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The Association Between Parental Attributions of Misbehavior and Parenting Practices in Caregivers Raising Children with Prenatal Alcohol Exposure: A Mixed-Methods Study

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Abstract

Background and Aims—Limited research has focused on parenting practices used by caregivers raising children with fetal alcohol spectrum disorders (FASD). The current study hypothesized that parental attributions of children's misbehavior would relate to the parenting strategies caregivers utilize with children with FASD. This study also aimed to develop a coding scheme to allow quantification of these treatment-relevant constructs in future intervention trials.

Methods—Thirty-one caregivers of children with FASD (age 4-8) were interviewed with the Parenting Practices Interview (PPI), a study-developed qualitative interview. Quantitative measures of FASD knowledge, parenting sense of competence and stress, and child behavior problems were included. Mixed-method analyses assessed the relationship between parental attributions of misbehavior and parenting practices.

Results—Caregivers who attributed their child's misbehavior to underlying neurodevelopmental disabilities were more likely to use antecedent strategies and feel more confident in managing their child's behavior. Parents who attributed their child's misbehavior to willful disobedience were more likely to rely on consequence strategies and feel more ineffective.

Conclusions—Results are consistent with theoretical models for FASD parent training interventions. Assessment of theorized mechanisms of change in intervention trials is needed; the development of the PPI and quantitative coding system will facilitate this type of research.

Graphical Abstract

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Keywords

fetal alcohol spectrum disorder; fetal alcohol syndrome; prenatal alcohol exposure; parent attributions; parenting; assessment

1. Introduction

Active case ascertainment studies estimate that 2 to 5 percent of children in the United States have neurodevelopmental disabilities associated with prenatal alcohol exposure (PAE) (May et al., 2014). The term fetal alcohol spectrum disorders (FASD) encompasses the range of effects associated with PAE, and includes formal diagnoses of fetal alcohol syndrome (FAS), partial FAS (pFAS), and alcohol-related neurodevelopmental disorder (ARND; Hoyme et al., 2005). Children with full FAS present with a characteristic pattern of subtle facial features, growth delay, and central nervous system (CNS) damage or dysfunction. Children with pFAS have many of the same features, but typically lack a history of growth delays. Children with ARND have confirmed prenatal alcohol exposure and CNS dysfunction, but lack the pattern of facial dysmorphology or growth delays. Research has demonstrated that children with or without the characteristic facial features associated with PAE have similar patterns of CNS dysfunction (Mattson, Riley, Gramling, Delis, & Jones, 1998). The pattern of CNS dysfunction is somewhat variable by individual, but often involves impairments in complex information processing, learning and memory, executive functioning, social communication, and adaptive skills (Kodituwakku & Kodituwakku, 2014; Mattson, Crocker, & Nguyen, 2011). Additionally, children with FASD often display significant internalizing and externalizing behavior problems that interfere with their social relationships and functioning in home, school, and community settings. Individuals with FASD are at high risk for secondary conditions, such as mental health problems, school disruption, and trouble with the law, especially as they enter adolescence and adulthood (Streissguth et al., 2004).

Behavior problems and secondary conditions contribute to the high cost and caregiving burden for families raising children with FASD (Olson, Oti, Gelo, & Beck, 2009; Popova, Statde, Bekmuradov, Lange, & Rehm, 2011; Tsang, Lucas, Olson, Pinto, & Elliott, 2016). Many children with FASD are raised in some form of out-of-home care (e.g., foster, adoptive, relatives, residential) due to their biological parents being unable to provide a stable and nurturing home (Astley, 2010). Regardless of caregiver type, recent research has

documented that caregivers of children with FASD often experience higher levels of stress relative to caregivers of typically developing children or caregivers of children with other types of developmental disabilities, such as autism (Paley, O'Connor, Frankel, & Marquardt, 2006; Watson, Coons, & Hayes, 2013). Identifying effective parenting approaches for children with FASD is critical for intervention development and improving family functioning.

A growing body of research has documented the efficacy of intervention programs targeting the cognitive and behavioral challenges associated with FASD (Petrenko, 2015). The majority of interventions developed for preschool and school age children with FASD have incorporated parent education and training to improve children's behavior and adaptive functioning and aid in child skill generalization outside of the treatment setting. The current study investigates the association between parental attributions of behavior and parenting practices, two treatment-relevant constructs that are often targeted in intervention programs. This study also provides a critical foundation for future research to directly test theorized mechanisms of change in family-focused interventions for FASD.

1.1 Parenting Children with FASD

Previous research has documented that caregivers raising children with FASD utilize similar parenting behaviors (e.g., consistent discipline, involvement with children, positive parenting approaches) in comparison to parents of typically developing children (Olson et al., 2009). However, children with FASD frequently display significant behavior problems, even in the context of families using consistent, standard parenting approaches. As a result, their caregivers often experience considerable stress and feel discouraged about their parenting skills (Olson et al., 2009; Paley et al., 2006; Watson et al., 2013). This discrepancy leads to the logical conclusion that interventions for families raising children with FASD may need to focus on different types of parenting practices than those typically used with children with externalizing behavior problems.

Positive behavioral support (PBS) is an optimal framework for families raising children with FASD as it takes into account the neurological impairment that co-occurs with children's challenging behaviors (Olson et al., 2009). PBS originated within the field of developmental disabilities and evolved from three major sources: applied behavior analysis, the normalization/inclusion movement, and person-centered-values (Carr et al., 2002). PBS focuses on expanding the child's behavioral repertoire while also adapting the child's environment so that they can function more adaptively and enjoy a better quality of life (Carr et al., 2002; Koegel, Koegel, & Dunlap, 1996). PBS involves systematic observation and analysis of patterns of behavior within the child's environmental contexts to identify the relevant factors (e.g., intrapersonal, interpersonal, environment) that predict or maintain challenging behaviors. Behavior plans are then developed, often with an emphasis on antecedent strategies. These types of strategies address setting factors and ways to set up the environment so that the child's behavior is more functional. They involve a process of proactively finding ways to change the caregiver's behavior, modify the child's environment, or adjust daily schedules to anticipate and prevent misbehavior.

The underlying theory in existing parenting interventions that incorporate PBS for children with FASD proposes that caregivers who view their children's behavior from a neurodevelopmental perspective (versus willful disobedience) are more likely to use antecedent strategies and strategic behavior plans (Bertrand, 2009; Olson & Montague, 2011; Olson et al., 2009). In line with this theory, parenting interventions have incorporated psychoeducation and cognitive behavioral strategies to target caregivers' attributions of their children's behaviors. Programs also train parents to use antecedent strategies or systematic behavior plans based on their children's observed behaviors and pattern of neurodevelopmental disabilities. It is theorized that parents who utilize these strategies will feel more effective in their parenting and positive about their children (Bertrand, 2009; Olson et al., 2009).

Although improvements in child behavior and parenting self-efficacy have been documented in controlled trials of parent training interventions with this population (Bertrand, 2009), the theorized mechanism of change linking attributions of behavior and parenting practices to changes in behavior and parenting self-efficacy has not been tested to date. In addition, few studies have characterized the parenting practices of children with FASD or have investigated caregivers' attributions for their children's behavior.

One reason for this gap in the literature is the lack of adequate measures to assess the constructs of parental attributions of behavior and parenting practices that are relevant for this population. Parenting assessments commonly used with parents of typically developing children are less likely to detect the more specialized parenting approaches hypothesized to be the appropriate targets of intervention, such as antecedent strategies in PBS. Measures that are able to sensitively discriminate the types of parenting practices that are most effective for children with developmental disabilities are needed to adequately understand how parental attributions influence adaptive parenting behavior in this population.

1.2 Support for the Association between Parental Attributions and Parenting Behaviors in Other Populations

Studies with typically developing community samples find parental attributions of behavior are associated with parents' emotional reactions to their children and their parenting practices (e.g., Dix, Ruble, & Zambarano, 1989; Miller, 1995; Slep & O'Leary, 1998). Consistent with attribution theory (Miller, 1995; Weiner, 1985), parents who attribute their children's misbehavior to internal (reflective of child characteristics rather than situational factors), stable (not simply a one time occurrence), or controllable (something the child could have avoided) factors are more likely to respond with negative affect and utilize power-assertive, reactive, or coercive parenting responses. Attributions of knowledge, intentionality, and responsibility increase with age, and thus parents are more likely to respond negatively and with more intense parenting responses to an older child.

Very few studies have investigated the relationship between parental attributions for misbehavior and parenting behaviors in children with developmental disabilities (Hassal & Rose, 2005). In one study of Latina mothers raising children with moderate to severe intellectual disabilities, attributions of negative behaviors were associated with maternal affect and parenting strategies (Chavira, Lopez, Blacher, & Shapiro, 2000). Specifically,

mothers who viewed their children as responsible for negative behaviors had higher levels of negative affect and were more likely to use harsh or aggressive parenting strategies. Although this association represented a moderate effect and was robust in the context of other demographic factors, the majority of mothers attributed limited responsibility to their children for negative behaviors and only a relatively small percentage of the sample reported harsh or aggressive parenting strategies. It is reasonable to predict that parents of children with less visible developmental disabilities (i.e., no visible physical manifestations, higher intellectual functioning), such as those raising children with FASD, may be more likely to attribute their children's misbehavior to willful disobedience.

1.3 The Current Study

The first aim of the current study was to test the association between parental attributions of misbehavior and parenting practices in caregivers of children with PAE. Since little is known about the parenting practices of caregivers raising children with FASD, a semi-structured qualitative assessment was selected to avoid limiting caregivers' response options and to enhance relevance to the diversity of experiences and family contexts often seen in families raising children with FASD. A mixed-method data analytic approach was utilized to test the association between parental attributions of behavior and parenting practices. It was hypothesized that caregivers who attribute their children's misbehavior to their neurodevelopmental disabilities would be more likely to use antecedent strategies to manage behavior and report feeling more effective as parents. In contrast, caregivers who view their children's behavior as willful were expected to rely more on consequence-based strategies to manage behavior and feel less effective and satisfied with their parenting. Greater knowledge about FASD was expected to predict neurodevelopmental attributions of behavior.

The second aim of the study was to develop a coding system to allow for quantification of the treatment-relevant constructs of parental attributions and parenting practices for use in subsequent investigations of intervention efficacy. A quantitative coding system would provide the means necessary to carry out a true test of the theorized mechanism of change in parent consultation programs with children with FASD and their families, as well as with other populations with neurodevelopmental disabilities.

2. Material and Methods

2.1 Participants and Recruitment

Data for the current study was collected as part of a pilot investigation of the efficacy of a multi-component intervention program designed to prevent secondary conditions in children with FASD. To be eligible, children had an FASD diagnosis based on Revised Institute of Medicine guidelines (Hoyme et al., 2005) or confirmed history of PAE, were between 4 and 8 years old, lived within a reasonable distance of study sites in Rochester and Buffalo, NY, and were expected to remain in their current placement for the study duration (~18 months, including 9-month intervention and follow-up timepoints). All children were evaluated by a pediatric geneticist with expertise in FAS, and received a neuropsychological evaluation as part of the larger investigation. Just over 40 percent of children met criteria for a diagnosis of

FAS or pFAS. The remaining children had confirmed prenatal alcohol exposure and some evidence of CNS dysfunction, but lacked the characteristic set of facial features or growth delays. Given the overarching goal of the intervention program to prevent secondary conditions and the young age of the sample, children in this latter group were not required to meet full criteria for ARND (requiring at least 3 domains of significant impairment) to participate. Some domains of impairment (e.g., executive functioning, social communication) are likely to become more apparent as children age and demands increase. Children were excluded from the study if they had moderate to severe intellectual disabilities ($IQ < 55$), lacked sufficient English proficiency, or had physical or mental conditions that would preclude them from participating safely in research interviews or intervention sessions. Families were recruited to the study through provider referrals, brochures and flyers, and presentations at local parent support groups. Participant characteristics can be found in Table 1. It is relevant to note that while a few of the children were living with or had contact with a biological parent, none of the primary caregivers who participated in this study were a biological parent of the child. The primary caregivers of the children who were living with or had contact with a biological parent were generally extended relatives (e.g., grandparent, aunt) or an adoptive step-parent. The mean overall cognitive ability for the sample of children was 90.71 ($SD=13.87$, range = 62 – 120), as assessed by the Differential Abilities Scale, Second Edition (DAS-II; Elliott, 2007).

2.2 Procedures

Current data are from the caregiver baseline research visit that occurred prior to randomization to intervention condition. Written informed consent was obtained from all caregivers in the study prior to their participation. The research visit lasted approximately 2 to 2.5 hours and consisted of interviews and standardized questionnaires presented to the caregiver by a trained research assistant. Research assistants were trained by the lead author in standard administration and qualitative interviewing techniques and completed several pilot interviews before being approved to conduct research visits.

Estimates of children's general cognitive functioning (DAS-II) were obtained during neuropsychological assessments completed with all children as part of the study prior to randomization. Written permission was obtained for children's participation in the study from the child's parent or legal guardian and children ages 7 to 8 provided verbal assent prior to their participation.

2.3 Measures

2.3.1 Parenting Practices Interview (PPI)—The PPI was developed for the current study to assess parenting strategies and parental attributions for child misbehavior. The PPI is a qualitative interview administered individually with the caregiver by a trained interviewer. The interview includes three questions: 1) “We are trying to learn about different strategies that parents use to manage their children's behavior. What types of things do you say or do?” 2) “What are some things you have tried before that did not work well?” and 3) “All children misbehave sometimes. What do you think are the most common reasons for your child's misbehavior?” Interviewers were trained to provide prompts as necessary to obtain a rich description of the caregiver's perspective on his or her parenting practices and

attributions of the child's misbehavior. Interviews lasted 13.78 minutes on average (range = 4 - 31 minutes). PPI interviews were audio recorded and later transcribed verbatim. The quantitative coding system developed as a result of qualitative analyses in this study is detailed below in section 3.2.

2.3.2 Baseline Caregiver Interview (BCI)—The BCI contains questions about important child and family demographics, the child's health, educational, and placement history. Relevant variables from the BCI in the current study include child and caregiver age, family type, and estimated gross family income. For analysis, family type was collapsed into a binary variable contrasting caregivers related to the child (coded 1) and unrelated foster and adoptive parents (coded 2).

2.3.3 Knowledge and Advocacy (K&A) Scale—The K&A assesses the parent's level of knowledge about issues related to alcohol-related disabilities and advocacy for children with special needs and developmental disabilities. The K&A was developed by Olson and colleagues to evaluate the efficacy of a parent consultation program (Bertrand, 2009; Olson et al., 2009). The version of the K&A used in the current study consists of 42 items. Response options to items vary and include True/False, level of agreement ('strongly agree', 'agree', 'disagree', 'strongly disagree'), and multiple choice. Sample items include: "Diagnoses such as FAE, ARND, and partial FAS mean the child has less brain damage and fewer problems than a child with FAS"; "Even if a child does not qualify for special education services (with an IEP), he may still be eligible for accommodations under other laws"; and "Having FASD means a person is mentally retarded". The K&A is scored by calculating the total number of items correct (maximum of 42). For level of agreement items, responses are scored correct if they are the correct valence (e.g., get credit for agree or strongly agree if the item statement is true).

2.3.4 Eyberg Child Behavior Inventory (ECBI)—The ECBI (Eyberg & Pincus, 1999) is a widely used rating scale measuring conduct problems in children ages 2 through 16. The ECBI consists of 36 items that are each rated on a 7-point Intensity scale to indicate how frequently the behavior occurs, and a Yes-No Problem scale to indicate whether or not the behavior is problematic for the parent. The current study focuses on the intensity scale, which has demonstrated high internal consistency ($\alpha = .95$) and construct validity for children and adolescents. Scores are presented as T-scores ($M=50$, $SD=10$), with higher scores indicating higher frequency behavior problems.

2.3.5 Parenting Sense of Competence (PSOC)—The PSOC (Johnston & Mash, 1989) is a 16-item self-report measure of the parent's sense of parenting efficacy and satisfaction. The items in the PSOC are answered on a 6-point scale ranging from "strongly disagree" to "strongly agree". The scale assesses two factors: Satisfaction, or extent to which the individual enjoys the parenting role, and Efficacy, or perceived competence in the parenting role. The measure has demonstrated adequate internal consistency scores for both the Efficacy ($\alpha = .76$) and Satisfaction ($\alpha = .75$) scales as well as adequate validity.

2.3.6 Parenting Stress Index, Fourth Edition, Short Form (PSI-4-SF)—The PSI-4-SF (Abidin, 2012) is a 36-item, abbreviated inventory, evaluating the magnitude of stress in

the parent-child system. Individual items focus on a variety of parenting stressors including objective life events, parental evaluation of child characteristics, and subjective feelings resulting from parenting responsibilities. The current study focuses on the Parental Distress scale assessing the parent's level of distress relating to personal factors associated with parenting. Scores are presented as T-scores ($M=50$, $SD=10$), with higher scores reflecting greater levels of stress. The PSI-4-SF has demonstrated adequate internal consistency ($\alpha = .95$) and validity.

2.4 Data Analysis

Mixed-methods analyses were conducted sequentially. The aim of qualitative data analysis was to test the theorized association between parental attributions of misbehavior and parenting practices in caregivers raising children with PAE. Results of the qualitative data analysis subsequently guided the development of a quantitative coding system and informed statistical modeling. Detailed description of data analysis is integrated with the presentation of results.

3. Results

3.1 Qualitative Data Analysis

A thematic analysis was undertaken to test the association between parental attributions of misbehavior and parenting practices (Miles, Huberman, & Saldana, 2014). An existing theoretical model (Olson et al., 2009) was used to guide initial 'first level' coding of the data. Preliminary codes were generated for the constructs of parental attributions of behavior (i.e., neurodevelopmental reasoning, willful disobedience) and parenting strategies (i.e., antecedent strategies, consequences-punishment, consequences-rewards, calming/redirection). The research team also considered unique elements of individual interviews such as tone, word choice, emphasis, and elaboration, which revealed additional themes relating to caregiver confidence and effectiveness. Patterns were then examined within and across individual participants to aid in model building and transcripts were reviewed iteratively to identify confirmatory and disconfirmatory evidence for the emerging analytic model. Overall, the data appeared to be a good fit with the existing theoretical model. Several demographic and family background variables (e.g., caregiver type, knowledge about FASD) added explanatory power when analyzing patterns across participants and were included in the final analytic model.

Figure 1 presents an illustration of the final analytic model. Analysis revealed two distinct patterns distinguished by caregivers who attributed children's misbehavior to neurodevelopmental disabilities compared to those who attributed misbehavior to willful disobedience. Willful disobedience attributions ranged from statements reflecting child characteristics, such as "laziness," "lack of motivation" and "stubborn," to situational factors, such as "she doesn't get what she wants" or "to get attention." Neurodevelopmental attributions linked the child's behavior to specific functional impairments such as "impulsivity," "sensory needs," or "attention problems" or made specific reference to brain damage (e.g., "doesn't have part of his corpus callosum" or "that is how his brain is wired"). Caregivers who provided neurodevelopmental attributions for misbehavior were more likely

to use antecedent strategies for preventing misbehavior based on their knowledge of their children's disabilities. For example, one parent stated: “anticipating what's gonna happen, what could happen, and how will he interact with those things, that's a huge part of what we do.” Antecedent strategies often included a focus on the child's sensory needs, as exemplified by a parent who noted that “making sure that he gets the sensory input by making sure that we go to the playground or go swimming.” These parents were also less likely to use punishment strategies (e.g., time out, removal of privileges, spanking) for misbehavior and focused more on calming or redirecting their children when they were upset or dysregulated. Several parents reported that “yelling doesn't work.” One parent also stated: “when he has had a temper tantrum and he cannot control himself physically, or when he's screaming, we will send him to his room to calm down. That is not a punishment, but that's a, ‘You need to remove yourself to calm down.’” These caregivers also reported using rewards (e.g., sticker charts, praise, tangibles, extra time with parent) to reinforce positive behavior and described greater success and confidence in parenting.

In contrast, caregivers who attributed their children's misbehavior to willful disobedience described little to no use of antecedent strategies and were likely to rely primarily on consequence strategies. These caregivers reported more severe punishments and used them more frequently than caregivers with neurodevelopmental attributions for behavior. For example, one parent listed: “we've spanked him, we wash his mouth out with soap, time outs, send him to his room.” Families in this group were less likely to use calming or redirection strategies. Caregivers making attributions about their children's misbehavior as willful also tended to use rewards to reinforce positive behavior, but described feeling less successful in managing behavior. They also reported feeling ineffective and frustrated with their children's behavior. One caregiver indicated, “it's been a real challenge trying to figure out what works and what doesn't with him...It's just been a real struggle...I'm trying, it's exhausting.” Another admitted, “sometimes it gets pretty ugly and then it's hard because there's really nothing I could do to prevent that.” A third caregiver captured the lack of understanding felt by many of these parents: “I don't know if it's him just being unmotivated, lazy... he doesn't give me any other good reason of why he does the things he does...So if you can figure it out, why he's doing what he's doing... because I still don't know.”

The pattern of results also varied by family type and FASD knowledge. Although a few caregivers who were related to the child gave neurodevelopmental attributions for behavior, they tended to be less specific and less confident in their parenting. The families that tended to give the highest level of neurodevelopmental attributions (e.g., specifically identifying brain structures or areas of functional impairment) were adoptive families. Families who seemed to have greater knowledge about FASD and referenced the disability during the interview were more likely to give neurodevelopmental attributions.

3.2 Development of Quantitative Coding System for the PPI

A coding system was developed based on the results of qualitative analyses to quantify the constructs of parental attributions of misbehavior and parenting practices. To develop the parental attribution coding system, two members of the research team independently aggregated transcripts based on the classifications “willful attribution” and

“neurodevelopmental attribution”. They then compared groupings, discussed their rationale, and came to a consensus. Next, they collaboratively developed a continuum from strongest “neurodevelopmental attribution” to strongest “willful attribution” by ordering each individual interview accordingly. Upon further review of the continuum, distinct clusters of interviews became evident. A total of 8 clusters were identified and distinguishing characteristics were detailed for each cluster. These clusters formed an 8-point scale (see Table 2 for descriptions of each level) that was then used to code each transcript.

Due to most caregivers’ reliance on a mix of parenting strategies, qualitative coding constructs for parenting practices were more complex and included codes for multiple types of strategies that could not be translated in to a single continuum. Two distinct variables were created to target specific parenting practices of interest. Separate 5-point scales were developed for Antecedent Strategies and Punishment Strategies to determine the extent to which parents reported utilizing each. Levels were predetermined based on frequency of use (See Table 3 for descriptions of levels).

Two raters who were not involved in the development of the coding systems were trained in the scales and coded each transcript independently. Final codes were determined by consensus. The intraclass correlation coefficients were all adequate: attribution ICC= 0.76; antecedents ICC=0.71; punishment ICC=0.84.

3.3 Quantitative Analysis

Multiple correlation and regression analyses were conducted to quantify effects identified in qualitative analyses after controlling for relevant factors such as child age, FASD diagnosis, child behavior problems, child general cognitive ability, caregiver age, family type, family income, and knowledge of FASD. Zero-order correlations were examined to guide the selection of variables to include in multivariate regression models given the modest sample size (see Table 4). Variables were selected for multiple regression models if correlations with the response variable represented a medium effect or larger ($r > \pm .30$).

3.3.1 Descriptive Statistics and Patterns of Zero-Order Correlations—On average, the sample had average cognitive abilities and a level of behavioral problems within the clinically significant range (See Table 4). The distribution of parental attributions of behaviors was slightly skewed with relatively more caregivers attributing behavior to willful disobedience or a mix of factors. Similarly, the use of antecedent strategies was somewhat skewed with caregivers describing one or more nonspecific antecedent strategies (e.g., visual schedule, timer, review expectations; any strategy given without a clear link to a functional impairment or purpose for implementation) on average. The use of punishment strategies was more evenly distributed with caregivers reporting one or more common punishment strategies on average. Caregivers correctly answered 24 out of 42 items (62%) on the Knowledge & Advocacy Scale, suggesting a moderate level of knowledge about FASD and advocacy. Scores on the PSOC were somewhat lower than scores reported in community or clinical samples (e.g., Johnston & Mash, 1989; Ohan, Leung, & Joshnston, 2000; Sanders & Woolley, 2005), but similar to other FASD samples (H. C. Olson, personal communication,

January 17, 2016). The overall level of parent stress was within the average range relative to normative data.

See Table 4 for correlation results. Consistent with qualitative analyses, a large effect was found between parental attributions of behavior and use of antecedent strategies ($r = .65$). Caregivers who were more likely to attribute behavior to the child's neurodevelopmental disabilities were more likely to use antecedent strategies to manage behavior. Caregivers with greater FASD knowledge were more likely to give neurodevelopmental attributions of behavior ($r = -.38$). Foster and adoptive parents tended to have greater knowledge about FASD than caregivers related to the child ($r = .37$) and were more likely to use antecedent strategies ($r = -.37$).

The use of punishment strategies was not significantly associated to parental attributions of behavior, although the association represented a moderate effect size ($r = .32$). The use of more frequent or severe punishments was significantly associated with having children without dysmorphic facial features (vs. children with FAS/pFAS; $r = -.50$) and with higher levels of behavior problems ($r = .45$).

Parenting efficacy was not significantly related to caregiver attributions of behavior ($r = .20$) or parenting practices (r 's = $-.03$ to $.00$); only family income was significantly correlated with parenting efficacy ($r = .47$). Caregivers from families with higher annual income rated themselves as feeling more efficacious in their parenting. In contrast, parenting satisfaction was associated with caregivers' use of punishment ($r = -.44$). Caregivers who used higher levels of punishment reported less satisfaction with parenting. Lower levels of parenting satisfaction was also significantly related to child age ($r = -.39$), FASD diagnosis ($r = .68$), greater intensity of behavior problems ($r = -.59$), and higher levels of parenting distress ($r = -.66$). Higher levels of parenting distress were associated with having a child without dysmorphic facial features ($r = -.48$) and being related to the child ($r = -.40$). Additionally, younger children ($r = .38$) and those with FAS or pFAS (vs. nondysmorphic FASD; $r = -.45$) diagnoses tended to have fewer behavior problems.

3.3.2 Multivariate Regression Modeling—The first two models examined the amount of variance in parenting practices accounted for by parental attributions of misbehavior in the context of other relevant factors. Table 5 presents the statistics for both models. Parental attribution of misbehavior was a significant predictor of caregiver use of antecedent strategies. Attributions uniquely accounted for 31.4% of the variance in antecedent strategy use above and beyond family type. Caregivers who gave higher levels of neurodevelopmental reasoning were also more likely to implement antecedent strategies to prevent misbehavior. Although the overall model was significant for the use of punishment strategies, no individual predictor accounted for significant variance in strategy use above and beyond other variables. Individual predictors each accounted for between 5 and 9 percent of unique variance in the use of punishment.

The next model tested the association between knowledge of FASD and parental attributions of misbehavior (see Table 6). Although the zero-order correlation between FASD knowledge and parental attributions of misbehavior was statistically significant, when family type was

included in the model, the association between the two variables was no longer statistically significant.

The final set of models examined the associations between parenting practices and indices of parenting self-efficacy, satisfaction, and distress (See Table 7). When considering parenting satisfaction, the overall model was statistically significant and the variables included accounted for over 50 percent of the variance in parenting satisfaction. Although caregiver use of punishment was significantly related to parenting satisfaction in zero-order correlations, it did not remain statistically significant in the overall model when accounting for other factors. The parenting stress overall model was also statistically significant, with variables accounting for over a quarter of all variance in parenting stress. In both models, having a child with a FAS or pFAS diagnosis (vs. alcohol-exposed children without dysmorphic facial features) was related to higher levels of parenting satisfaction and lower levels of parenting stress. A multivariate model was not conducted for parenting efficacy, since the only zero-order correlation that represented a moderate effect was with family income. In summary, parenting practices were not significantly associated with parenting efficacy, satisfaction, or stress when other factors were included in the model.

4. Discussion

Results of the current study are consistent with theoretical models in FASD intervention (Olson et al., 2009) and empirical evidence from other populations that document associations between parental attributions of children's misbehavior and specific parenting practices (e.g., Chavira, Lopez, Blacher, & Shapiro, 2000; Dix, Ruble, & Zambarano, 1989, Miller, 1995; Slep & O'Leary, 1998). Both qualitative and quantitative analyses in this study found a robust association between parental attributions of misbehavior and caregivers' use of antecedent strategies. Caregivers who had greater knowledge about FASD were more likely to view their children's misbehavior as relating to their neurodevelopmental disabilities and use antecedent strategies to prevent misbehavior. These caregivers were also more likely to be unrelated foster or adoptive parents than caregivers related to the child.

Parental attributions of behavior were less strongly related to the use of punishment strategies. The majority of families reported some use of punishment strategies to manage behavior. More severe or frequent use of punishment was associated with having children with more intense behavior problems and with children who did not have the characteristic facial dysmorphism associated with FAS or pFAS. This finding is consistent with previous research that has documented that having an FAS or pFAS diagnosis is protective against the occurrence of secondary conditions (Streissguth et al., 2004). One explanation for this finding is that people are more likely to recognize children with physical manifestations of PAE as having a developmental disability than children who appear typical. When children are viewed as having a developmental disability, people are less likely to interpret their misbehavior as willful disobedience and use harsh punishments.

Qualitative analysis in the current study supports the theorized associations between neurodevelopmental attributions of behavior, the use of antecedent and calming strategies, and higher levels of confidence and efficacy in parenting. Caregivers who described using

more antecedent strategies were generally more successful in managing behavior. In contrast, caregivers that reported a primary reliance on punishments tended to be less successful in managing behavior, and described feeling more frustrated than other caregivers. Although this study is correlational in nature, it is plausible that both processes operate in a cyclical manner, with the success, or lack thereof, perpetuating strategy choice. For example, caregivers relying on punishment approaches described escalating the degree of punishment when initial attempts were unsuccessful, and becoming increasingly frustrated that nothing was working.

Despite robust associations in qualitative analyses, the use of antecedent strategies was not significantly related to standardized measures of parenting efficacy, satisfaction, and distress in quantitative analyses. Although the use of more severe punishments was moderately associated with lower parenting satisfaction in zero-order correlation analysis, this association was not significant when other relevant factors were considered. Specifically, child FASD diagnosis and family background (i.e., income and family type) accounted for a greater percentage of variance in parenting efficacy, satisfaction, and distress than parenting practices. It is possible that the standardized rating scales (i.e., PSOC, PSI-IV-SF) captured caregivers' feelings of confidence and efficacy in their parenting somewhat differently than what emerged from qualitative analysis of PPI interviews. It is not entirely unsurprising that families with more financial resources experience more feelings of efficacy in parenting than families with less financial resources. Obtaining appropriate services for children with FASD can be very difficult due to a number of systems barriers (Petrenko et al., 2014); having greater financial resources provides families with greater opportunities to find respite, pay for services and recreational programs for the child, and reduces other sources of stress for families (e.g., paying bills, meeting basic needs). Future studies are needed to replicate findings in larger, more representative samples and to test the causal linkages between parental attributions of behavior, parenting practices, and parenting sense of competence (optimally through randomized controlled intervention trials; Toth, Petrenko, Gravener-Davis, & Handley, 2016).

Findings from the current study are generally consistent with theoretical models for parent training interventions in FASD that suggest that targeting caregiver attributions of behavior and parenting practices will reduce child behavior problems, increase parenting sense of competence, and improve family functioning in this population. The feelings of ineffectiveness and frustration experienced by caregivers in the current study, as well as the well-documented levels of stress in this population (Olson et al., 2009; Paley et al., 2006; Watson et al., 2013) emphasizes the need for parenting interventions that include content focusing on caregiver support and stress management. Although the current study is cross-sectional and correlational in nature, it provides an important foundation for future intervention trials that will be able to directly test this mechanism of change and test causality. Additionally, the current study offers unique strengths and contributions to the existing literature in the field. This is the first known study to assess the association between parental attributions of behavior and specific parenting strategies in families raising children with FASD. Additionally, the use of a mixed-method approach to data collection and analysis contributes several advantages in addressing the primary research objectives. The use of a qualitative interview to assess the primary constructs of parental attributions and

parenting practices enhanced relevance for diverse family structures and experiences and avoided limiting caregivers' response options. Creating a rating scale a priori to assess these constructs would have been premature and would have likely missed important insights since previous research on parenting practices is very limited for caregivers raising children with FASD. Qualitative data analysis capitalized on the descriptions provided by caregivers in context and yielded a coherent analytic model. Augmenting qualitative analyses with quantitative data collection and analyses permitted quantification of effects and statistical control for multiple relevant factors. The quantitative coding system for the PPI will also allow for detection of change over time and will facilitate a test of these treatment-relevant constructs in future intervention trials.

Results of the current study should be interpreted within the context of the following limitations. The study sample size was adequate for qualitative data analysis based on the frequency of recurrence of themes and clear patterns across participants; however, quantitative analyses had power to only detect moderate to large effects. Although several large effects were identified, which were consistent with qualitative analyses, more subtle effects could not be detected statistically. Another limitation is the lack of representation of biological parents in the study. The primary caregivers who participated in this study were all extended relatives of the children or non-relative foster or adoptive parents. Although several caregivers related to the child shared custody with the child's biological parent, the biological parent perspective is not represented in the data. Caregivers in this study also sought out supports and agreed to be in a study lasting 18 months in duration with the expectation that the child's placement would be stable throughout that time period. The pattern of results could differ in less stable placements or for caregivers who were less interested or able to invest in this level of commitment. Furthermore, although participants in the study represented a wide range of socioeconomic status (e.g., family income range \$17,000 to \$220,000), the median income (\$75,000) was somewhat higher than the median for the region (approximately \$50,000). Replication is needed with larger, more representative samples.

It is also important to recognize that the children in this study were between the ages of 4 and 8 years. The findings of the current study may not generalize to caregivers raising children or adolescents outside of this age range. Parental attributions and parenting strategies likely vary by children's chronological age as well as by the size of the gap between children's chronological age and their functional age. Further research is needed to understand how parental attributions relate to parenting practices and family functioning at different developmental periods in this population.

5. Conclusions and Implications

The current study documented important associations between caregiver knowledge about FASD, attributions of misbehavior, parenting practices, and parenting confidence and well-being. These constructs are primary targets in parenting interventions in FASD, and this study provides empirical support for the theorized relationships among them. Future studies are needed to directly test whether interventions produce change in these constructs and whether this change mediates the observed reductions in child behavior problems and

improvements in family functioning. Randomized controlled trials are an optimal design with which to evaluate existing theory, as they allow for a true test of causality, which may not be possible otherwise (Toth, et al., 2016). The establishment of a relevant, semi-structured qualitative interview and the development of a quantitative coding system facilitates future research testing these theorized mechanisms of change. Future research using the PPI with other samples with FASD as well as other populations with developmental disabilities will provide important data on the replicability and generalizability of findings. Understanding how caregivers raising children with FASD are similar or different to caregivers or parents of children with other developmental disabilities would also be useful. In conclusion, this study acts as a critical step toward a fuller understanding of parenting children with FASD, which is essential for improving the efficacy of interventions for diverse families.

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Highlights

- Children with FASD have significant behavior problems and intervention is critical.
- Caregiver FASD knowledge predicts neurodevelopmental attributions of behavior.
- Neurodevelopmental attributions of behavior predict use of antecedent strategies.
- Parenting practices relate to caregiver confidence and levels of frustration.
- The Parenting Practices Interview can facilitate future mechanistic research.

What this paper adds?

This is the first known study to investigate the association between parental attributions of misbehavior and parenting practices in caregivers raising children with FASD. These constructs are integral in theorized mechanisms of change in parenting interventions for this population and are primary targets in several interventions with empirical support. Very little research has been conducted on the parenting practices of caregivers raising children with FASD. The current study advances the field by documenting robust associations between parental attributions of misbehavior and parenting strategies. The mixed-method approach combines the advantages of both qualitative and quantitative methods to identify patterns among constructs and quantify these effects after controlling for relevant factors. This study also advances the field through the development of a relevant, semi-structured qualitative interview and quantitative coding system that will facilitate measurement of parental attributions and parenting practices in future intervention trials.

Figure 1.

Final qualitative analytic model illustrating associations between parental attributions of misbehavior and parenting practices for caregivers raising children with fetal alcohol spectrum disorders (FASD). Caregivers with greater knowledge about FASD were more likely to attribute their child's misbehavior to underlying neurodevelopmental disabilities and were more likely to use antecedent strategies and feel more confident in managing their child's behavior. Caregivers who attributed their child's misbehavior to willful disobedience were more likely to rely primarily on consequence strategies and feel more ineffective in their parenting.

Table 1

Participant demographic characteristics

Demographic Variable	Children	Caregivers
Mean Age (SD)	6.58 (1.31)	46.87 (8.38)
Biological Sex		
% Female (n)	25.7% (8)	87.1% (27)
% Male (n)	74.2% (23)	12.9% (4)
Race/Ethnicity (non-exclusive categories)		
% Caucasian/White (n)	83.9% (26)	90.3% (28)
% African American/Black (n)	22.6% (7)	6.5% (2)
% Hispanic/Latino (n)	12.9% (4)	3.2% (1)
% Native American (n)	3.2% (1)	6.5% (2)
% Asian (n)	3.2% (1)	0.0% (0)
% FAS/pFAS diagnoses (n)	41.9% (13)	
Caregiver Type		
% Relative of child (n)		25.8% (8)
% Adoptive parent (n)		67.7% (21)
% Non-relative foster care (n)		6.5% (2)
Caregiver Marital Status		
% Single, never married (n)		9.7% (3)
% Divorced (n)		16.1% (5)
% Married or living with partner (n)		74.8% (23)
Caregiver Educational Attainment		
% High school diploma (n)		12.9% (4)
% Some college or Associate's degree (n)		35.5% (11)
% Bachelor's degree		22.6% (7)
% Master's degree or higher		22.6% (7)
% Not reported		6.5% (2)
Mean Annual Family Income (SD)		\$77,574 (\$41,849)
Income Range		\$17,000-\$220,000

Table 2

Coding system for parent attributions of misbehavior

Code	Description	Criteria
1	Parent explicitly mentions specific neurodevelopmental disabilities present in their child AND independently attributes behavior problems to these disabilities	- At least 1 specific neurodevelopmental disability mentioned - Multiple general neurodevelopmental attributions provided - No reference to any willful child attributions
2	Parent does not explicitly state that the connection between neurodevelopmental disabilities and behavior exists, but their elaborate responses indicate that they have this understanding and are making neurodevelopmental attributions for misbehavior	- No specific neurodevelopmental disability mentioned - At least 1 general neurodevelopmental attribution provided - No reference to any willful attributions
3	Parent mentions specific neurodevelopmental disabilities but does not make connections between these disabilities and the child's misbehavior	- At least 1 specific neurodevelopmental disability mentioned - May or may not include general neurodevelopmental attributions - May or may not include willful attributions
4	Parent makes reference to at least one general neurodevelopmental attribution but does not demonstrate full understanding of the brain-behavior connection; their explanation is not elaborate enough to fully determine if they are making a brain-behavior connection, but this connection may be alluded to	- No specific neurodevelopmental disability mentioned - Vague general neurodevelopmental attributions alluded to (i.e. "a disconnect there", "not able to put together") 0-1 willful attributions provided
5	Parent makes references to both neurodevelopmental and willful attributions but doesn't seem to fully understand or commit either way; interview is split down the middle	- No specific neurodevelopmental disability mentioned - At least 1 general neurodevelopmental attribution provided - At least 1 willful attribution provided
6	Parent primarily indicates willful attributions; they mention neurodevelopmental attributions briefly in passing but they clearly fail to elaborate or make any brain-behavior connection	- No specific neurodevelopmental disability mentioned - At least 1 general neurodevelopmental attribution provided - Multiple willful attributions provided
7	Parent primarily indicates willful attributions but is also questioning or somewhat unsure about the possibility of there being alternative reasons for misbehavior	- No specific neurodevelopmental disability mentioned - At least 1 general neurodevelopmental attribution provided or alluded to AND accompanied by a "questioning phrase" (i.e. "I think", "I don't know", "I don't understand", "I wonder", "maybe...", "puzzling" etc.) - Multiple willful attributions provided
8	Parent only provides willful attributions with no mention of any neurodevelopmental attributions or questioning about alternative reasons for the behavior	- No specific neurodevelopmental disability mentioned - No general neurodevelopmental attributions provided - At least 1 willful attribution provided

Note. Specific neurodevelopmental disability: explicit reference to brain injury or deficit; direct reference to the brain (i.e., "brain problem", "how brain is wired", identification of specific brain part or region); General neurodevelopmental attribution: deficit associated with brain injury without explicit reference directly to the brain (i.e., "impulsivity", "self-regulation deficits", "sensory deficits")

Table 3

Antecedent and punishment strategies coding system

Antecedents	
Code	Description
1	Describes systematic use of positive behavior support planning ○ Must incorporate a description of a plan/process for targeting behavior ○ Focus is clearly directed at the function of the behavior
2	Strategic use of antecedents ○ Proactive ○ Links strategy with neurodevelopmental deficit
3	Non-specific use of antecedents ○ Multiple examples provided
4	Mentions only 1 non-specific antecedent
5	No mention of antecedent strategies
Punishments	
Code	Description
1	Infrequent use of common punishment strategies; or no major behavior problems
2	Mentions 1 common punishment strategy ○ Mild – moderate use
3	Multiple common punishment strategies OR elaborates on using 1 common punishment strategy frequently
4	Level of punishment seems excessive for situation OR involves physical punishment ○ i.e. extensive time out, soap in mouth, spanking (no mark)
5	Maltreatment

Table 4
Descriptive Statistics and Zero-order Correlations for Variables Considered for Multivariate Regression Analyses

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Attribution		.65 ^{***}	.32	.11	-.16	-.11	.10	-.00	-.31	-.01	-.38 [*]	.20	-.20	.07
2 Antecedent			.27	.02	-.22	-.13	.06	-.11	-.37 [*]	-.16	-.27	.00	-.09	.04
3 Punishment				.07	-.50 ^{***}	-.23	.45 [*]	.04	-.29	-.07	-.27	-.03	-.44 [*]	.20
4 Child Age					-.17	.14	.38 [*]	-.17	.05	-.23	-.08	.02	-.39 [*]	.29
5 FAS/pFAS Diagnosis						.13	-.45 [*]	.09	.20	.34	.11	.05	.68 ^{***}	-.48 ^{***}
6 Child Cognitive Ability							-.22	-.11	.39 [*]	.11	.20	.24	.13	-.21
7 ECBI Intensity								-.38 [*]	-.27	-.30	-.26	-.18	-.59 ^{***}	.34
8 Caregiver Age									-.29	.08	-.39 [*]	.08	.06	-.15
9 Family Type										.32	.37 [*]	.21	.29	-.40 [*]
10 Family Income											.07	.47 ^{***}	.17	-.21
11 FASD Knowledge												-.11	.24	.11
12 PSOC Efficacy													-.21	.02
13 PSOC Satisfaction														-.66 ^{***}
14 PSI-IV PD														
Mean	5.74	3.97	2.71	6.58	0.42	90.71	66.90	46.87	1.74	77,574	26.13	20.10	35.10	50.39
SD	1.95	1.08	1.10	1.31	0.50	13.87	10.61	8.38	0.44	41,849	6.88	4.99	7.15	9.33
Range	1-8	1-5	1-4	4.08-8.67	0-1	62-120	47-90	31.67-65.67	1-2	\$17,000-220,000	10-37	9-28	22-51	34-71

Note.

* $p < .05$

** $p < .01$

Table 5
Multivariate regression models testing the association between parental attributions of misbehavior and parenting practices

Variable	t	p	β	sr ²	F	df	p	adj R ²
<u>Antecedent Strategies</u>								
Overall Model					11.30	2,28	< .001	.41
Attribution	3.94	.00	.59	.31				
Family type	-1.23	.23	-.18	.03				
<u>Punishment Strategies</u>								
Overall Model					5.07	3,27	.01	.29
Attribution	1.55	.13	.24	.06				
FAS/pFAS Diagnosis	-1.97	.06	-.34	.09				
ECBI Intensity	1.50	.15	.26	.05				

Table 6

Multivariate regression model testing the association between caregiver knowledge of FASD and parental attributions of behavior

Variable	t	p	β	sr ²	F	df	p	adj R ²
<u>Parental Attributions of Behavior</u>								
Overall Model					2.83	2,27	.08	.11
Knowledge of FASD	-1.66	.11	-.31	.09				
Family type	-0.97	.34	-.18	.03				

Table 7

Multivariate regression models testing the association between parenting practices and indices of parenting satisfaction and stress

Variable	t	p	β	sr ²	F	df	p	adj R ²
<u>Parenting Satisfaction</u>								
Overall Model					9.54	4,26	< .001	.53
Punishment Strategies	-0.39	.70	-.06	.00				
Child Age	-1.48	.15	-.20	.03				
FAS/pFAS Diagnosis	3.28	.00	.49	.17				
ECBI Intensity	-1.71	.10	-.27	.05				
<u>Parenting Stress</u>								
Overall Model					4.47	3,27	.011	.26
FAS/pFAS Diagnosis	-2.11	.04	-.37	.11				
ECBI Intensity	0.54	.60	.10	.01				
Family Type	-1.83	.08	-.30	.08				