2019

Exploring Provider-Patient Interactions with Young Children in the Dental Setting

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(Part of a larger study - NIDCR/NIH R21 DE026540)

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Honors Thesis defense submitted to the

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2019

Abstract

A key element that must be addressed when striving for good overall health is positive oral health practices that begin early in life (AAPD; 2013, 2014). Unfortunately, two major difficulties are commonly faced by dental providers who try to implement these positive oral health practices in young children: dental fear and behavior management problems. The current study aimed to examine how the natural interactions that occur between a dental provider and child patient may be related to child dental fear and behavior. Dental appointments for 36 children under the age of six years old were examined, and verbal and behavioral interactions between the dental provider and child were coded. Analyses were then run to compare these behavioral codes to the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS; Cuthbert & Melamed, 1982) and the Frankl Behavior Rating Scale (Frankl; Frankl, Shiere, & Fogels, 1962). Interestingly, a significant correlation was found between the CFSS-DS and the Frankl, indicating a strong association between the participants who were dentally fearful and those who displayed challenging behaviors during their appointment. Additionally, significant differences in the use of four behavioral codes existed between dentists and dental hygienists. However, no significant relationships were found between the behavioral codes and the Frankl. These findings suggest that future efforts should be aimed at reducing both child dental fear and behavioral management problems, due to their interconnected nature, in order to improve the early dental experiences, and overall well-being, of children.

Keywords: child dental fear, behavior management, Dyadic Parent-Child Interaction Coding System

Exploring Provider-Patient Interactions with Young Children in the Dental Setting

According to the American Academy of Pediatric Dentistry (AAPD; 2013, 2014), the achievement of good overall health is strengthened by positive oral health practices that begin in infancy. Prior to a child's birth, parents should be educated on the etiology and prevention of early childhood oral health issues in order to promote preventative health care. It is recommended that infants receive an oral health risk assessment by their primary health care professional by six months of age before then visiting the dentist by the emergence of the first tooth or the age of one year. If dental visits and diagnoses are delayed, the oral health issues of the child can be exacerbated (AAPD, 2013). For example, by providing anticipatory guidance to parents on good oral hygiene and dietary habits, in addition to infants' early exposure to dental professionals, preventative oral care can be established, and surgical intervention can hopefully be avoided (AAPD, 2014).

Unfortunately, providers experience two salient issues when providing care for these young children: dental care-related fear and behavior management problems. Children with dental fear may present with behavior management problems in the dental setting because of their increased levels of stress and anxiety. Consequently, managing these behaviors becomes difficult for the dental provider, leading to a more stressful and undesirable experience for all involved. By understanding the influences of dental fear and behavior management concerns, dental providers can utilize effective behavior management strategies to improve the dental treatment of young children.

Dental Fear

McNeil and Randall (2014) generally define dental care-related fear as an unpleasant emotional response to stimuli presented in the dental setting, and they define dental care-related

anxiety as a cognitive process that involves unpleasant thoughts and worries pertaining to dentistry. Although it is important to note that research suggests key differences between the two constructs (McNeil & Randall, 2004; Poulton, Waldie, Thomson, & Locker, 2001), the term "dental fear" is used in the present study to represent both dental care-related fear and anxiety.

Many people experience dental fear. In fact, about one in seven people are highly anxious about undergoing dental treatment (Armfield & Heaton, 2013). However, current prevalence estimates for dental fear in children in the private practice sector are even higher, hovering between 6-22% (Baier, Milgrom, Russell, Mancl, & Yoshida, 2004). In another example, a literature review by Klingberg and Broberg (2007) found that 6-20% of children and adolescents present with dental fear. These statistics are concerning because of their impact on oral health, long term health care utilization, quality of life, and behavior management problems seen in these individuals (Armfield, 2010; Armfield & Heaton, 2013; Cohen, Fiske, & Newton, 2000; Hamzah, Gao, Yiu, McGrath, & King, 2014; Klingberg, Berggren, Carlsson, & Norén, 1995; Luoto, Lahti, Nevanperä, Tolvanen, & Locker, 2009; Mehrstedt, Tönnies, & Eisentraut, 2004).

Children and adults alike who present with dental fear are more likely to avoid treatment, thus leading to poorer oral health (Armfield, 2010; Armfield & Heaton, 2013; Cohen et al., 2000; Hamzah et al., 2014; Klingberg et al., 1995). In a study by Klingberg et al. (1995), results indicated that children with dental fear had a higher number of dental caries as well as missed appointments than children who were not dentally fearful. Additionally, the avoidance of treatment associated with dental fear has been shown to affect an individual's utilization of long-term health care (Armfield & Heaton, 2013). The dental fear leads to missed appointments and prolonged treatment, which can cause further complications, thus exacerbating the fear and leading to future avoidance. Further studies suggest that this avoidance of treatment can even

affect an individual's quality of life (Cohen et al., 2000; Hamzah et al., 2014; Luoto et al., 2009; Mehrstedt et al., 2004). In a study by Luoto et al. (2009), dental fear was shown to negatively affect a child's oral-health-related quality of life, both socially and emotionally. As shown above, dental fears in young children impede dental care and affect the individual in a number of ways. Additionally, children's fear is associated with behavior management problems during dental appointments that further complicate provider efforts to establish positive and preventative oral health practices.

Behavior Management Problems

High levels of dental fear are often seen in pediatric populations and are often associated with behavior management problems during visits. Definitions of behavior management problems typically encompass all uncooperative and disruptive behaviors that can lead to a hindrance of treatment from the dentist (Klingberg & Broberg, 2007). Common uncooperative or disruptive behaviors seen in the dental clinic might include complete refusal of treatment, forceful crying, and even kicking and screaming. This means that children who present with fear in the dental clinic are subsequently very likely to exhibit negative behaviors, making treatment more difficult for the dental professional.

In a sample of patients from Sweden, Klingberg et al. (1995) found that 27% of children with behavior management problems had dental fear while 61% of children with dental fear exhibited behavior management problems. Additionally, in a sample of children from private pediatric dentistry practices in the state of Washington, Baier et al. (2004) found that about 20% of children exhibited dental fear and 21% displayed challenging behavior during dental treatments. As these studies investigated heterogeneous samples from different locations, the

combined findings suggest that these issues are widespread throughout the general child population.

Along with the prevalence of child dental fear and behavior management problems seen in the general population, these conditions are seen in children with mental health concerns as well. In an exploratory experiment, Aminabadi et al. (2016) found that children with Oppositional Defiant Disorder (ODD) or Attention Deficit Hyperactivity Disorder (ADHD) were much more likely to experience dental anxiety and behavior management problems than children with no diagnoses. According to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association, 2013), 5% of children have ADHD. Although originally thought to be an "American condition," Faraone, Sergeant, Gillberg, and Biederman (2003) found that ADHD is at least as prevalent in children from countries other than the United States. Moreover, because ADHD and ODD have a high comorbidity, and lifetime ODD prevalence is estimated to be around 10%, providers are likely to encounter these children on a regular basis (Nock, Kazdin, Hiripi, & Kessler, 2007). Therefore, not only are children in the general public affected by dental fear and the subsequent behavior management concerns, but specific subgroups (such as children with ODD/ADHD) are affected as well, presumably at an even greater magnitude.

Children who present with dental fear and behavior management problems typically present unique challenges for dental providers. For example, Armfield and Heaton (2013) and Diercke et al. (2012) both found that dental professionals rate treating children with dental fear or behavior management problems as a source of significant stress. Thus, child dental fear and behavior management problems commonly lead to a more stressful dental experience for all

involved and are associated with negative oral health outcomes (Armfield & Heaton, 2013; Klingberg et al., 1995; Sharma & Tyagi, 2011).

Although dental fear and behavior management problems are distinct constructs, this does not mean that they are mutually exclusive. These two problems often present together, resulting in the formation of a negative interaction cycle between children and dental providers. For example, a child with dental fear may be more likely to exhibit behavior management problems due to increased stress and anxiety. Consequently, these behavior management problems may produce more stressful dental situations for both providers and children, making behavior management more difficult, dental experiences more negative, and quite possibly exacerbating this child's dental fear. Due to the pervasiveness and interrelated nature of dental fear, behavior management problems, and stress, investigating the relationships among them is necessary to improve the quality of oral care and overall health of children.

Behavior Management in Dental Settings

In recognizing this detrimental cycle among dental fear, behavior management problems, and negative oral health outcomes in children, researchers have examined the possible factors that influence these conditions and how they can be effectively managed by the dental provider. Because it is now recommended that infants first see the dentist by one year of age and rates of dental fear and behavior management problems are high in young children, dentists currently are faced with these challenges on a regular basis. Therefore, providers need to know how to reduce dental fear and manage child behavior when providing care. According to the AAPD (2015), in order to effectively provide treatment to children, dentists must be able to handle a multitude of child behaviors. Each child is different and will therefore react differently to the dental environment and provided treatment. A few of the most common strategies providers use to

manage problem behaviors in the clinic include drugs/sedation, physical restraint, and nonpharmacological behavior management techniques.

One approach used by dental providers to manage disruptive pediatric patients is pharmacological intervention. This method utilizes drugs and sedation techniques to manage the child in order for the clinician to successfully perform treatment. Although this method is utilized frequently, especially by pediatric dentists, there are complexities and limitations to this strategy. First, the dental professional must have formal training in the methods needed to safely and effectively administer the drugs. Unfortunately, few regulations guarantee that clinicians are competent in training related explicitly to sedation procedures, especially with very young children (Wright & Kupietzky, 2014). Although increased regulations and the implementation of guidelines have been established in recent years, the language allows for interpretation in instituting such training, leading to variability in the sedation education of dental staffs. Additionally, added costs and a potential for adverse outcomes are associated with drugs and sedation in the dental setting (Coté, Karl, Notterman, Weinberg, & McCloskey, 2000; Feigal, 2001; Wright & Kupietzky, 2014). Finally, when pharmacological intervention is used, communication and learning between the patient and clinician is often hampered, leading to a missed learning opportunity for overcoming fear and the potential for a future exacerbation of fear and anxiety in the child patient (Feigal, 2001).

Another behavior management strategy used by dental professionals is physical restraint. Physical restraint, also referred to as protective stabilization, is the physical restriction of a patient's movement in order to complete treatment successfully and decrease the risk of injury to the child or dental staff (AAPD, 2015). When physical restraint is utilized as a behavioral management strategy, a variety of techniques might be used by the dentist. The dental staff might

hold a child still with their hands while covering that child's mouth or use special devices such as a Papoose Board or whole-body wrap (Wright & Kupietzky, 2014). Interestingly, the use of restraining devices such as the Papoose Board are not universally accepted. These devices are unacceptable in all dental practices in the United Kingdom indicating that this method of management may be losing favor (Manley, 2004; Morris, 2004). Additionally, several studies have reviewed the acceptability of various behavior management techniques finding that physical restraint, especially when utilizing a device such as the Papoose Board, were some of the least accepted methods by parents (Eaton, McTigue, Fields, & Beck, 2005; Lawrence et al., 1991; Murphy, Fields, & Machen, 1984). According to the AAPD (2015), the use of physical restraint on a pediatric dental patient could lead to physical or psychological harm and must therefore be carefully considered before utilizing.

Finally, the most favored behavior management strategy utilized by dental providers is the use of non-pharmacological techniques. The AAPD (2015) recommends various non-pharmacological behavior management strategies such as practicing good communication, "tell-show-do", voice control, positive reinforcement through praise, and distraction to successfully treat children. These strategies are popular because not only are they effective in managing a child's behavior in the dental clinic, but they are also viewed as acceptable by parents (Eaton et al., 2005; Lawrence et al., 1991; Murphy et al., 1984). By utilizing specific behavior modification techniques, dental providers can easily and efficiently manage the disruptive behavior of children. For example, in a systematic review, Zhou, Cameron, Forbes, and Humphris (2011) explored the relationship between specific dental staff behaviors and the anxiety and behavior of child dental patients. The review identified three specific dental staff behaviors that reduced anxiety and encouraged compliance in children: an emphatic approach,

verbal reassurance, and an appropriate level of reassuring touch. In an additional review, Howells and Lopez (2008) examined the communication strategies used with pediatric patients to better understand their importance. It was found that effective communication with both child patients and their parents can increase satisfaction, improve patient understanding and compliance, and even have the ability to lead to better health outcomes (Howells & Lopez, 2008). These findings suggest that small, easily implemented changes in the behavior of dental staff could impact the behavior of a child patient, leading to a more successful outcome.

In addition to the ease and effectiveness of non-pharmacological behavior management strategies, there are other benefits as well. First, these techniques are extremely cost-effective. In contrast to the added costs associated with going into a hospital setting to receive sedation, non-pharmacological behavior management strategies add no cost to the patient's family or the dental provider (Wright & Kupietzky, 2014). Another benefit to using non-pharmacological techniques is the positive impact they have on the child patient. For example, Howells and Lopez (2008) found that by simply utilizing effective communication skills, children can better understand what is happening to them and thus be more cooperative. The "tell-show-do" technique, another common non-pharmacological behavior management strategy used with pediatric dental patients, reduces dental fear by explaining to the children what will be done, then showing them before actually performing the action (Wright & Kupietzky, 2014). Through the use of this technique, the fear of the unknown is eliminated and the child is able to experience a learning opportunity that has the ability to positively impact their future dental visits. Although there are many behavior management techniques utilized by dental providers, non-pharmacological methods have been shown to be effective, acceptable by parents, cost-effective, and beneficial to the fearful child patient. Therefore, these non-pharmacological behavioral interactions between

providers, parents, and child patients should be further investigated to better understand their impact on child dental fear and behavior management problems.

Behavior Management Techniques in Parent-Child Interaction Therapy

Although many studies have examined the aforementioned dental behavior management strategies, few evidence-based techniques have actually been investigated and implemented in this setting. One evidence-based treatment commonly utilized for young children with emotional and behavioral disorders is Parent-Child Interaction Therapy (PCIT). PCIT focuses on improving the parent-child relationship by guiding the parent to interact differently with his or her child, thus leading to the reduction of problematic behaviors (McNeil & Hembree-Kigin, 2010). The types of interactions examined during PCIT are measured using the Dyadic Parent-Child Interaction Coding System, Fourth Edition (DPICS-IV; Eyberg, Chase, Fernandez, & Nelson, 2014; Eyberg, Nelson, Ginn, Bhuiyan, & Boggs, 2013). In PCIT, treatment continues until certain benchmarks on the DPICS are met, and the treatment rests on the notion that DPICS scores of parents with children with behavior disorders differ from the scores of parents with typically behaved children (Robinson & Eyberg, 1981). Through various studies, the effects of different DPICS codes on the behavior of young children have been examined to better understand how parents' behaviors affect the behavior of young children. By applying findings that pertain to this established parent-child interaction coding system (i.e., DPICS) to the field of dentistry, provider-child interactions can be explored to investigate possible associations with problem behavior in the dental setting.

Filcheck, McNeil, and Herschell (2001) examined different types of parental verbal feedback and their effects on child compliance and general behavior. In both disruptive and typical children, nonenthusiastic description led to higher rates of compliance while enthusiastic

praise led to higher rates of general behavior. These findings indicate that depending on the desired behavior, different types of verbal feedback may be more effective than others. Another study examined whether certain DPICS codes could be used to effectively screen for behavior disorders (Bjørseth, McNeil, & Wichstrøm, 2015). Three negative parent codes (i.e., negative talk, indirect command with no opportunity for compliance, and direct command with compliance) and one child code (i.e., command) effectively screened for children with behavior disorders. These findings indicate that the aforementioned negative DPICS codes may relate to an overall negative parent-child interaction style, which may subsequently increase problem behaviors in children.

The findings from the PCIT literature indicate that specific DPICS codes are related to child behavior problems, which begs the question: can the DPICS methodology be useful in other settings? If these codes predict child behavior in parent-child dyads, could they also be related to child behavior in dentist-child dyads? By transferring certain tenants of PCIT to the interactions that take place during a dental appointment, could the behavior of a child patient be more effectively managed, and could dental fear be reduced?

The Present Investigation

The current study aimed to investigate the verbal and behavioral interactions between dental staff and pediatric patients during dental appointments to better understand their impact on child dental fear and behavior management problems. The overarching purpose was to investigate the reliability and validity of a number of potential codes that could be used to explore the interactions commonly seen during dental appointments and to explore possible relationships between these codes and a child's behavior. Dental appointments were video recorded and specific interaction codes were compared to the child's behavior as rated on the

Frankl Behavior Rating Scale (Frankl; Frankl, Shiere, & Fogels, 1962) as well as the child's fear as rated on the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS; Cuthbert & Melamed, 1982). The following hypotheses were made in relation to the correlations between specific interaction types and child behavior, backed by the previous medical and PCIT literature:

1. A positive correlation will exist between the number of labeled praises used during a dental visit and Frankl scores. A less strong correlation is expected to exist between number of unlabeled praises and Frankl scores.
2. A negative correlation will exist between the number of indirect commands and Frankl scores. A negative correlation will exist between the number of no-opportunity commands and Frankl scores.
3. A negative correlation will exist between the number of negative talk statements used during a dental visit and Frankl scores.
4. A positive correlation will exist between the number of instances of rapport building with the child and Frankl scores.
5. A positive correlation will exist between the number of instances of positive physical touch used during a dental visit and Frankl scores.
6. A positive correlation will exist between the number of coping promoting techniques used during a dental visit and Frankl scores.
7. A negative correlation will exist between the number of distress promoting techniques used during a dental visit and Frankl scores.
8. A positive correlation will exist between the number of times the "tell-show-do" method is utilized during a dental visit and Frankl scores.

9. A positive correlation will exist between the usage of live modeling during a dental visit and Frankl scores.
10. A negative correlation will exist between the usage of voice control during a dental visit and Frankl scores.
11. A positive correlation will exist between the usage of enthusiasm during a dental visit and Frankl scores.
12. A positive correlation will exist between the number of times age appropriate terminology is used during a dental visit and Frankl scores.
13. A positive correlation will exist between the number of times sensory information is disclosed to the child during a dental visit and Frankl scores.

In addition to investigating the above hypotheses, exploratory analyses were conducted to examine the interactional styles of dentists versus hygienists, as well as the relationships between the behavioral codes, the CFSS-DS, and the Frankl scores as reported by dentists, hygienists, and research assistants.

Method

Participants

In the current investigation, 36 children (19 male and 17 female) were recruited from four community dentistry practices in West Virginia, Tennessee, and Ohio. Although more practices were utilized for the larger R21 study, this experiment utilized data from only four practices. Within the four practices, 55.60% of participants were seen at one practice, 27.80% were seen at a second practice, and 8.30% were seen at both the third and fourth practice. Within the total 36 participants, there were eight sibling pairs. This means that in eight appointments within this study, two siblings had their appointments back-to-back. In these instances, both children were

typically in the room together during the entire time, however only one child was being examined in the dental chair at one time. To be eligible for the study, children had to be under the age of six years old. The participants ranged in years from 1-5 with an average age of 3.42 years (*SD* = 1.37). The child participants also slightly differed in ethnicity with 74.30% of participants identifying as Caucasian (Figure 1). All of the appointments examined in this study were either happy visits, in which the dentist's main goal was to briefly examine the child's teeth and create a positive experience for the child, or a routine cleaning and exam, in which the dentist completed a thorough examination of the child's teeth in addition to a cleaning. Five different dentists and eight different dental hygienists were utilized for this study. Additionally, the interactions that occurred between two administrative assistants, who briefly entered the operatory, and a child patient were also coded. For simplicity, these two assistants were categorized as "dental hygienists" in the analyses.

Study Measures

Dental provider report.

Frankl Behavior Rating Scale (Frankl). The Frankl is a dental provider report of a child's behavior (Frankl et al., 1962). Based on the types of cooperative behaviors displayed by the child, the dentist and dental hygienist rated the child's behavior on a four-point scale ranging from 1 (*definitely negative*) to 4 (*definitely positive*). The 1 (*definitely negative*) rating included behaviors such as refusal of treatment and forceful crying, the 2 (*negative*) rating included behaviors such as reluctance and mild uncooperative behaviors, the 3 (*positive*) rating included behaviors such as willingness to comply and acceptance of treatment, and the 4 (*definitely positive*) rating included behaviors such as laughter and enjoyment. To check for reliability

among Frankls, research assistants also gave each child a Frankl score after watching the video recording of the child's appointment.

Parent report.

Children's Fear Survey Schedule-Dental Subscale (CFSS-DS). The CFSS-DS is a 15 item parent-report questionnaire (Cuthbert & Melamed, 1982). Parents rated their child's fear for each item on a scale from 1 (*not afraid at all*) to 5 (*very afraid*). Each item related to a medical experience that may be associated with dentistry, such as fear of injections, having somebody examine their mouth, and the noise of the dentist drilling. If a child had never experienced an item, the parent rated the child's fear based on how they believed the child would respond.

Behavioral codes.

DPICS. The DPICS-IV is an observational coding method typically used to code verbal interactions between a caregiver and child during a PCIT session (Robinson & Eyberg, 1981). The reliability and validity of the DPICS being utilized during live sessions and video-recorded sessions has been previously demonstrated in addition to the average inter-rater reliability, with mean scores of .91 and .92 for parent behaviors and child behaviors (Eyberg, Nelson, Duke, & Boggs, 2005; Robinson & Eyberg, 1981). In this study, the DPICS was used to code verbal interactions observed between a dental provider (i.e., dentist, dental hygienist, or dental assistant) and child during an appointment. The focus of this study was on six DPICS codes: praise (i.e., labeled and unlabeled), commands (i.e., direct and indirect), questions, and negative talk, however all verbalizations were coded because the DPICS is an exhaustive coding system that requires all verbalizations to be coded as one of the nine codes. Therefore, frequency counts of behavior descriptions, reflections, and neutral talk were recorded as well. In order to create standardized codes that could be compared across all appointments, the frequency counts were

manipulated into a ratio. The total number of each coding category was divided by the total number of DPICS codes to create a comparative ratio for each code.

Family Unit Questions. In addition to the nine DPICS codes, one code that was specific to the triadic-plus coding schemes observed in this study was also operationally defined and coded. Family unit questions were defined as questions directed to the entire family as a whole. To be coded as a family unit question, any member of the family had to have had the opportunity to have responded to the question. If a generalized question was directed to the caregivers in the room, it was not coded as a family unit question because the child did not truly have the option to respond. Family unit questions were coded with the DPICS rules in mind, and the total frequency count for each participant was divided by the total number of DPICS codes used to create a comparative ratio.

Dental-specific codes. Utilizing information from previous dental/medical literature, a novel coding system focusing on specific behaviors displayed by dental providers was developed. The following dental-specific codes focused on interactions between the dental professionals and the child that may be influential to the overall behavior of the child during a dental appointment. Although it was proposed that each of these codes would be examined in this study, due to feasibility limitations, only the use of age-appropriate terminology was investigated.

Age-appropriate terminology. Age-appropriate terminology was defined as the use of euphemisms and "kid-talk" in reference to specific dental equipment or procedures (e.g., Mr. Sunshine, special pictures of your teeth, Mr. Squirty). Each use of age-appropriate terminology was coded as one frequency count and a total frequency count was tallied for each dental hygienist and dentist working with each participant.

Below are the nine remaining dental-specific codes that were proposed, but were not examined.

Rapport building. Rapport building was defined as the use of non-procedural "chit chat" and/or the use of a humorous and fun activity between the dental provider and child before the procedures of the dental appointment officially began. Rapport building would have included both statements and questions directed at the child and a complete thought would have been counted as one instance of rapport building. Successive phrases that were separated by a two second pause were to be counted as two instances of rapport building.

Positive physical touch. Positive physical touch was defined as the use of any non-procedural touch (neutral or positive) directed towards the child (e.g., pat on the back, rub on the arm, etc.).

Coping promoting techniques. Coping promoting techniques would have been measured using the operational definitions of the Child-Adult Medical Procedure Interaction Scale-Revised (CAMPIS-R; Blount et al., 1997) and the Child-Adult Medical Procedure Interaction Scale-Short Form (CAMPIS-SF; Blount, Bunke, Cohen, & Forbes, 2001). Coping promoting techniques were defined as those in which nonprocedural talk to the child, humor to the child, engaging the child in play, and attempting to distract the child by pointing to something in the room or out the window was used. These strategies were to be observed and counted individually in addition to being added together into one composite code. Possible relationships between the individual coping promoting techniques and behavior as well as the composite coping promoting technique score and behavior were to be examined.

Distress promoting techniques. Distress promoting techniques would have been measured using the operational definitions of the CAMPIS-R and the CAMPIS-SF (Blount et al., 1997;

Blount et al., 2001). Distress promoting techniques were defined as the use of reassuring comments to the child, criticism of the child, apologizing statements, giving control to the child, and empathizing with the child. These strategies were to be observed and counted individually in addition to being added together into one composite code. Possible relationships between the individual distress promoting techniques and behavior as well as the composite distress promoting technique score and behavior were to be examined.

Tell-show-do method. According to the AAPD (2015), tell-show-do was defined as follows. First, the dental provider must have explained what was going to be done to the child in an age-appropriate manner. Next, the provider must have demonstrated how the procedure was going to be done without actually performing the procedure on the child. Finally, the provider must have then completed the procedure on the child.

Live modeling method. Although live modeling can include three types of models: siblings, parents, and other children, this study defined live modeling as the use of siblings or caregivers to demonstrate a behavior for the child to observe prior to having the procedure performed on that child (Wright & Kupietzky, 2014).

Voice control. Voice control was defined as the use of sudden, firm commands in which the volume and tone of the dental provider's voice was purposefully adjusted to be more assertive towards the patient (AAPD, 2015; Wright & Kupietzky, 2014).

Enthusiasm. Enthusiasm was defined as the use of a positive, happy, high pitched tone in addition to positive body cues such as smiling and laughing towards the patient.

Sensory information. Sensory information was defined as the use of pre-procedural comments to the child indicating how the procedure was going to feel (Suls & Wan, 1989).

Sensory information would have included both pain warnings and other positive and negative sensory references.

Procedure

Various dental practices were recruited for this study within the states of West Virginia, Tennessee, and Ohio. The practices ranged from general dentistry practices to pediatric dentistry practices, with preference given to practices that were not affiliated with a university. Upon recruiting the practice, researchers traveled to the practice to consent the staff, recruit participants, and collect data.

To recruit participants, researchers approached families (i.e., caregivers and children) within the study's age range in the waiting room of the dental practice. After explaining the purpose of the study and obtaining informed consent, researchers then brought the participants into a separate room to complete pre-appointment measures. Following consenting, each participant's dental appointment was filmed using a small mounted video camera that was turned on by a research assistant. Research personnel were not present in the dental operatory during procedures, and providers were encouraged to conduct appointments as per usual. The video cameras recorded the entirety of the dental appointments, so the naturalistic triadic interactions among the child patient, dental provider, and caregiver could be examined. Following their interaction with the child, dental providers completed the Frankl (Frankl et al., 1962). After the appointment, families were given a battery of post-appointment measures, debriefed, and compensated (i.e., Walmart gift card and children's book).

Video transcriptions. Researchers transcribed the video recordings of each appointment to include both verbalizations and behaviors. Transcriptions were completed for the entirety of the appointment, regardless of what was actually visible (i.e., if the child and parent were out of

camera view, the researcher made note on the transcription and then transcribed the vocalizations to the best of their ability). A Cascading Model (CM; also commonly called train-the-trainer model) was used to train researchers in the transcribing protocols (Herschell et al., 2015). Utilizing a "top-down" hierarchal approach, two advanced transcribers were trained by a senior researcher (i.e., graduate student) via modeling, direct practice, observation, and feedback. These two advanced transcribers then replicated this training with subsequent transcribers. Furthermore, the two advanced transcribers periodically reviewed the transcripts of second-generation transcribers to ensure competence and fidelity. The senior researcher provided on-going consultation with the two advanced transcribers throughout the process.

DPICS coding. Supervising researchers trained research assistants in the DPICS, with an emphasis on the six codes that were focused on in this study. A one-day training session occurred for approximately two hours. A trained researcher led a presentation to teach research assistants about the codes and research assistants practiced by coding a five-minute clip of an example video that was pre-chosen by the researchers. Following coding the practice clip, any questions or discrepancies amongst the trainees were addressed by the supervising researchers. Next, trainees coded a DPICS quiz to assess competency.

Following training, the research assistants began coding the transcripts in pairs, and periodic competency checks were administered by the supervising researcher via coding quizzes and group coding discussions. After subsequent checks were performed, research assistants then coded transcripts and videos independently. Research assistants coded the transcripts line by line and only coded interactions that occurred between the providers and child when the child was in the operatory. In other words, the coding start time was when the child first entered the room and the coding stop time was when the child left the room at the end of the appointment. In order to

check reliability upon coding completion, 25% of the transcripts were double coded and inter-rater reliability was calculated using intraclass correlation coefficients (ICCs).

Frankl coding. To check for reliability on the Frankl scores provided by the dentists and dental hygienists, research assistants gave their own independent rating of the child's behavior on the Frankl following the coding of the video and transcripts for each participant. This score could then be compared to the given scores provided by the dentists and dental hygienists to check for reliability.

Dental-specific coding. To train research assistants in the correct coding procedure for the use of age-appropriate terminology, a supervising researcher met with two pre-chosen research assistants. The supervising researcher operationally defined the code, gave examples, and used an example transcript to model correct coding practices. Research assistants then asked questions and practiced in front of the supervising researcher with one transcript each. Following this training, these two research assistants then coded transcripts independently focusing on this one code and referred to the supervising researcher with questions.

Although the researchers were unable to code all dental-specific codes, in order to train research assistants in all 10 codes, it was proposed that supervising researchers would have trained research assistants during a one day training session lasting approximately two hours. An advanced researcher would have first led a presentation that would have taught the research assistants the 10 codes utilized for the study. Research assistants would then have practiced coding the dental-specific behaviors using a five-minute clip of a pre-chosen video. Any questions would have been addressed by the advanced researcher. Next, trainees would have coded a new five-minute pre-chosen video clip to assess coding competency.

After successfully completing training, the research assistants would have then begun coding the transcripts independently. The research assistants would have both watched the video and followed along with the transcript in order to code the behaviors of the dental providers. Upon coding completion, 25% of the videos would have been double coded and inter-rater reliability would have been calculated using ICCs. Although these coding procedures were unable to have been implemented in this project, each step of the dental-specific coding procedures were thoroughly conceptualized in the planning stage of the project.

Data Analysis

Of the 36 participants within this study, three participants had missing data for age and scores on the CFSS-DS, and 19 participants had missing scores on the Frankl as rated by the dental hygienist. **Descriptive statistics** were run for age, gender, behavioral codes, scores on the CFSS-DS, and scores on the Frankl (as rated by the dentists, hygienists, and coders) to determine distributions, means, and standard deviations. **Two Kruskal-Wallis ANOVAs** were run to determine possible differences in the use of specific behavioral codes across the four different Frankl ratings for dentists and due to small cell counts, Frankl scores were condensed into two categories (i.e. positive scores of a 3 and 4 versus negative scores of a 1 and 2) to be utilized for further analyses. Additionally, due to missing data from the hygienists, behavioral codes for the hygienists were compared to Frankls as rated by the research assistant coder in the proceeding analyses.

Researchers ran two **Spearman Rank-Order Correlations** to examine possible relationships among the aforementioned behavioral codes (i.e., DPICS, dental-specific behavior), the Frankl, and the CFSS-DS for the dentists and dental hygienists. Additionally, **Mann Whitney U Tests** were also run to examine whether the two samples of participants falling under

the low versus high Frankl scores were equal across the other variables within this study. Finally, an additional **Mann Whitney U Test** was run to investigate whether the use of each specific DPICS code differed between dentists and dental hygienists.

Results

In this sample of children under the age of six years old, 30.66% of participants met or exceeded the dentally fearful cut-off score on the CFSS-DS. Additionally, 27.78% of children fell into the negative behavior category on the Frankl when scored by the dentist, and 25% of children fell into this negative category when scored by a research assistant coder (Figure 2). Frankl scores as rated by the dental hygienists were not used for analyses because scores were missing for 19 participants. Interestingly, 36.36% of children with reportedly high levels of dental fear also fell into the negative category on the Frankl as reported by the dentist and 54.55% of these children fell into the negative category when utilizing Frankls as rated by a coder. This relationship was further signified when a significant negative correlation was found between scores on the CFSS-DS and the Frankl as rated by the coder, $\rho(33) = -0.59$, $p = 0.000$, however this relationship was not present when examining the CFSS-DS and the Frankl as rated by the dentist, $\rho(33) = -0.22$, $p = 0.230$. Finally, a Mann Whitney U Test further enforced this significant relationship when it was found that child dental fear ratings in young children with low Frankl scores as rated by a research assistant coder ($M = 27.89$) differed significantly from fear ratings in children with high Frankl scores as rated by the coder ($M = 13.76$), $U = 19.00$, $z = -3.65$, $p = 0.000$ (Figure 3).

Before conducting statistical analyses to test the proposed hypotheses of this study, ICCs were run to check the inter-rater reliability of the DPICS coding. Twenty separate ICCs were calculated for each of the nine DPICS codes, as well as the family unit questions code, for the

dentists and the dental hygienists. ICCs ranged from 0.76-1.0, indicating good to excellent reliability between the coders (Table 1).

This study had 13 major hypotheses. Unfortunately, only four of those hypotheses were tested. Nine hypotheses were not tested due to feasibility limitations. Due to time constraints, specific dental-specific behavioral codes were unable to be examined and as a result, those hypotheses could not be addressed. Each of the hypotheses addressed below assessed the possible relationship between a behavioral code (i.e., a DPICS code, family unit question, age-appropriate terminology) and the measure of the child's behavior via the Frankl. Table 2 and Table 3 display the correlational findings of the following hypotheses for dentists and dental hygienists.

Hypothesis 1

The first hypothesis presented in this study posited that a positive correlation would exist between the number of labeled praises a dental provider used and the rating of the child's behavior on the Frankl. It was also hypothesized that a less strong positive correlation would exist between the number of unlabeled praises used and the Frankl. According to a Spearman Correlation, there was not a significant correlation between the number of labeled praises used by dentists and the Frankl as rated by the dentist, $\rho(36) = -0.11$, $p = 0.520$. There was also no significant correlation between the number of unlabeled praises used by the dentists and the Frankl as rated by dentists, $\rho(36) = -0.09$, $p = 0.591$. When comparing the use of labeled praises by dental hygienists and the Frankl as rated by the coder, no significant correlation was found, $\rho(37) = 0.01$, $p = 0.949$. There was no significant correlation between the use of unlabeled praises by hygienists and the Frankl as rated by the coder either, $\rho(37) = 0.13$, $p = 0.462$.

Hypothesis 2

The second hypothesis postulated that a negative correlation would exist between the number of indirect commands used during an appointment and the Frankl. Again, according to a Spearman Correlation, no significant relationship was found between indirect commands given by dentists and Frankls as rated by dentists, $\rho(36) = -0.17$, $p = 0.330$ or indirect commands given by dental hygienists and Frankls as rated by coders, $\rho(37) = 0.05$, $p = 0.754$.

Hypothesis 3

The third hypothesis predicted that a negative correlation would exist between the number of times negative talk was used toward the child and the Frankl, however no significant relationship was found between dentists' usage of negative and their Frankl scores, $\rho(36) = -0.27$, $p = 0.108$, nor dental hygienists' usage of negative talk and Frankl scores as rated by coders, $\rho(37) = 0.09$, $p = 0.591$.

Hypothesis 4

Finally, the fourth hypothesis posited that a positive correlation would exist between the number of times age-appropriate terminology was utilized and the Frankl score. A Spearman Correlation indicated that no significant relationship was found between dentists' usage of these terms and the Frankl as rated by dentists, $\rho(36) = 0.06$, $p = 0.712$, nor dental hygienists' usage of age-appropriate terms and the Frankl as rated by coders, $\rho(37) = 0.12$, $p = 0.464$. Overall, no significant relationships were found between any of the behavioral codes and the child's behavior on the Frankl.

Although the primary hypotheses presented in this investigation focused on the possible relationships between behavioral codes of the dental provider and the effects on the resulting behavior of the child patient, possible relationships between behavioral codes and the measure of child fear via the CFSS-DS were also examined. Interestingly, a significant negative correlation

was found between the use of age-appropriate terminology by dental hygienists and the CFSS-DS, $\rho(34) = -0.47$, $p = 0.005$, however no significant correlation was found between these two variables for dentists, $\rho(33) = -0.12$, $p = 0.518$.

Additionally, a few interesting relationships between the behavioral codes were found via correlational analyses. For dentists, a significant negative correlation was found between the use of indirect commands and age-appropriate terminology, $\rho(36) = -0.37$, $p = 0.026$. For dental hygienists, a significant positive correlation was found between the use of unlabeled praises and age-appropriate terminology, $\rho(37) = 0.33$, $p = 0.048$, the use of indirect commands and negative talk, $\rho(37) = 0.427$, $p = 0.008$, and the use of negative talk and age-appropriate terminology, $\rho(37) = 0.389$, $p = 0.017$.

Finally, according to a Mann Whitney U Test, a few significant differences in the usage of specific DPICS codes were found between dentists and dental hygienists (Table 4). A significant difference existed in the use of labeled praises by dentists ($M = 47.00$) and dental hygienists ($M = 27.27$), $U = 306.00$, $z = -4.64$, $p = 0.000$. A significant difference also existed in the use of unlabeled praises by dentists ($M = 49.97$) and dental hygienists ($M = 24.38$), $U = 199.00$, $z = -5.16$, $p = 0.000$. Another significant difference was found between the use of direct commands by dentists ($M = 29.97$) and dental hygienists ($M = 43.84$), $U = 919.00$, $z = 2.80$, $p = 0.005$. And one final significant difference was found in the use of negative talk by dentists ($M = 29.32$) and dental hygienists ($M = 44.47$), $U = 942.50$, $z = 4.12$, $p = 0.000$.

Discussion

The current investigation is one of the first studies to examine the specific behaviors that naturally occur in the pediatric dental setting and the ways in which they may be related to a child patient's behavior and fear during an appointment. This line of research is important

because many sources have indicated the importance of oral health and the ways in which positive practices early in life can contribute to more positive overall health outcomes (e.g., AAPD; 2013, 2014). However, due to the widespread prevalence of dental fear and behavior management problems, positive oral health practices are difficult to implement with young children.

Notably, this study contained a greater percentage of participants with high dental fear ratings (about 30%) than what is stated in previous literature (about 20%; Baier et al., 2004). This greater proportion of reported dental fear may have been due to the age range of this study. Baier et al. (2004) reported prevalence rates of dental fear in a sample of children ranging from 1-13 years. However, because this study focused on a much younger, more restricted age range, levels of fear as reported by caregivers may have been higher. Additionally, many previous findings have found a strong association between the children reporting high levels of dental fear and the children displaying behavior management problems in the dental setting (about 61%; Klingberg et al., 1995). The current findings are consistent with the results of previous literature because a significant negative correlation was found between CFSS-DS scores and Frankl scores as rated by a coder, indicating that higher levels of fear were associated with poorer behaviors. One important confound to note in regard to this negative correlation however, is the fact that caregivers completed the CFSS-DS after the appointment. Because of this timing, caregivers may have been rating their child's fear based on the behaviors they just witnessed during the appointment, thus biasing their judgement and leading to the strong negative correlation observed between scores on the CFSS-DS and the Frankl.

Overall, these findings add evidence to the multifactorial nature of dental fear and behavior management problems during dental appointments. Dental providers who interact with

children under the age of six may benefit from providing a measure of dental fear as a screening tool prior to a child's dental appointment. This screening tool would allow the providers to prepare for the possibility of behavior management problems and thus help guide their interactions with the child during the appointment. For example, providers might want to set up a "happy visit" for children with high levels of dental fear that is focused on increasing the child's comfort level with the dental operatory and staff, without expectations for completing procedures. By recognizing the interconnectedness of child dental fear and behavior management problems, future intervention efforts can be aimed at targeting both fear and behavior management problems, rather than one or the other.

In addition to the relationships described above, a few other interesting explanations may account for the significant relationships seen between some of the behavioral codes. In dental hygienists, negative talk was significantly positively correlated with indirect commands. This relationship most likely existed because in many cases, the children may not have been complying with the indirect commands and as a result, the hygienist used more negative talk to attempt to get the child to stop whatever he or she was doing wrong. Additionally, a significant positive correlation existed between negative talk and age-appropriate terminology for dental hygienists, which may have been controlled by age. If a child was younger, a hygienist may have instinctively used more age-appropriate terminology and, somewhat unrelatedly, may have also used more negative talk to try to control challenging behaviors that are commonly seen in young children.

Significant differences observed in the use of specific DPICS codes between dentists and dental hygienists may also have some interesting explanations. In this study, dentists used more labeled and unlabeled praises than dental hygienists, however hygienists used more direct

commands and negative talk. These findings are most likely due to the procedural style that occurred in many of the observed practices. Generally speaking, in most practices, the dental hygienist spent the majority of the time with the child trying to complete the necessary procedures. Therefore, the hygienist needed the most cooperation and compliance from the child, thus leading to the high usage of direct commands and negative talk. The dentists on the other hand, typically entered the operatory near the end of the appointment, checked the child's teeth, and answered any questions from the caregiver. Therefore, in this context, the majority of the verbal interactions between the dentist and child would most likely be praises aimed at the child's teeth and at their cooperation with the dentist's requests.

Although many behavioral codes were examined in this study, no significant relationships were found between the codes and the child's behavior as rated on the Frankl. However, this investigation is still an important addition to the literature pertaining to pediatric dental experiences because it implies that future research must still be conducted to examine the possible antecedents to challenging child behavior in the dental setting. The methodology and findings of this study must be examined and improved upon in order to further investigate these relationships.

Limitations

There were a number of limitations within the current study that may have contributed to the findings. First, as discussed above, the feasibility of this investigation was an extremely limiting factor. Due to the cumbersome and time-consuming nature of coding observational data, the overall amount of data that could be examined in this study was limited. Due to limited resources, in the form of available research assistants who could assist with transcribing and coding videos, as well as the time limits inherent in conducting an undergraduate honors thesis,

the researchers were unable to examine all of the behavioral codes and as many participants as was originally planned. This decrease in variables concentrated the scope of the project, and the small sample size impacted the power of the analyses. A G*Power 3.1.3 sensitivity power analysis (Faul, Erdfelder, Buchner, & Lang, 2009) was conducted to determine the necessary effect size with a power of .80, alpha of .05, and sample size of 36 using a point biserial correlation model. This analysis suggested an effect size of 0.39 would have been needed when conducting a Spearman Correlation in order to attain this level of power. Because the observed effect sizes within this study were well below this level, the finding suggests that the sample size was much too low to detect significant results.

In addition to the feasibility and the small sample of participants, the small number of dental practices and dentists and dental hygienist used in this study may have restricted the variability of the findings. Because data from only four practices were utilized for this study, this restricted the number of dentists and hygienists that could be observed, and thus, decreased the variance and generalizability of the findings. Only a small number of dentists and hygienists interacted with the participants within this study, therefore it is difficult to claim that these findings would then generalize to all dentists and hygienists in this area.

One other limitation within this study was the lack of internal validity that resulted in possible confounding variables. Because the study aimed to capture the naturalistic interactions occurring in dental practices, no control was placed over the proceedings that occurred during the actual dental appointments and as a result, there was incredible variability in what was observed. For example, in some instances, families would come into the practice with three children, all of whom were being seen by the dental provider during one large time slot. These cases complicated coding procedures because as the number of people in the room increased,

possible interaction types also increased. The same complication was seen when multiple providers were in the procedure room as well (e.g., dentist and multiple dental hygienists/dental assistants).

Another example of a possible confounding variable that was observed as a result of the naturalistic aim of this investigation was the type of procedural style that varied from practice to practice. Because four different practices were examined, different procedural styles were utilized within each practice. For example, in some practices, the dental hygienist spent the majority of the time with the child patient and the dentist only entered the room for a brief period of time. However, in other practices, the dentist spent the majority of time with the child and the hygienist only interacted with the child to take pre-appointment x-rays. Additionally, some practices were more restrictive in allowing staff to participate in the study, thus affecting the measures that could be obtained. For example, in one practice, the behavioral interactions between the dental hygienist and the child patients were observed and coded via the video recordings of each appointment, however because there was some hesitation in allowing the hygienists to fully participate by the dentist in this practice, Frankl ratings by the hygienist were not obtained for many participants of the participants observed in that practice (i.e., the 19 missing Frankls as rated by dental hygienists). Therefore, this variability in procedure style not only affected the interaction types that were observed and coded, but also the outcome on the child behavior measure.

Overall, although the naturalistic aim of this study led to rich data containing numerous possibilities for further research, it may have also led to a number of confounding variables such as the presence of siblings and multiple family members in the appointment, the presence of

multiple providers in the appointment, and the variability in procedure style across dental practices.

Future Directions and Conclusion

In order to address the limitations of this study as well as the limitations seen in the overall literature pool, future researchers should allocate considerable time and resources to investigating these topics. Pre-planning should focus on the amount of time needed to train researchers in transcribing and coding procedures as well as the amount of time needed to thoroughly and reliably code behavioral interactions. Researchers should take care to report training and coding procedures, feasibility, and cost/benefits of similar observational studies to ensure transparency as well as inform replication in future research. Additionally, due to the immense variability seen across the appointments examined in this study, future researchers may wish to employ certain restrictions to future investigations. For example, in order to control for familial effects, future researchers may wish to only examine appointments occurring with parents and a single child, while excluding families with multiple siblings from the study. Future researchers may also wish to investigate the possible effects of different procedural styles on child behavior. For example, future analyses could compare differences between the behavior of children who only briefly interact with the dentist and spend the majority of their time with the hygienist and the behavior of children who spend considerable time with the dentist rather than the dental hygienist. Overall, future research should continue to examine the behavioral interactions occurring in the pediatric dental setting to better determine what may be contributing to early child dental fear and behavior management problems. By utilizing tenants from evidence-based child behavior interventions such as PCIT, we can gain a better understanding of these interactions and how they may be influencing child fear and behavior, so dental providers

can eventually use empirically-based interaction methods to improve the dental experiences of young children.

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Figure 1

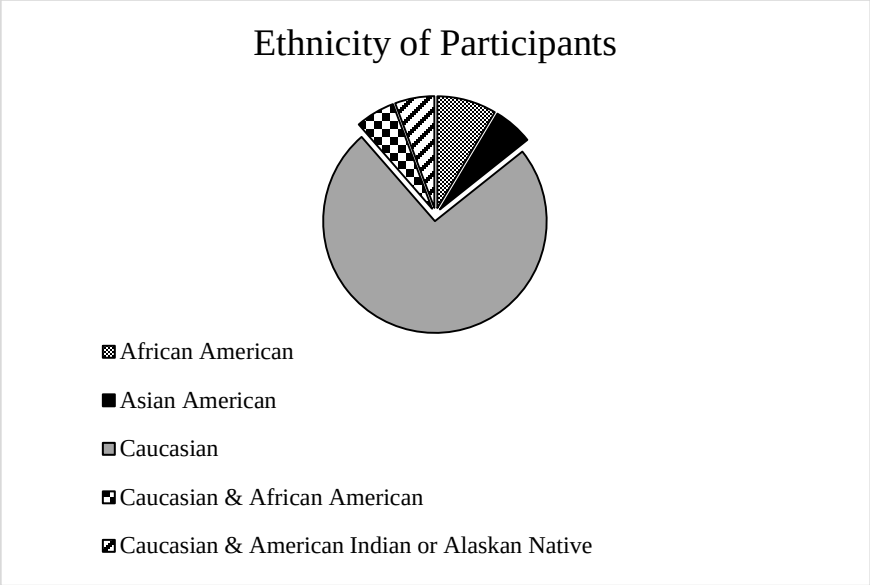

Figure 1. Ethnicity of Participants. Figure 1 displays the reported ethnicities of each child participant. 74.3% of children identified as Caucasian, 8.6% identified as African American, 5.7% identified as Asian American, 5.7% identified as Caucasian & African American, and 5.7% identified as Caucasian & American Indian or Alaskan native.

Figure 2

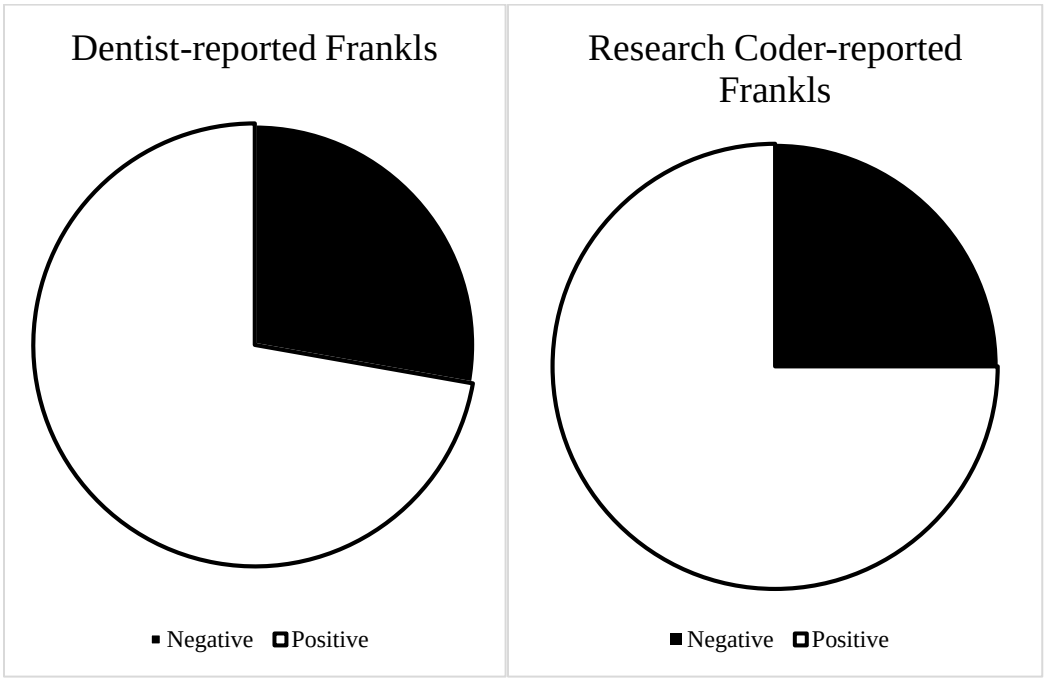

Figure 2. Positive and Negative Frankl Ratings. Figure 2 displays the proportion of participants who were scored negatively versus positively on the Frankl as rated by the dentist and research assistant coder.

Figure 3

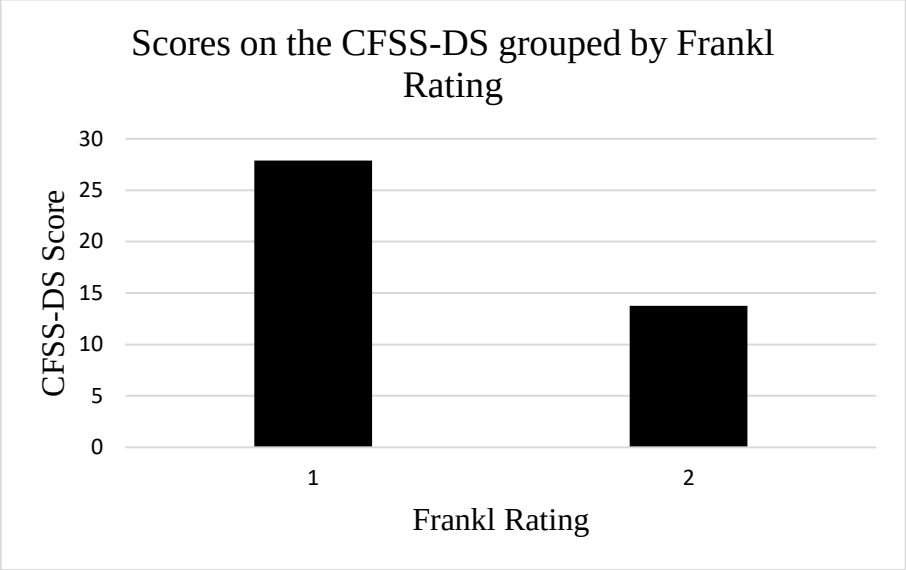

Figure 3. CFSS-DS Scores. Figure 3 displays CFSS-DS scores for participants who were given negative versus positive Frankl scores as rated by the research coder.

Table 1

Intraclass Correlation Coefficients

DPICS Code	Dentist	Dental Hygienist
Labeled Praise	0.958	0.858
Unlabeled Praise	0.964	0.975
Indirect Command	0.760	0.963
Direct Command	0.948	0.965
Question	0.975	0.967
Family Unit Question	0.971	0.996
Reflection	0.913	0.981
Behavior Description	1.0	0.995
Negative Talk	NA	0.963
Neutral Talk	0.950	0.924

Note. Values are Single Measures Intraclass Correlation Coefficients. NA refers to a correlation that could not be run due to the fact that all values were zeros (i.e., in this sample that was double-coded, zero dentists used negative talk).

Table 2

Spearman Correlations of DPICS codes and Frankl-Dentists

Code	1	2	3	4	5	6	7
1. LP	-						
2. UP	-.214	-					
3. IC	.067	-.148	-				
4. NTA	.050	-.106	.187	-			
5. Age- appropriate Terminology	.275	-.099	-.370*	-.215	-		
6. Frankl (Dentist)	-.111	-.093	-.167	-.273	.064	-	
7. Frankl (Coder)	.064	-.083	-.096	.098	.220	.358*	-

Note. Spearman correlation coefficients for correlations between DPICS codes used by dentists and the Frankl.

*p <.05.

Table 3

Spearman Correlations of DPICS codes and Frankl-Dental Hygienists

Code	1	2	3	4	5	6
1. LP	-					
2. UP	.025	-				
3. IC	.018	.115	-			
4. NTA	-.189	.063	.427**	-		
5. Age- appropriate Terminology	.118	.327*	.220	.389*	-	
6. Frankl (Coder)	.011	.125	.053	.091	.124	-

Note. Spearman correlation coefficients for correlations between DPICS codes used by dental hygienists and the Frankl.

*p<.05, **p<.01

Table 4

Mann Whitney U Test between Dentists and Hygienists

DPICS Code	Dentist		Dental Hygienist		*z* score
	Freq. Mean	Ratio Mean	Freq. Mean	Ratio Mean	
Labeled Praise	0.94	0.01	0.11	0.0007	-4.64*
Unlabeled Praise	21.61	0.26	9.32	0.10	-5.16*
Indirect Command	6.36	0.07	8.57	0.12	0.83
Direct Command	7.94	0.07	13.43	0.15	2.80*
Question	28.25	0.23	21.57	0.22	-0.34
Family Unit Question	1.19	0.02	0.73	0.06	-0.37
Reflection	0.50	0.003	0.86	0.006	0.38
Behavior Description	0.50	0.004	0.27	0.004	0.13
Negative Talk	0.03	0.0002	1.57	0.02	4.12*
Neutral Talk	43.36	0.35	38.92	0.33	-0.69

Note. Freq. Mean = means of pure frequency counts. Ratio Mean = mean of coded ratios (individual code/total DPICS codes). Z score is standardized test statistic between the DPICS code ratios observed for dentists versus dental hygienists.

*$p < .01$