Somewhat
    d. ___Very much

7. To what extent do you expect to be involved in working with students with FASD in your career as a teacher?
    a. ___Not at all
    b. ___Very little
    c. ___Somewhat
    d. ___Very much

Appendix D: Modified CDS-II Items

Please read the following Vignette: A student in your class has been diagnosed with FASD. You notice that he has difficulty planning and organizing his behaviour, as he often seems confused as to how to begin and complete classroom assignments or tasks. He requires additional time to complete tasks. He is struggling in all subjects, particularly when topics become increasingly abstract (i.e. word problems in math, language concepts that are less concrete). Additionally, his learning/memory seems inconsistent; he may know the answer to a question one day, but forget it the next. Although he appears to understand instructions, because he can repeat them back to you when asked, he is unable to actually follow those instructions. He also appears to be more immature than his same aged peers and so he is often either alienated, or ends up spending time with others who struggle to fit in. He often finds himself in trouble because he is impulsive, and does not seem to think before he acts. You have been working with him for quite some time to help him to change his behaviours, but he does not seem to be making connections and learning from past experiences and consequences.

15. Thinking about the vignette above, what do you believe is the PRIMARY CAUSE (i.e. number one cause) of the difficulties students with FASD experience in school?

_____

Please answer the following questions while thinking of the PRIMARY CAUSE you described above:

The PRIMARY cause of the difficulties associated with FASD:

1. Is manageable by the child	1	2	3	4	5	6	7	8	9	Is not manageable by the child
2. Is permanent	1	2	3	4	5	6	7	8	9	Is not permanent
3. Can be regulated by the child	1	2	3	4	5	6	7	8	9	Cannot be regulated by the child
4. Can be controlled by other people	1	2	3	4	5	6	7	8	9	Cannot be controlled by other people
5. Is something I can control	1	2	3	4	5	6	7	8	9	Is something I cannot control
6. Is stable over time	1	2	3	4	5	6	7	8	9	Is not stable over time
7. Is under the power of other people	1	2	3	4	5	6	7	8	9	Is not under the power of other people
8. Is manageable by me	1	2	3	4	5	6	7	8	9	Is not manageable by me
9. Is something the child has power over	1	2	3	4	5	6	7	8	9	Is not something the child has power over
10. Is unchangeable	1	2	3	4	5	6	7	8	9	Is changeable
11. Can be regulated by others	1	2	3	4	5	6	7	8	9	Cannot be regulated by others
12. Is something I have power over	1	2	3	4	5	6	7	8	9	Is something I do not have power over

Appendix E: Modified TSES Items

Please answer the following questions based on your experiences and expectations as a pre-service teacher. Choose the answer that best reflects your belief.

	Nothing	Very Little	Some Influence	Quite a Lot	A Great Deal
How much can you do to control the disruptive behaviour of students with FASD in the classroom?	1	2	3	4	5
How much can you do to motivate students with FASD in their school work?	1	2	3	4	5
How much can you do to get students with FASD to believe they can do well in school work?	1	2	3	4	5
How much can you do to help students with FASD value learning?	1	2	3	4	5
To what extent can you craft good questions for students with FASD?	1	2	3	4	5
How much can you do to get students with FASD to follow classroom rules?	1	2	3	4	5
How much can you assist families in helping students with FASD do well in school?	1	2	3	4	5
How well can you establish a classroom management system with students with FASD?	1	2	3	4	5
How much can you use a variety of assessment strategies with students with FASD?	1	2	3	4	5
To what extent can you provide an alternative explanation or example when students with FASD are confused?	1	2	3	4	5
How much can you calm students with FASD when they are disruptive or noisy?	1	2	3	4	5
How well can you implement alternative strategies in your classroom to support students with FASD?	1	2	3	4	5

Appendix F: Considerations for the Development of the FASD AR Intervention

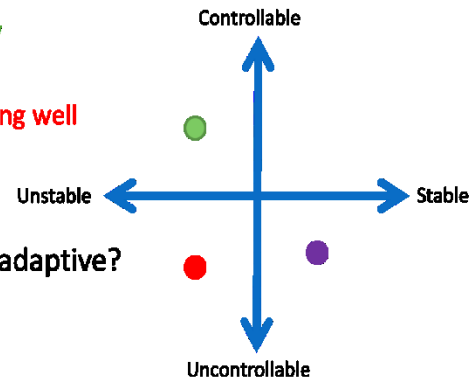
The development of this FASD-specific AR intervention borrowed largely from Haynes & colleagues (2009) proposed protocol for AR interventions, and their extensive review of the AR literature helped inform decision-making on the inclusion of specific components. Still, each of the five stages of this protocol needed to be adapted specifically for the topic of FASD, a novel area in AR intervention research. The development of this AR intervention was an iterative process, as considerations and challenges were identified, addressed, and reflected upon. Feedback from pre-service teachers, fellow colleagues, and experienced FASD researchers was sought throughout development. A summary of key considerations and decision-making points regarding the development of the intervention, organized by AR stage, is presented below.

	Questions & Considerations	Decisions Made
Stage 1: Pre-Assessment	**Survey Development** - Considerations for survey format (paper, online), timing (completed in advance, or during AR session), and measures to be included. At this point, modifications to wording on the TSES and CDS-II were required to specifically reflect students with FASD.	Online survey to be complete on-site before intervention begins. This ensures all participants complete pre-assessment, and allows for dual purpose of the survey as the causal search activation component (see next stage).
Stage 2: Causal Search Activation	**How to Activate Causal Search** - Considerations for how to best to get participants thinking about the causes of the difficulties experienced by children with FASD in order to fill out the CDS-II. Specifically: • Do pre-service teachers know enough about FASD to complete the CDS-II? • Could a vignette assist participants in answering the questions? To address this, two versions of the surveys were piloted – one where participants listed difficulties experienced by students with FASD and one where they read a vignette detailing some of these difficulties. They were then asked to identify a primary cause for the difficulties, and to complete the CDS-II. During a "Think Aloud" activity, a group of pre-service teachers overwhelmingly supported the use of the vignette to assist them in completing the CDS-II, citing that their limited knowledge of FASD made creating a list very difficult.	The CDS-II acted as the causal search activation for the intervention. A vignette was added for participants to reference when indicating their beliefs about the primary cause of the difficulties experienced by children with FASD. This vignette was developed with the support of Dr. Jacqueline Pei, an experienced FASD researcher and practitioner. The rationale for including the vignette was to provide participants with enough information to know what was being asked of them when completing the items.

Stage 3: AR Induction	**Type of Induction Activity** – Various methods have been used in previous academic AR studies, including video taped AR narratives, sometimes accompanied by handouts. The question for this stage was what would be most effective and feasible given the FASD subject matter?	A handout was chosen in part due to resources – creating a video was outside the scope of this research. The handout would also allow for a tangible take-home resource that participants could reflect on and reference in the future. This handout was developed, reviewed, and edited with the help of colleagues in a lab group.
Stage 4: AR Consolidation	**Type of Consolidation Activity** - A number of consolidation activities have been proposed and implemented in previous AR research. Some (e.g. aptitude testing) were not relevant to the current study, but a number were. A decision needed to be made between an individual writing exercise, and a group activity for consolidating participants' learning.	Small group activity was chosen with the goal of making the intervention as interactive and engaging as possible, and to allow for participants to learn from the experiences of others. Also, given the 1-hour limit for the participant pool study, an individual writing assignment would not have been feasible to complete.
	How to Consolidate without personal experience - Consolidation activities often ask participants to draw on their own personal experiences to make AR learning more meaningful and personally relevant. For this intervention, how could participants with no previous experience and little knowledge of FASD participate most effectively?	Vignettes were created and made available for those who did not have personal experience to draw on during the consolidation activity. These vignettes were based on behavioural and neuropsychological profiles of students with FASD, and were reviewed and vetted by Dr. Jacqueline Pei, an experienced researcher and practitioner in the field of FASD.
Stage 5: Post-Assessment	**How and When to Follow Up** - Following delivery of the intervention, decisions needed to be made regarding how and when to follow-up with participants for a post-measure of their attributions and self-efficacy. Previous AR research has varied widely in post-measurement timing, from immediately following the intervention to 5-7 months after. Access to participants through the participant pool limited the timeframe for completion of this study, and necessitated that follow-up surveys be completed before the end of the semester.	Participants were emailed links to online surveys approximately 4-6 weeks following their in-person AR sessions. This maximized the time between AR and follow up, while still respecting the end-of-semester as a deadline for participation.

Appendix G: AR Intervention Content & Handouts

Summary of PowerPoint Presentation

Component	Content Presented
Introduction to FASD	Participants were given a basic overview of FASD, which included: ***What is FASD?*** *F = Fetal: changes in normal development in utero* *A = Alcohol: teratogen that crosses placenta* *S = Spectrum: damage/difficulties present (mild to severe)* *D = Disorder: a difficulty or inability to function/adapt as expected* • *Large variability (spectrum) in presentation* • *Difficulties with behaviour regulation, cognition, memory, social skills, attention, motor skills, language, adaptive skills, executive functions, and academic achievement can be challenging for teachers.*
Goal of this Session	The goal for the AR session was made explicit to participants: *To help prepare you for successfully working with students with FASD by reframing some of the ways you might currently be thinking about these children and the difficulties they experience in school. We will focus on Attributions – how we perceive and understand the causes of events or outcomes that happen in our life.*
Introduction to Causal Dimensions	**Stable < ---------- > Unstable** **Controllable < ---------- > Uncontrollable**
Academic Example Using Causal Dimensions	Example of academic failure was provided to illustrate how causal dimensions interact, before moving to FASD-specific content. Participants were asked to situate causes along the dimensions, followed by a discussion of adaptive vs. maladaptive attributions. • Doing poorly on a test • Why? • Didn't study • Not smart • Wasn't feeling well • Which is most adaptive? 

Attributions about FASD	Participants were asked for examples of causes they indicated on their surveys for the difficulties experienced by children with FASD. These were situated on the causal dimensions.
AR Induction	Participants were provided with a handout (see below) to assist in re-attributing the difficulties experienced by students with FASD in the classroom. The handout was reviewed, adaptive (unstable and personally controllable) examples of attributions were discussed, and participants were provided with an opportunity to ask questions.
AR Consolidation: Group Activity	Participants were divided into groups of 4-6, and were asked to complete a group consolidation activity. They had the choice of drawing on a personal experience of a group member in working with a student with FASD, or working with a hypothetical vignette situation. A Group Consolidation Activity handout (see below) guided their process. Participants were asked to list possible causes of the difficulties experienced by the child, the underlying dimensions that may underlie those causal beliefs, and whether they were adaptive or maladaptive. The group activity was reviewed as a larger group, and suggestions for more adaptive attributions were discussed.
Summary & Conclusion	Information was summarized, two take home messages were emphasized: • The way we think influences how we act, and therefore how we work with students with a variety of difficulties, including those with FASD. • We can challenge our thinking, and adopt more adaptive thinking. Finally, participants were provided with a list of FASD resources (see below) to further support the AR consolidation process.

AR Induction Handout

Working with Students with FASD

Working with children with FASD can be challenging. Here are some suggestions for challenging the way you might be thinking about the difficulties these children face in the classroom.

AR Consolidation Group Activity Handout

Rather than Thinking…	Instead, Think…
• This child has a permanent brain injury and nothing can be done.	• Although FASD is a permanent, life-long condition, children can make considerable gains with appropriate support and intervention. (see FASD Resources handout).
• This child is struggling because of a poor home situation. There is nothing I can do to change that.	• I can attempt to collaborate with parents and caregivers to support this child. • If that is not an option, this child spends a considerable amount of their time with me at school, where I have the ability to create a supportive environment.
• This child has been struggling for so long, and nothing I try works. This child will never change.	• Instead of wondering whether the child is capable of change, I can choose to ask "what can be changed?"
• This child has difficulties that are beyond my skill level as a teacher. I can't possibly provide the support he or she needs.	• I have the basic skills required to support this child in the classroom. • I have the ability to seek additional help and resources, to learn more about this disorder, and to seek help from others.
•	•

Small Group Activity

If you've worked with a child with FASD – think of a specific situation in which the child experienced a difficulty or was struggling.

If you haven't worked with a child with FASD – Request a vignette, and read it thoroughly.

Step 1

List 3 possible causes of the child's difficulties. **Why is this child is struggling**?

1. _____
2. _____
3. _____

Step 2

What attributions would you associate with each cause? (i.e. stable, unstable, controllable, etc)

1. _____
2. _____
3. _____

Step 3

Are these the most adaptive attributions? If not, how can we challenge our thinking?

FASD Vignettes for AR Consolidation Group Activity

Vignette 1. 11-year-old Johnny transferred into your class in November, from another school. Johnny was transferred because he was experiencing severe behaviour problems and his school thought he needed a "fresh start". Reviewing his file, you read that he has frequent anger outbursts, he was often sent to the office for disruptive behaviour, he tends to yell at a teacher when he is challenged, and he generally doesn't get along with his peers. Efforts to modify his behaviour (reward systems, punishment, removal of privileges, etc) have been unsuccessful. Although his previous school had contacted his parents for support, they were overwhelmed and had no suggestions for help. They explained that he had FASD and, as a result, he could not manage his behaviour. The first day in your class, Johnny lives up to his reputation. He starts by irritating other students, escalating quickly into a temper tantrum that has him spending the rest of the day in the principal's office.

Vignette 2. A 12-year-old girl in your class, Julie, has chronic problems with attendance. When she does attend school, she is often late and has not completed her homework. She is doing very poorly on tests and not completing assignments, and you often keep her in at recess to complete the work that she hasn't finished. She struggles with transitions, takes a long time to warm up to new tasks, and often appears anxious in the classroom. Julie seems to have a limited vocabulary, as she struggles to express herself when you ask her questions about why she doesn't come to school or complete her homework. Although you don't know her very well, she is very quiet, compliant, and well-behaved in class, so you question why she is not engaged. You have repeatedly attempted to contact her parents to voice your concerns, but your phone calls and emails have not been returned.

FASD Resources Handout

FASD Resources

You may find the following websites helpful for learning more about FASD, including current research on classroom strategies and interventions for children with FASD.

Teaching children with FASD: www.fasd.typepad.com/fasd_support_in_alberta/

FASD in the classroom: www.fasdoutreach.ca/elearning/learning-about-fasd

Government of Alberta (also check other provincial government websites for handbooks/resources)

- www.education.alberta.ca/admin/special/resources/fasd.aspx
- www.education.alberta.ca/teachers/resources/fasd.aspx

FASlink – Educating Students with FAS/FAE: www.faslink.org/n.htm

Canadian FASD Research Network: www.canfasd.ca/

FASD Prevention Blog: www.fasdprevention.wordpress.com/

FASD Learning Series: www.fasd-cmc.alberta.ca/education-training/fasd-learning-series-2011-2012/

Edmonton and Area Fetal Alcohol Network: www.edmontonfetalalcoholnetwork.org/

Intervention Network Action Team (iNAT): www.canfasd.ca/networkActionTeams/initiative2.aspx

FASD Community of Practice: www.fasdcommunity.ca/join

Appendix H: Focus Group/Interview Protocol & Questions

FACILITATOR'S GUIDE

Facilitator's Role

The facilitator's role is to moderate the discussion, to keep the conversation on track, to help participants to talk with one another, rather than engaging in question and answer, and to ensure that all topics are covered in the available time.

Each key question has been written as a probe to spark discussion. **Some key questions have two or three questions within them. Read the whole of each key question. Then repeat the first part if there are two or more parts. The second and third parts may be repeated or used as a probe**.

Try to obtain as many different points of view as possible on each topic. And try to foster interaction that explores participants' reactions in some depth.

Direct discussion toward concrete and specific accounts of participants' experiences so that the conversations elaborate on the detail and are not too general.

FACILITATOR'S INTRODUCTORY SCRIPT—PLEASE READ, OR "AD LIB" THE IDEAS

Opening - [Facilitator introduces self and note-taker.]

Please review your information letters and sign your consent forms before we begin. Feel free to ask if you have any questions.

This research is aimed at understanding your experiences of an attributional retraining intervention that you recently participated in. The subject of this intervention was about changing the way you think about working with students with FASDs in your future classrooms. Now, we want to hear about your experiences of the intervention and your recommendations for future improvement.

Before we get underway, I just want to review with you the ground rules for our conversation today:

- *Only one person speaks at a time.*
- *No side conversations—these obscure the audio recording.*
- *It is important that we hear from each of you, and that no one dominates the conversation. If I notice someone is not participating, I may invite you to join the conversation. You are not required to speak; I just want to make sure that everyone has the opportunity.*
- *Either you or I will steer the discussion to another topic if conversation becomes unproductive.*
- *The note-taker will note who is speaking, but will not participate in the discussion.*
- *There are **six main or key questions**, so we will allow approximately 8 minutes for each question.*
- *Just a quick reminder about confidentiality. As you know from the information letters that your name will not be recorded in the write up. As well, in order to maintain the privacy of participants, please speak in general terms about colleagues and do not refer to anyone by name. In addition, the discussion from this focus group interview is considered confidential among the participants. Please respect that confidentiality by keeping what is said here in this room.*

Transition:

Let's begin by asking each of you to introduce yourself by your first name. You may use a pseudonym if you prefer.

Key questions

1. What do you remember about the Attributional Retraining session that you participated in, about children with FASD?

2. Which aspect of the AR session was most helpful? (i.e. learning about attributions, discussions with colleagues, getting more info about FASD)
    a. Which aspects were least helpful?
    b. Did you find anything confusing or difficult to understand? If so, what?

3. Following the intervention, how do you feel about your ability to work with students with FASD in your future classrooms?
    a. Do you feel more or less prepared? Confident?
    b. How do you view students/individuals with FASD? Has your view changed since the intervention?

4. What kind of information or experiences do you require to feel prepared to work with students with FASD?
    a. How could you access that information/experience?

5. What are your biggest concerns about working with students with FASD in your future classrooms?
    a. Did the AR session address any of these concerns?
    b. What are some important qualities or characteristics that a teacher should have to work successfully with children with FASD?

6. How can you, as a teacher, play a role in promoting positive and successful futures for your students with FASD?

Summary of Key Points

*The note taker and/or facilitator (decide this in advance) takes the last few minutes of the focus group to summarize a few key points of the conversation. This might include speaking just to one question, or briefly going over general themes. The point here is to ensure participants' feel accurately heard.

Appendix I: Letter of Information and Consent Form (Qualitative Phase)

Project Title: *Pre-service Teachers' Experiences of an Attributional Retraining Intervention*

Research Investigators:

Erin Atkinson, M.Ed. – 6-102 Education North, University of Alberta, ematkins@ualberta.ca
Lia Daniels, Ph.D. (Supervisor) – 6-123F Education North, University of Alberta, lia.daniels@ualberta.ca

Dear Participant:

This letter introduces "*Pre-service Teachers' Experiences of an Attributional Retraining Intervention*" project, which is focused on exploring the experiences of participants who take part in a attributional retraining intervention for working with students with Fetal Alcohol Spectrum Disorders (FASD). You have been invited to participate in this focus group following your completion of the attributional retraining intervention in the fall semester of 2014.

To document and learn more about your experience of this intervention, the current project requests your participation in focus groups of approximately one (1) hour, to be conducted by graduate research assistants. We will be asking you questions about your experience of the intervention, your expectations for the future, and your beliefs about students with FASD. After the focus group, you will be provided with a summary of findings at which point your feedback and any additional information you wish to share will be welcomed.

The focus group will be audio-recorded and these audio recordings will be transcribed. A pseudonym will be assigned to your data to maintain confidentiality. Your participation is voluntary. No one (including participant pool coordinators, as this is outside your requirement for participant pool) will know whether or not you chose to participate in this project. Although we cannot guarantee that others participating in the focus group will maintain the confidentiality of what is discussed during the session; we will ask them to do so and emphasize mutual respect for the opinions of others. You may choose to withdraw your data from this project at any time before the end of April 2014, without penalty, simply by notifying the researchers via email. Only the researchers will have access to this information and the analyzed data, to protect the rights, dignity, and welfare of all those who have agreed to participate. If you have any concerns at any time about the project, you are urged to contact us using the information listed at the top of this letter.

While there are no direct benefits to you for your participation, sharing your experiences of this intervention and your views on students with FASD will help us to make improvements to similar intervention in the future. It is also possible that you may learn from the experiences shared by other participants.

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contract the Research Ethics Office at (780) 492-2615.Please keep this description of our work together for your records. Thank you in advance for supporting our exploration of this attributional retraining intervention for pre-service teachers.

Sincerely,

Erin Atkinson, M.Ed., and Lia Daniels, Ph.D.

Consent Form for Focus Group & Interview Participants

Project Title: *Pre-service Teachers' Experiences of an Attributional Retraining Intervention*

- I have read and retained a copy of the letter of information concerning the study "An Attributional Retraining Intervention for Pre-Service Teachers" project and agree to participate in the study. All questions have been explained to my satisfaction. I am aware of the purpose and procedures of this study.

- I understand that my participation will involve participation in a focus group, to be conducted by a research assistant. I have been informed that this focus group will be audio recorded.

- I have been notified that participation is voluntary and that I may withdraw at any point during the study without any consequences to myself. I understand that all measures to protect confidentiality will be taken with appropriate storage, access of data, and the use of pseudonyms.

I understand that I will be provided with a summary of findings after the completion of this research for my review and I will then have the opportunity to provide feedback. I understand that the researchers intend to publish the findings of this study and to present them at conferences.

I am aware that I can contact the researchers, Erin Atkinson (ematkins@ualberta.ca) and Lia Daniels (lia.daniels@ualberta.ca) if I have any further questions about this project.

I understand that the plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contract the Research Ethics Office at (780) 492-2615.

Please sign this copy of the consent form and return to the researcher.

I HAVE READ AND UNDERSTOOD THE LETTER OR INFORMATION AND THIS CONSENT FORM, AND I AGREE TO PARTICIPATE IN THE STUDY.

Participant's Name: _____

Signature: _____

Date: _____