

Children's Perspectives of Dental Experiences in Student Clinical Evaluations

by

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Abstract

There has been an increasing emphasis in dentistry to incorporate children's perspectives of care to improve patient services, develop prevention and promotion strategies, and inform dental education. This move is in line with patient- and family-centered care, which has become the driving focus of health care systems, replacing the paternalistic view of health provision that preceded it. Patient- and family-centered care emphasizes that the patient's health care decisions should involve them and recognize the role family members play in extended caregiving.

Regarding children specifically, the inclusion of their perspectives in their own oral health is crucial in the upholding of children's rights, for fostering the sense of ownership within children of their own health, and for understanding various facets of dentistry throughout a patients' lifetime. Increasing the frequency of opportunities for patient feedback in health education curricula may help normalize patient- and family-centered principles throughout students' careers and serve to prepare them for being receptive to and welcoming of patient feedback.

Patient feedback is gaining recognition as an important measure of patient-centered care, satisfaction, and efficacy of health programs in research, policy, and education. Despite the importance of the patient and their family's perspectives in the provision of quality dental care, there is a paucity of pediatric patient and family feedback in the education and assessment of dental students. In dental education clinical curricula, the perspective of the patient, particularly pediatric patients, is often the missing lens in student evaluations of clinical performance. It is possible to involve their perspectives ethically and effectively, but currently, there is little guidance for program directors regarding the best-practices for gathering and integrating patient feedback into the curricula, the ethical considerations of research with children, and the time and effort required to implement and analyze holistic methods of gathering children's perspectives.

Projective methods, such as drawing, combined with traditional ones, such as verbal interviewing, are rising approaches used for exploring the perceptions of children. A handful of studies have used this combination of approaches to inquire into children's perspectives of dental treatment, but none explored the child's perspective of treatment in dental education. This thesis, therefore, proposes a framework for gathering children's perception of their dental experiences at a teaching dental clinic, and then explores how the children's feedback is related to the evaluation of student performance. The two research questions for this study are: 1) What insights into children's perspectives of dentistry can be gathered from drawings? 2) How do children's perspectives inform current dental student evaluation? Forty-two child patients of the teaching clinic between the ages of 5 and 8 years were included in all stages of the study. For the first research question, the child participants were asked to draw all about themselves at the dentist and then to verbally explain their artwork. The drawings were analyzed using the Child Drawing: Hospital instrument to determine the child's anxiety score, while the verbal interviews were analyzed using deductive and inductive forms of thematic analysis to establish the factors which contributed to the child having a positive or a negative experience. The relationships between the children's level of anxiety and their experience and the student clinical assessment data were then analyzed using correlation analyses and binary logistic regressions. Most children in the study exhibited average levels of anxiety and had an overall positive perception of the dentist. The correlation and regression analyses determined that when children presented higher levels of anxiety, the students received statistically significant higher scores in evidence-informed practice and their tolerance for error during procedures. No other grading criteria was related to the children's anxiety or whether their experience was positive or negative. Most notably, the students' grades on professionalism and communication did not show any

relationship to the children's data. Although this study provided a framework for exploring children's perspectives of their experiences in teaching clinical settings, more research is needed to refine the method for student evaluation.

Preface

This thesis is an original work by Silvia Ortiz. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “Children’s Perspectives of Dental Experiences”, Pro00086015, January 2019.

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Acronyms

AAPD: American Academy of Pediatric Dentistry

AHS: Alberta Health Services

BGT: behaviour guidance techniques

BMT: behaviour management techniques

CD:H: Children Drawing: Hospital

CIHI: Canadian Institute for Health Information

CPQ8-10: Child Perceptions Questionnaire for children 8 to 10 years of age

FIS: Facial Image Scale (FIS)

FLACC: Faces, Legs, Activity, Cry, Consolability scale

FPS-R: Facial Pain Scale- Revised scale

OHRQoL: Oral health related quality of life

PCC: Patient-centered care

PFCC: Patient- and family-centered care

SEM: Sound, Eye, and Motor scale

Chapter 1: Introduction

As global health systems increasingly shift away from a paternalistic health care approach and towards a culture of empowering patients as partners in their own well-being, patient feedback regarding their experiences has become a key performance indicator of the quality of care. National health institutions have been implementing formal measures and regulatory processes in response to this shift. As a result, the current societal expectation of health care is that providers and institutions should engage in patient-centered care by actively listening to and respecting patient views, involving them in decision-making processes, including them in evaluation of services, and integrating patient perspectives and priorities into health professions education curricula.

Competency-based health professions educational programs require multisource evaluations of students (Massie & Ali, 2016), consisting of authentic environments and multiple lenses (such as that of the instructors, the patients, their families, and the students themselves) (Mahoney et al., 2018). The latter of these, the student's assessment of themselves, is often captured through reflective practice and learning. According to Jones et al. (2019), "reflection involves engagement in retrospection, self-evaluation, and re-orientation based on the individual's own experiences, feedback on their performance, or the observation of others" (p.397). The feedback that patients and their families provide regarding their experiences can be a powerful trigger in promoting student reflection. This feedback tends to focus on the interpersonal and communication skills of the student, allowing for insight into how the students' own behaviours affected patients as well as into how to modify these behaviours in the future (Plant et al., 2017). Emphasizing communication and interpersonal skills leads to increased quality of care provided by future health professionals and better health outcomes for patients;

thus, the major thrust of the patient-centered principle is to encourage the development of those skills in students (Wenner et al., 2011).

In many health professions programs, communication and professionalism are a part of a hidden agenda in the curricula, meaning that "...[these are] not present in the form of a separate subject but [are] often coincidentally instilled into other subjects – usually without clear learning objectives" (Klemenc-Ketis & Vrecko, 2014). As such, these aspects of competence, alongside other important non-cognitive traits, are weaved throughout students' learning and rarely get evaluated. Myers-Virtue et al. (2016) explored the noncognitive skills that contribute to the success and achievement of competence in dental students, finding that these factors were comprised of: interpersonal skills (communication, professionalism, empathy, active listening, cultural awareness), approach to learning (preparedness, willingness to learn, motivation to learn), and perseverance (cognitive flexibility, grit). In their study, interpersonal and communication skills were continuously rated as most important for clinical and academic performance. Other researchers have found correlations between the quality of the dentist-patient relationship and the patient's perception of the dental student's competence (Avtgis & Polack, 2007) and efficiency in communication (Mauksch et al., 2008). While effective communication between a health professional and the patient is a main objective in preparing students for their careers (Cegala et al., 1996), these skills are always secondary to procedural and technical ones in student training (Yoshida, Milgrom, and Coldwellin, 2004). This highlights a gap in the way students are graded in their clinical rotations, as the way patients viewed their experience is not being embraced in student evaluation. The inclusion of feedback from the pediatric patient and their family in the assessment of dental students ensures that student learning is in line with family and patient-centered care guidelines.

Despite the growing focus in cultivating a patient-centered mindset and fostering of interpersonal skills, the development of this competency tends to be limited and is often overshadowed by the emphasis on technical skills (Dubosh et al., 2018). While many health professions programs include specific courses on patient-centred care and professionalism during pre-clinical years, dedicated teaching on this topic decreases once the students enter clinical rotations (Dubosh et al., 2018). The development of evaluation tools focused on students' interpersonal and communication skills can increase focus on PCC during clinical years of education.

In dentistry specifically, gauging the success of treatment with measures outside of technical skills was first documented in 1895 when McElroy wrote, "although the operative dentistry may be perfect, the appointment is a failure if the child departs in tears" (as cited in Wright & Kupietzky, 2014, p.6). With the eventual recognition in the field of pediatric dentistry that patient attitudes and perceived experiences are influential factors in the treatment process and outcomes, interest in how the dentist can help the child feel comfortable and accepting of the treatment has grown (Wright & Kupietzky, 2014). The ability to meet the needs of patients can increase treatment motivation and adherence to health services (Werkkala et al., 2020), reduce likelihood of patient anxiety, and improve self-care skills (Wong et al., 2016). All these treatment attributes mentioned ultimately have positive implications on the child patient's lifelong oral health behaviours. For the dentist or the dental student, effective communication with the patient and higher patient satisfaction allows for increased positive consultations, a decreased risk of litigation, and lower levels of burnout (Dubosh et al., 2018). Moreover, engaging in patient-centeredness and understanding patient perspectives can help clinicians to

build a more robust clinician-patient relationship, creating better expectations of the treatment course (Dubosh et al., 2018), and achieving more effective preventative care (Wong et al., 2016).

Within pediatric dental education, there is a limited body of research on how children perceive their encounters with dental students, or how this perception can be captured and used as formative feedback and evaluation for students (Moreau et al., 2019). As such, there is a need to increase patient feedback opportunities in the evaluation of dental student performance to assess the student's interpersonal and communication skills. Advances in communication assessment techniques are essential for developing future dental health professionals' competence, which is inclusive of their communication and interpersonal skills (Wong et al., 2016). Recent studies have focused on the development and validation of tools for evaluating pediatric health consultations (Crossley et al., 2005). However, these efforts tend to be based on parental or instructor perspectives (Bardgett et al., 2016). For instance, a study on conversation strategies used by pediatric dentists done by Wong et al. (2016) highlighted the potential impact of using various types of communication intentionally and strategically in a conversation to scaffold the student's approach to empathy and enhance the child's caregivers' perceived quality of care. Utilizing approaches to seek the opinions of children specifically can offer invaluable and meaningful insight into their perspective of dental conditions and the related treatment (Rodd et al., 2010). Gathering feedback from children directly can contribute to student assessment processes and the improvement of dental education. Ultimately, there is both a need and an opportunity for the development of child-centred approaches to dental education that can lead to a more meaningful understanding of the child's perspective of their dental experiences and their specific perception of the dental students' performance.

One barrier to engaging children in sharing their perceptions of dental care is the lack of a validated instrument that can gather children-specific feedback. Conventional patient feedback tools in dentistry, such as surveys constructed of Likert scales and written responses, are not designed for children and are therefore restrictive in the responses that can be gathered. (Rodd et al., 2010). Collecting feedback through traditional qualitative methods such as verbal interviews is also problematic as children have a lower ability to express themselves fully through verbal means of communication (Aguilar, 2016). As an alternative, art and projective methods of elicitation can allow young patients to use symbols to express what they are experiencing, thinking, and feeling (Searle & Shulha, 2016). When combined with verbal methods, such as interviews, artistic approaches have been found to be effective in facilitating communication between an adult and the child in both clinical and research settings, allowing children to consistently recollect and report more information than when the child participates in an interview only (Driessnack, 2005). Art also provides children with a focal point other than the interviewer or themselves and shifts the emphasis to the art piece they created (Gross & Hayne, 1998). This projective method shifts the balance of power in the clinical and research setting, allowing for the child to be more comfortable with the clinician or the researcher.

The purpose of this study is to gather insights from pediatric patients' perspectives of their experiences receiving treatment from dental students through the use of interviews with drawing and to present a framework for the potential implementation of children's perspectives into the criteria for assessing dental students in clinical rotations.

Research Questions:

- 1) What insights into children's perspectives of dentistry can be gathered from drawings?
- 2) How do children's perspectives inform dental student evaluation?

As dental education and continued professional development progress toward multifaceted forms and lenses of evaluation and assessment, tools and frameworks that enable the gathering of multiple sources of feedback are essential. Art approaches can provide alternative avenues for pediatric patient expression and, as such, lead to more robust feedback. The child-specific view of student performance can offer insights into the student's ability to interact with a young patient, build rapport, and aid in the patient's acceptance of treatment. Using a drawing activity, this thesis will present a framework for the implementation of children's perspectives into the criteria for assessing dental students in clinical settings.

Chapter 2: Literature Review

This chapter presents a summary of the literature regarding children's perspectives in dentistry in three parts. The first part rationalizes the importance of including children's perspective in dental research and education. The reasons explored include children's rights, the influence of child experience in lifelong dental behaviors, and the value of using child experience to inform dental curricula. In Part 2, the ethical concerns of conducting research with children are presented. There is a specific focus on ethics in methodological design with respect to research with children. The last part, Part 3, presents a short history of the use of, or lack thereof, patient feedback in dental education, with an emphasis on pediatric patient feedback. After this three-part review of the literature, a summary of the gaps regarding children's perspectives in oral health is presented. These gaps are the limitations in current research that this thesis will attempt to address.

Part 1: Importance of Children's Perspectives

The United Nations' Convention on the Rights of the Child (UNCRC) is a treaty for the rights of children presented by the U.N. in 1989. Canada signed and ratified the treaty document in 1991, therefore Canada is bound to the document by international agreement (Government of Canada, 2010). Article 12 of the UNCRC declares that "States Parties shall assure to the child who is capable of forming [their] own views the right to express those views freely in all matters affecting the child" (UNCRC, 1989, p. 5). This means that in Canada, children have the right to express their thoughts and opinions and be listened to in the decisions that affect them, including in health care. As such, the adults who make the health care decisions, such as researchers, health providers, and legislators, have a responsibility to include children as active participants in health care research, policies, and care choices. In 2005, the Committee on the Rights of the Child,

which oversees the implementation of the UNCRC, stated that although it is changing, Article 12 is probably the right that is least attended to globally (UNICEF, 2005). A survey conducted in 2011 featuring 46 countries – one being Canada – found similar results (Powell et al., 2011). Policymakers in the study stated that they placed ‘very little to no’ importance to including children’s views in decisions. Researchers that participated in the study expressed that, in the past, children have not readily been included in research; but that in recent years, there has been an increase in research involving children’s perspectives (Powell et al., 2011). The main argument given for the reluctance to include children in decision-making was questions of children’s ability to understand their experiences and to provide accurate information of themselves (Powell et al., 2011). This argument is easily refuted with the various studies showing that children have a profound grasp of many areas of themselves and their experience. For instance, studies have found that children have an understanding of the self and of self-image (Nielsen, Suddendorf, and Slaughter, 2006; Moore et al., 2007; Herold and Akhtar, 2014), of the way in which they learn (Colliver, 2017; Colliver and Flee, 2016), of their coping mechanisms (James and Fox, 2016; Dowling, 2013), of their well-being (September and Savahl, 2009), of health and illness (Rushford, 1999; McWhirter, 2004), and of health behaviours (Koopman et al., 2004; Mengwasser and Walton, 2011). The problem now is not whether children are competent in their knowledge of themselves and their experience, but the availability of tools that give children the opportunity to participate in ways that are appropriate and comfortable for them.

Another important reason for including children’s perspectives in dental care is that an increasing body of knowledge in childhood experiences with dental health will also help to understand adults’ relationships with dentistry as well (Qvortrup, 2002). Dentistry is an aspect of health care that has continual exposure throughout a person’s life and begins at an early age

(Adewumi et al., 2001). Studies have found early encounters with dental care are significantly associated with a person's lifelong dental behaviours (Kwan et al., 2005), as well as the development of dental fear and anxiety (Rajeev et al., 2020; Staugaard, Jossing, and Krohn, 2017). Exploring children's perspectives of these introductory dental experiences can provide insight into adults' development of positive or negative relationships with dentistry.

According to Beaton et al. (2014), development of dental fear and anxiety in patients is multifaceted and can stem from various sources. These sources include direct learning from previous experiences, such as in childhood; conditioning through others' experiences or media portrayals; and/or it is an inherited personality trait (Beaton et al., 2014). McNeil et al. (2014) expanded on this idea further by recognizing that there are stimuli specific to dental care settings that can induce dental fear and anxiety. These include "...lying back in the chair, pain, anticipation or memory of pain, sight and sound of hand-pieces, and receiving local anesthetics injections and environmental factors of lack of predictability and control, inability to escape or leave the dental setting" (McNeil et al., 2014). They explain that the stimulus of pain, in particular, can lead to a conditioned response of fear and anxiety (McNeil and Randall, 2014). For instance, if a child experiences a painful procedure in one of the initial encounters with dentistry, then the child may form a conditioned connection between the stimulus of the dentist and dental treatment and a conditioned response of anxiety and fear thereafter (McNeil and Randall, 2014).

It has been argued, however, that the development of conditioned stimuli can take longer to form with children who regularly visit the dentist and have multiple introductory opportunities with dental care (Davey et al., 1989). This argument seems to hold in countries with low prevalence of dental fear and anxiety, such as in Denmark (5.7%) (Wogelius, Poulsen, and Sorensen, 2003), where the increased and early use of dental services lead to a decrease in their dental fear.

Alternatively, some studies in developing countries deduce that dental fear and anxiety can rise as children get older and gain awareness of their dental condition and of their surrounding world (Paryab and Hosseinbor, 2013). In these countries, children tend only to visit the dentist when in pain, making it more likely to form the conditioned response of dental fear and anxiety (Beena, 2013). As a result, having a better understanding of children's perception of dental experiences, especially in the initial stages of the relationship with dentistry, can increase current knowledge regarding dental fear and anxiety, as well as help minimize patients' formation of negative associations with dentistry and reduce their avoidance of dental treatment (Staunton, 2018). Through an overall increased understanding of children's dental experiences, the knowledge regarding several issues of dental adherence, behaviours, and negative relationships with dentistry in both adults and children is also increased. This, in turn, allows oral health researchers, providers, and authorities to better address the issues that affect patients' relationship with dentistry and issues with dental adherence.

Knowing how children perceive their dental experiences can also aid in the development of more appropriate and effective programs and strategies aimed at increasing lifelong adherence to dentistry, minimizing dental anxiety and fear, and improving prevention strategies and programs intended for children. According to Nola Pender's Health Promotion Model (1996), when patient behaviours and perspectives are better understood, individualized support and programs can be provided to enhance patient health and prevent illness or disease. Increasing children's participation in dental care through inquiries into their perspectives and opinions of their experiences serves to integrate children into their own oral health and enables them to define oral health within the context of their lives. This integration makes the preventative and promotional programs to better resonate with, and more appropriate for children (Schub and Cabrera, 2018).

Catering these efforts to children is important as programs and strategies that are successful in helping children can develop positive relationships with dentistry early on minimize negative perceptions, experiences, and behaviours related to dentistry in the long run.

The inclusion of children's perspectives in dental research and education helps to develop children's ownership of their oral health. Allowing and encouraging children to participate in matters of their own health leads to the validation of children and their contributions to the world around them (Adewumi et al., 2001). The State of the World's Children Report defines children's participation as the process in which children actively contribute to and share in all decisions that affect themselves and their communities (UNICEF, 2003). Although children should not be responsible for decisions, their participation in decision-making with support and guidance is a vital part of children's socialization and independence (Melton, 1983). By giving children the chance to express opinions in a non-threatening environment, children are likely to become efficient and confident in future decision-making roles (Adewumi et al., 2001). As such, it is important to give children the opportunity to participate in decisions that affect them and to develop their confidence to engage and advocate for themselves and their community.

Moreover, the literature recognizes that children want to take part in the health decisions that affect them, such as in their dental treatment. In a study about children's consent in dentistry, Adewumi et al. (2001) found that out of 60 children between the ages of eight and thirteen, 88% felt that the dentist should talk to them about their dental treatment and 75% said they 'felt old enough to reason about the treatment' and believed that 'children's views should be heard'. Literature in the medical and dental education suggest that children view helping with assessments or exams as a positive experience (Woodward & Gliva-McConvey 1995; Lane et al. 1999; Carraccio & Englander 2000; Bardgett et al., 2016), and feel motivated to help educate doctors

and dentists (Klaber & Pollock 2009). By providing child (and adult) patients with adequate and comprehensible information, they are then able to contribute to health care in meaningful ways.

The last argument for the value of exploring children's experiences with dentistry pertains to its importance in the development of well-rounded dental education curricula. Mainly, inquiring into children's views and opinions of their encounters with the dental student serves to address the disparities between the child's, the instructor's, and the dental student's perspectives of treatment success (Rodd et al., 2010). Involving patient perspectives in dental curricula is also an act of receptivity, or of acceptance of change or innovation (Rinaldi, 2006), which is crucial in teaching students to accept and conform to the patient-centered principles that are at the forefront of the future of oral health care. Studies suggest that increasing the frequency of opportunities for patient feedback in health education curricula may help in the normalization of patient-centered principles throughout students' careers and will serve to prepare them for being receptive to and welcoming of patient feedback, which is now becoming a standard for professional development (Baines et al., 2019).

The reasons outlined in this section explain how the inclusion of children's perspectives in oral health is crucial in the upholding of children's rights, to foster the sense of ownership within children of their own health, for understanding various facets of dentistry throughout a patients' lifetime, for training dentists who maintain the patients' perspective in mind as they conduct treatment, and to improve the quality of care provided in current health systems. In recent years, there has been a greater emphasis in dentistry, and in society, to incorporate children's views to improve patient services, prevention and promotion strategies, and to inform dental education. However, there are some necessary considerations when involving children in any respect. These issues will be discussed next in the next section.

Part 2: Ethical Considerations of Research with Children

Conducting research that involves children carries several ethical considerations. Mainly, the power imbalances that are present as well as the methodological design and its appropriateness regarding children.

When researching with children, a power imbalance manifests in at least two levels: researcher to participant and adult to child. First, power is constructed through the researcher's scrutinization of a phenomenon within the participant. In the act of research, the participant is presented as a case study, in which the phenomenon is separated from the person and is captured at the specific moment it is gathered (Cannella, 2000). What is valued is the phenomenon and whether it serves the research. This causes a power imbalance, as the researcher remains human and possesses the knowledge, while the participant is objectified as a tool. Second, unequal power exists between an adult and a child in society in terms of age, status, competency, and experience. There is a concept of authority, in which children may perceive adults as someone they cannot say no or express their views or hold opinions to (Einarsdóttir, 2007). The adult-child power hierarchies lead to questions of children's ability to consent. Are they consenting because they felt obligated to answer an adult? Or do they have a significant understanding of the study? (Einarsdóttir, 2007). To address this, some maintain that power imbalances in research can be adjusted through careful consideration of children's assent and through methodological design (Colliver, 2017).

Researchers have the ethical responsibility to choose a methodological design that presents children's perceptions authentically and is not simply interrogational and intimidating. Since children's vocabulary and cognitive capacities are in development, there are communication barriers that keep them from being able to fully express their thoughts and emotions (Aguilar,

2016). As such, conducting purely verbal interviews when gathering children's perspectives cannot portray children authentically. Some even argue that giving children only verbal or written forms of expression is against the rights of children (Einarsdóttir, 2007). This is because using inadequate methods that do not portray children and their perspectives honestly does not grant the children true opportunities for expressing their opinions. Article 13 states that children, "...shall have the right to freedom of expression; this right shall include freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of the child's choice" (UNCRC, p. 4). Given this understanding, it would seem the most appropriate approach to research with children is to incorporate several forms of expression, such as through the use of art, when gathering children's verbal feedback. Recent literature has implemented various forms of art to facilitate the way children express themselves in research, such as through poetry, theatre productions, collage, song writing, photography, painting, quilting, and dancing (Driessnack, 2005). Using art in research allows child participants to use symbols – aside from words – to express what they are experiencing, thinking, feeling, and their processes of making meaning (Dyson, 1993). Moreover, the literature has shown that, compared to verbal interviews alone, the combination with art approaches leads to richer information provided by children (Driessnack, 2005). This is because art generates retrieval cues through sensory and spatial connections that help children organize their accounts of experiences (Salmon, 2001). The several benefits of art make it a promising approach for the successful and ethical inquiry into children's perspectives.

Drawing as a Method

In terms of specific art approaches, drawing has been shown to have many advantages as a tool for children's expression in research and education. Drawing in research began gaining momentum in the 1970s when educator Rhoda Kellogg (1970) collected thousands of young children's drawings and authored a book on her findings regarding the mental development of children. She found that drawing provided children with tools to tell elaborate stories and found that the way the drawing process developed in children is similar across settings, cultures, and languages (Kellogg, 1970). Then, in the early nineties, Vygotsky's description of drawing as a kind of "graphic speech" began to gain popularity (Dyson, 1982) with researchers, such as Dyson (1993), concluding that drawing is helped by talk and gesture to become "a mediator, a way of giving a graphic voice to an intention" (Dyson, 1993:24). Kreiss (1997) extended Dyson's hypothesis to include play as one of the actions that make drawing expressive. They asserted that "...young children's play-based narratives are hybrid things within the language used to indicate action and narrative sequence, and drawing is used to represent, to display, the people and objects in the story" (Kreiss, 1997, p. 24). This means that, by including signifiers of actions (i.e. play and speech) in their drawings, children gradually coordinate the lines of their drawings with more elaborate schematic relationships that often represent a higher complexity of thinking (Deguara, 2017). Schemas were described by Piaget as "...cognitive structures that contain within them elements of perception, memories, concepts, and operations" (Piaget, 1961, p. 139). He stated that schemas are "...linked together in a variety of connections, which may be spatial, temporal, causal, or dynamic" (Piaget, 1961, p. 139). In 1990, educator Chris Athey, in their book *Extending Thought in Young Children: A Parent - Teacher Partnership*, differentiated between four levels of Piaget's schemas: action, symbolic representation, functional dependency, and thought. In the first

level, action, children make marks to represent the dynamic aspect of an object or event. Then, they add the second level of symbolic representation in which children can represent themselves, other subjects, or certain objects as images. The third level, called functional dependency, is where a child demonstrates an understanding of “cause and effect” relationships. Lastly, the final level of schema is thought, which occurs when children can represent events or objects without props (Athey, 1990).

Although there are reasonable concerns for the use of drawing as a method of gathering children’s perspectives, there are several benefits to its use alongside children’s explanations as a means of facilitating children’s expression in research. Some of the more practical benefits of drawing are that it is inexpensive, easily transportable, and is familiar and enjoyable to children (Aminabadi et al., 2010). At a deeper level, drawing also helps to balance the power dynamics between present in research with children. This is because the activity presents a talking point through an object external to the child, but that is created by them (i.e. the drawing), making children the experts in the exchange with the researcher (Maida et al., 2015). This balance creates a level of comfort that enables a deeper and more extensive dialogue with children (Maida et al., 2015). For the balance of power to occur, drawing must be accompanied by the explanation the child shares of their creation. When using drawing alone, on the other hand, the same imbalance of power occurs. For instance, an analysis of only with drawing raises questions regarding the subjectivity of the interpretation by the researcher when there is no input from the child (Kortessluoma, Punamaki, & Nikkonen, 2008). This extends to questions of what drawings by themselves can actually measure, with some arguing that they are more effective as markers of childhood development than of the child’s thoughts and that they lack validity in predicting cognitive function (Golomb & Kennedy, 2004). Nonetheless, when drawings are supported by a

written or verbal explanation, these can provide a complementary understanding of the thought-process behind the image, giving more information than a rater's subjective interpretation of the drawing and the child's development (Van Oers, 1997).

Despite the advantages in using drawing to analyze children's perceptions, there are certain limitations with its application. First, the process of interpreting drawings is highly subjective in nature and is dependent on the interpreter, the method of collection, and the drawings themselves (Aguilar, 2017). Next, there are concerns about the actual drawing's significance, with some researchers stating that children's drawings may not always directly relate to their actual experiences or feelings at that very moment in time (Massimo and Zarri, 2006). Questions have also been raised regarding the continuity of the method when using children's drawings, as drawings are cue-dependent in that they are influenced by the child's internal and external environment. For example, some argue that the materials the child uses and the prompts with which they are presented, affect the product created by the child, and consequently, the analysis (Massimo and Zarri, 2006). Another limitation is that this type of research is time-consuming, both in data gathering and analysis, and hence not practical in clinical or education settings. Lastly, some children may not like to draw, which is why several art methods, such as using the Mosaic Method by Clarke and Moss (2001) is often recommended. However, several fields, such as in education, have been successful using only one art intervention in their interviews (Searle & Shulha, 2016). In the end, the key theoretical contention is that young children's drawings are external products indicative of their complex mental structures and offer alternative insights to what can be achieved by traditional research methods (Campbell & Bond, 2017).

Adding a verbal or written component to the drawing activity in the data gathering process allows researchers to clarify different parts of the drawing created, while the drawing component helps children organize events or concepts that are difficult to describe (Wesson & Salmon, 2001). Studies show that drawing provides cues for a child to recall throughout their retelling of the experience, as these cues provide a structure for the child's narrative (Driessnack, 2005). In 2003, Salmon, Roncolato, and Gleitzman conducted a study that focused on children's ability to express themselves in verbal reports of emotionally laden events. They found that although there was a positive correlation between expressive vocabulary ability and the reported items, children who engaged in drawing during their interviews consistently reported more information than children who were only interviewed in a verbal manner. More importantly, in their sample, they observed that neither vocabulary abilities nor temperament affected how much the children reported when they engaged in drawing during the interview (Salmon, Roncolato, & Gleitzman, 2003). In sum, drawing activities in research are particularly adequate for young children as it allows them multiple forms of expression outside of language and helps them explore their lived experiences. Verbal interviews complemented with drawing help the child organize and understand their own thoughts and feelings, as well as aid their ability to form meaning from these experiences. For these reasons, drawings and their verbal explanations was the methodology chosen to gather children's perspectives in this study.

The Use of Drawings in Pediatric Dentistry

Studies have successfully analyzed children's drawing in health research settings. Human drawing assessments, such as the Goodenough-Harris Drawing Test (Goodenough & Harris, 1963), Draw-a-Person (Machover, 1953), and Human Figure Drawing (Koppitz, 1968), are valid

and reliable instruments for inquiring into children's emotions, thoughts, and perspectives (Burns-Nader, 2017). Nevertheless, only a handful of studies have been conducted to explore the use of pediatric patient drawings in dental student education. The first of such studies occurred in the 1970s. Taylor et al. (1976) asked children, grades two to eight, to "make a picture of a dentist at work" and to tell him what they "think about when [they're] there" and then classified the contents of these drawings. The analysis included the frequency in which items appeared in more than 1000 drawings with the purpose of defining a "typical" drawing of a child at the dentist in urban settings. They found a typical drawing consisted of "a normal dental chair with a normal-appearing dentist" and "a normal-appearing, patient, seated unrestrained." They also found that children tended to include "ill-defined but obvious" instruments, the overhead light, and subjects with missing body parts, either on themselves or on the dentist. Lastly, they observed that the children who did not create a drawing related to dentistry could be represented as "...what the child was thinking about, a lack of dental experience, or a high level of anxiety" (1976, p.3).

Aminabadi et al. (2010) used the drawings of children ages four to eleven of a person in a dental clinic and scored these with the Child Drawing: Hospital (CD:H) instrument (Clatworthy, 1979) along with the Sound, Eye, and Motor (SEM) and Frankl Behaviour scales. They found a statistically significant correlation between the scales and the CD:H, which indicates that the analysis of drawings can be a reliable tool for evaluating children's distress in dental settings. In 2015, Pala et al. expanded on Aminabadi et al.'s (2010) study by conducting a Pearson correlation test of the CD:H with other measures of pain and distress. They used drawings from children aged four to thirteen who underwent dental extractions and scored them using the CD:H instrument. They measured the efficacy of this projective measure of distress in children against

the Frankl Behaviour, Facial Pain Scale-Revised (FPS-R), and Faces, Legs, Activity, Cry, Consolability (FLACC) scales. They found a positive but not significant correlation between the parameters but claim that drawings can be useful as additional tools for exploring children's perceptions, offering a narrative of their experiences.

Torriani et al. (2014) analyzed the perceptions of children aged six to ten regarding dental treatment and oral health using drawings following Vygotsky's postulations. Vygotsky argues that "when a child draws, they embody the image they have created internally to handle their emotions" (Torriani et al., 2014, p.1). Children were instructed to draw two pictures based on the following prompts: 1) what do you remember about attending the dentist? 2) draw what you consider to be a healthy and a non-healthy mouth. In the results, they identified five categories of dental perceptions (personal relationship, power relation, trauma, childhood resistance, and contextualization of dental care in the child's life) and three categories related to oral health (dichotomy of health/sickness, lucid representation of health, and sickness as a process).

A more recent study delved into how children's perceptions of dentistry and their dentist were associated with their oral health-related quality of life (OHRQoL) Frauches et al. (2018). Applying the Facial Image Scale (FIS), Child Perceptions Questionnaire (CPQ8-10), alongside interviews and drawings they found that perceptions of the dentist were not associated with the oral health related quality of life, but explained that "knowledge of children's emotional reactions and the use of adequate interactive approaches are effective measures for promoting successful pediatric treatments" (Frauches et al, 2018, p.328).

This year, a couple of studies were published on the use of the CD:H as a measure of dental anxiety in pediatric dentistry. The first of these studies is by Yadav et al. (2020). They conducted a cross-sectional study of a hundred children and compared their CD:H scores to the

child's psychological parameters with pulse oximeter readings, as well as their scores on the Venham Picture Test (VPT). The second study by Onur et al. (2020) is similar to the study by Aminabadi et al.(2010) in that it also compares pediatric patients' CD:H scores with the Sound, Eye and Motor (SEM) and Frankl scales. Both studies found that the CD:H has potential as a self-report measure and as a tool for assessing anxiety in pediatric patients.

In sum, self-reported projective techniques, such as drawing, are promising approaches for collecting information regarding children's thoughts, emotions, perceptions, experiences, and the making of meaning. Using approaches that can give a more authentic representation of children's perceptions can lead to greater success in understanding their experience and in turn understanding the effectiveness of the care provided. This way, the gaps in care provision and health education can be identified and bridged more easily to ultimately improve pediatric dental health care as a field.

Part 3: Patient Feedback in Dental Education

In the past few decades, patient-centred care (PCC) has become the driving focus of the health care system, replacing the paternalistic view of health provision that preceded it (Bedos, 2011). The Institute of Medicine (IOM), now called the National Academy of Medicine, defines patient-centred care (PCC) as “providing care that is, respectful of and responsive to, individual patient preferences, needs and values, and ensuring that patient values guide all clinical decisions” (IOM, 2001). In pediatric health care, an additional component of the family is added to this concept, where patient-and family-centred care (PFCC) “emphasizes that a patient's health care decisions should be contextualized in terms of a patient's broader life experiences and recognizes the role family members play in extended and at-home care planning and caregiving” (Clay & Parsh, 2016).

There are several reasons why engaging in patient-centred care and understanding patient perspectives can improve the quality of care by helping health providers build robust relationships with patients. Better relationships can lead to patients having more positive expectations of the treatment course (Dubosh et al., 2018) and to achieving more effective preventative care (Wong et al., 2016). The ability to meet the needs of patients can increase treatment motivation and adherence to health services (Werkkala et al., 2020), reduce likelihood of patient anxiety, and improve self-care skills (Wong et al., 2016). For health professions students, effective communication with the patient and higher patient satisfaction allows for increased positive consultations, a decreased risk of litigation, and lower levels of burnout (Dubosh et al., 2018).

Patient-centered care (PCC) was introduced to Canadian health care in the 1990s through Stewart et al.'s book, *Patient-Centered Medicine: Transforming the Clinical Method*. The book focused on describing the patient-centered clinical method and claimed its goal was to place PCC at the epicentre of clinical practice and health professions education (Stewart et al., 2003). Since then, the paternalistic view of health care has become outdated, and the transition into patient-centered care is progressing. The provincial health authority under which this study takes place, Alberta Health Services (AHS), officially mandated a cultural shift towards PFCC in health care with the launch of their Patient First Strategy in 2015. This strategy focuses on making patients and families "...an integral part of the care team who collaborate with health care professionals in making clinical decisions" (AHS, 2015) and following PFCC principles. These fundamental principles of PFCC include listening to patients and families; facilitating their choices; sharing information and promoting health literacy; forming trusting relationships; and building patient confidence for their participation into health care decisions (Clay and Parsh, 2016). The

integration of PFCC principles into the current medical and dental school curricula is crucial for the cultural shift to occur.

Despite the importance of the patient and their family's perspectives in the provision of quality health care, there is a paucity of child and family feedback in the education and assessment of medical and dental students (Moreau et al., 2019). In 2004, a systematic review of the way dental schools across the United States and Canada taught PFCC principles, mainly through interpersonal and communication skills, was conducted by Yoshida, Milgrom, and Coldwellin (2004). The conclusions of their analysis highlighted the various shortcomings of the way PCC was being implemented into dental education. These included that interpersonal and communication skills were not well integrated into curricula; were taught without any theoretical background and mostly through passive learning techniques; and did not evaluate students adequately. Since this systematic review was conducted (i.e. almost two decades ago), the way PCC is taught in dental schools in Canada appears to have not endured significant changes. In 2018, Dubosh et al. observed that although most schools included courses specific to PCC in their curriculum, these courses tended to be offered only during pre-clinical years and assumed the learning of PCC skills and concepts to be learned by implication during clinical years. These findings are similar to those of the systematic review, where they found that 83% of the schools taught interpersonal communication two or less times in the curriculum and usually at the beginning of the program (Yoshida, Milgrom, and Coldwellin, 2004). This strategy of only having dedicated teaching on the topic in the earlier years of education has not yielded the intended results. Several studies have found that this approach to teaching PCC leads to a significant decline in students' interpersonal skills and patient-centered attitudes between their first and fourth year in the program (Hook and Pfeiffer, 2007; Hirsh et al., 2009). The research

also suggests that, as students progress through the curriculum, continuous and gradual increase in complexity is required to ensure effective teaching of any skill (Van Dalen, Zuidweg, and Collet, 1989). As a result, assuming that students are effectively learning PCC principles while they treat patients during clinical rotations, but without structured and dedicated teaching and assessment practices towards the topic, is a flawed strategy of teaching and a gap in undergraduate dental education curricula.

Another problem with the way patient-centred principles are taught in dental education is that patients' and their families' perspective of student performance is very seldomly included, or even collected, to measure of student performance (Moreau et al., 2019). The use of the patients' perspective in student evaluation is recommended by competency-based dental education – the education system followed by Canadian dental schools. This system encourages the use of multisource feedback (Massie and Ali, 2016), which is the evaluation of student performance through a combination of lenses, such as that of colleagues, multiple instructors, patients, and the students' own self-reflection (Massie and Ali, 2016). Using multiple lenses of evaluation allows for the development of well-rounded programs of assessment in dental education. This is because multiple sources of feedback can lead to a more holistic understanding of student performance as every source has a distinct role in the encounter and a specific view for the assessment of different student aspects. For instance, patients and families can offer distinct observations of dental student that tend to relate to patient-clinician relationships. As patients usually do not possess the ability and knowledge to evaluate the student's technical skills, they tend to focus heavily on the students' communication and interpersonal skills. The patients' point of view of the student performance is unique to their position in the encounter, and it has been recognized that instructors are not able to accurately represent patient views (McLaughlin et al. 2006).

While the majority of the lenses are frequently present in student assessment, there is little evidence of the inclusion of patient feedback in the evaluation of student performance in the teaching and assessing of communication and interpersonal skills (Carey, Madill, and Manogue, 2010). There is even less evidence with respect to the perspectives of pediatric patients, given the paucity of research exploring how children perceive their encounters with medical and dental students and how their perspectives are used in student evaluation (Bardgett et al., 2016; Rodd et al., 2010). Studies have observed that the patient's experience tends to be implied in the teaching and evaluating of dental student performance in undergraduate dental education (Carey, Madill, and Manogue, 2010). The use of actors in objective structured clinical examinations (OSCE) has also been commonly employed to account for the patients' lens (Yoshida, Milgrom, and Coldwellin, 2004). The problem with these approaches is that in an OSCE, the patient experience is fabricated, and there is recognition that examiners are not able to represent the perspectives of the patients accurately (McLaughlin et al. 2006). Studies show that patients and their families tend to primarily observe the students' non-technical skills such as professionalism, communication, and empathy, while instructors focus on evaluating procedural knowledge and hand skills first (Moreau et al., 2019). In regards to children, there is little evidence exploring how they perceive encounters with dental students and the qualities they value in dental professionals, however, there is speculation that children may be looking at and valuing student qualities differently than instructors and adult patients (Bardgett et al., 2016).

Feedback provided by patients has also been proven to result in improved self-regulation in students (Crommelick and Anseel, 2013; Nicol and MacFarlane-Dick, 2006). Rassbach et al. (2018) concluded that residents who reviewed the feedback they received from patients with a faculty coach were significantly more likely to report they would seek patient feedback, as well

as reported an improvement in self-reflection and higher willingness to apply the feedback received. This suggests review of feedback with a coach aids in the development of students' appreciation of patient feedback and its role in the students' lifelong learning and self-evaluation. As patient perspectives are becoming increasingly important in health care, there are now governing health authorities that have made evidence of patient perspectives part of their continued licensure. For instance, in 2001, The Institute of Medicine in the United States, now called the National Academy of Medicine, added patient-centeredness to its six health care quality aims (Bogetz et al., 2018). Due to this, the medical residency programs were formally required by the Accreditation Council for Graduate Medical Education (ACGME) to incorporate multisource or 360° assessments, which encourage the inclusion of patient and family feedback into the evaluation of residents' communication and interpersonal skills (Mahoney et al., 2018). In the United Kingdom, the General Medical Council (GMC) launched a new revalidation process for physicians which emphasized patient feedback as “the heart of doctors' professional development” (Rubin, 2012, p. 1655) and asked for proof of patient feedback to be included as part of the revalidation process. Ultimately, not actively encouraging or gathering the perspectives of patients and their families hinders the training of future dental professionals. Patients and family members are important sources of information and their perspectives contribute to the development of well-rounded dental education teaching assessment systems.

There are several reasons why patient feedback, and more specifically pediatric patient feedback, is lacking in dental education. One of these reasons is that there is little guidance for program directors regarding the best-practices for gathering and integrating patient feedback into the curricula (Rassbach et al., 2018). The gathering of patient perceptions is difficult due to a couple of reasons. First, patient experiences are multidimensional and are thus specific to the

patient's context, the treatment provided, the dental student, and the dental setting. Second, the common mechanisms for gathering this type of feedback raise several concerns, particularly in terms of pediatric patients. These include the lack of instruments that are validated and appropriate for children (Driessnack, 2005), the frequent use of adults as proxies to understand child experience (Gilchrist, 2015), and lastly, the common practice of gathering of patient feedback using Likert-scale questionnaires, which limit the patients' expression to the options available in the questionnaire (Al-Jabr et al., 2018). Finally, children's feedback in dental education is further complicated by the ethical considerations, which were already discussed in Part 1 of this chapter, and the time and labour required to employ better instruments. Therefore, this study explores children's perspectives about receiving treatment from dental students and hopes to present a framework for the potential implementation of their perspectives into current clinical grading practices of student performance in the clinic.

Summary

Patient feedback is gaining recognition as an important measure of patient-centered care, satisfaction, and efficacy of health programs in research, policy, and education (Bogetz et al., 2018). In dental education clinical curricula, however, the perspective of the patient, particularly pediatric patients, is often the missing lens in student evaluations of clinical performance. It is possible to involve their perspectives ethically and effectively, but this requires reflective engagement by the dental students, and an openness to creative methods of involving patients by the educational institution (Padgett, 2012). Projective methods, such as drawing, combined with traditional ones, such as verbal interviewing, are rising approaches used for exploring perceptions in children. Although projective approaches are increasingly common in health care, a significant gap remains in the research being conducted that prioritizes patient perspectives in

dental education. It is therefore imperative that this body of knowledge continues to grow in this area, so to reach a more comprehensive understanding of patient perceptions, how they can positively affect patient care, and improve dental student training. Ultimately, the inclusion of child patient perceptions benefits lifelong patient outcomes and satisfaction, develops more competent and empathetic clinicians, and strengthens dental professions education curricula.

Despite the advantages to using drawing to analyze children's perceptions, there are certain limitations with its application. First, the process of interpreting drawings is highly subjective in nature and is dependent on the interpreter, the method of collection, and the drawings themselves (Aguilar, 2017). There also are questions of their significance, with some researchers stating that children's drawings may not always directly relate to their actual experience or feelings at that very moment in time (Massimo and Zarri, 2006). Lastly, questions have been raised regarding the "continuity of method" when using children's drawings, as these are cue-dependent in that they are influenced by the child's internal and external environment as they complete the activity. For instance, the materials the child uses and the prompts with which they are presented, affect the finished product, and consequently, the analysis. Nonetheless, the key theoretical contention is that young children's drawings are external products indicative of their complex mental structures (Campbell & Bond, 2017) and offer alternative insights to what can be achieved by traditional research methods.

Chapter 3: Methods

In this chapter, the proposed framework for gathering children's perceptions of dentistry using art in verbal interviews is presented. These perceptions will then be used to determine how they inform undergraduate dental student's clinical evaluations in their pediatrics rotations. This approach is intended to determine how the patient's feedback is being applied into the evaluation of student performance. There are two research questions for this study:

- 1) What insights into children's perspectives of dentistry can be gathered from drawings?
- 2) How do children's perspectives inform current dental student evaluation?

This study is separated into two phases, with each phase intending to answer each research question. The first phase, intended to answer question one, features the analysis of the drawing and the analysis of the interview. The second phase, which addresses question 2, is composed of correlations and regressions intended to explore the relationship between the drawing/interview data with student grades. Ethics approval for this study was granted by the Research Ethics Office at the University of Alberta (Pro00086015) and statistical analysis of the data was performed using SPSS V24 (IBM Corporation, 2016).

Sample

Pediatric patients at the University of Alberta Pediatric Dentistry Clinic from March to July 2019 were recruited to voluntarily participate in the study. It was required for child participants to have parental presence during the visit to the clinic, so parents/ guardians could provide consent for their child's participation in the study. Participants were recruited through purposive sampling during the four months of data collection. Informed consent was obtained from all participants' parents and/or guardians. Informed assent was also collected from the child

participants verbally, which was then documented in their assent form. The principal researcher retained the participants' names, ages, and chair numbers in the clinic for analysis.

Age Range

The target age group for participants in the study, children five to eight years old, is informed by developmental restrictions outlined by the Dyson Model (Dyson, 1993). This model outlines drawing and writing as sequential and continuous processes in young children, beginning at approximately two years of age. The model states that children commence the symbol-making process by drawing with lines. Eventually, these lines start to gain representational value. As some of these lines transform into letters, writing begins to take its place as a supplement to other symbolic tools such as speech, gesture, play, and drawing. Finally, these letters assume representational value and become mediators in children's communication. This model situates the age range for this study in the last two stages, where drawing has gained representational value, but writing is not yet fully developed. This makes drawing an appropriate mediator for expression and an appropriate means to gather this type of projective data from children in the age range.

The CD:H instrument for analyzing the drawings also uses the age range in this study and follows a sequential developmental pattern of drawing as its basis. In the rationale for its criteria, the instrument states a "basic assumption" that by five years of age, all children should be able to draw a six-part person (head, eyes, mouth, body, arms/ hands, and legs/feet) and that by age seven or eight, noses, ears, and hair are frequently added. In both instances, fingers and toes are optional. In its manual, the instrument states that "it is believed that all five-year-old children will have reached the pictorial stage of development and would draw a picture that is reality based," which aligns itself with the Dyson Model and the age range of the study.

Other Criteria

Children who did not understand or speak English or Spanish were also excluded from the study. To account for consistency between the languages, the original interview guide was translated into Spanish and followed in the same way. The principal researcher is fluent in Spanish and can accommodate children who are more comfortable in this language. The interview guide for the study was created with one of the thesis supervisors. This supervisor also calibrated the principal researcher in interviewing and interacting with children in research.

Children were not excluded based on their cognitive development levels. In terms of development/cognitive ability, patients with moderate to severe cognitive and development delays are typically referred out to specialists during screenings as these cases are out of the scope of undergraduate dental students. As such, patients with cognitive and developmental delays are not usually part of the patient pool for the clinic.

Study Protocol

The setting for data collection was a meeting room inside the clinic containing a table, chairs, and drawing materials, such as paper and crayons. The following equipment were provided to the child participants: one 8x11 blank sheet of paper and one Crayola© crayon box of 96 colours that was open so the child could see all the crayons available.

At the start of each data gathering session, the study team drew themselves with their names on the board for each session. This was done to create a sense of familiarity within the researchers and the participants.

Early in the data collecting process, it was revealed that some children respond differently to specific characteristics of the principal researcher. For instance, some children did not interact well with a female researcher, therefore, since the principal researcher is female, a

male research assistant was brought in to assist with and ease these interactions. The principal researcher would ask participants questions via the male research assistant when children were more responsive to males. Since the male research assistant did not interview participants on their own, they did not need to be calibrated. Both the male and the female researchers were present in all data collection sessions.

The children who met the study criteria and whose parents/guardians consented, were brought to the study room by the dental students after completion of their treatment for that appointment. After a brief introduction and explanation of the study from the principal researcher, the children were asked if they would like to participate. If the child chose not to participate, they were taken to their parents/guardians who were in the waiting room. Those participants who accepted were prompted using the question, “Can you draw a picture that shows all about you at the dentist today?” and were not given a time limit to complete the drawing. This was because similar studies have reported that children do not have a good sense of time, so some might feel rushed by a time limit, while others might think they are being granted time in abundance (Pala et al., 2016). Not providing a time constraint allowed children to express their own creativity. It is important to note that the participants were told there was no right or wrong way to participate, as the activity was about how the participants thought, felt, and perceived their dental experience. Any perception or lack thereof held by the children was considered valid and, similarly, pages left blank or refusals to participate also contributed to the inquiry. Participants were asked to not include any identifiable information with their drawings (ex. age, name, address, etc.). Any such information that the children did include in their drawings was later removed by the principal researcher to ensure participants could not be identified from their drawings. The research team recorded all interactions and interviews using an audio recorder, as

well as in the form of observations, questions, and thoughts in their field notes. All recorded audio was transcribed verbatim by the principal researcher.

Lastly, the principal researcher documented the events and interactions that occurred throughout the drawing and interview activity in the form of reflexive field notes. The field notes served to record the proceedings of the activity alongside the thoughts of the principal researcher, hence “positioning and acknowledging them as partaking in the inquiry” (Patton, 2002). The importance on the use of field notes is that it serves to curate study circumstances, occurrences, and observations, while also “bring[ing] to the surface deep thought for exploration” (Allnutt, 2010). In other words, the primary researcher affects the study through observation of and interaction with participants, as well as by engaging in reflection throughout the research. This makes the primary researcher a component within the research.

Dental Student Assessment Data

Data regarding the dental students consisted of their clinical assessments based on a daily evaluation rubric. Every Wednesday, the third- and fourth- year dental students are given a chair number in the clinic and assigned to a single patient. Child patients are assigned to students depending on the students’ abilities and previous experiences to ensure the students are exposed to a wide array of cases and case types during their rotation. Students are then assigned in groups to an instructor, who grades their performance based on an electronic rubric in areas such as professionalism, communication, and hand skills, among others. Instructors are also expected to write comments regarding student performance on that clinic day. Students receive various instructors throughout the term, giving them a series of raters and ratings regarding their performance. At the end of the term, students receive an overall pediatric clinical grade consisting of the weighed average of the daily clinic evaluation data. The daily clinical grades of the students

treating each participant, as well as their overall clinic grade for the term were used to answer the second research question of this study.

A database containing the student grades was anonymized by a clinic staff member before it was provided for this study. The principal researcher was possessed the date and chair number for each participant and each student, which allowed the pairing of student and participant data by an external administrator, who also anonymized the student data. Students clinical grades used in the study and were analyzed on a post-hoc, secondary basis. This was mainly due to evade the Hawthorne Effect that is caused by the students' awareness of being observed thus causing them to modify their behavior as a response (Kompier, 2006). The effect can undermine the integrity of research, particularly in terms of the relationships between the student and child variables. The students were told the children were drawing about their perspectives of dentistry, which had to be done since the dental students delivered the children to the study room after the conclusion of their appointments. The students did not know that the drawings were intended to evaluate student performance. Another rationale for not informing the students of the analysis of their clinical grades was due to the study analysis and results being unlikely to adversely affect the students' academic outcomes.

Research Question 1: What insights into children's perspectives of dentistry can be gathered from drawings?

To answer the first research question, the verbal interviews and drawings were used to gather various aspects of the child participants' perception of their experience. The main tool used to analyze the drawings, the Children Drawing: Hospital (CD:H), provides a score for the participants' anxiety based on their drawings. Since dental fear and anxiety can have a significant effect on children's perception of the dentist and the dental treatment (Klinberg,

1995), a measure for anxiety was of value to this study. The verbal interviews consist of the child's explanation of their drawing and provides context for them. By looking at the context and the literature, it was determined what parts of the dental appointment constituted to positive and negative parts of the experience. This section outlines the detail behind the analyses of the drawings and the verbal interviews.

Analysis of the Drawings

The Children Drawing: Hospital (CD:H) instrument was created by Clatworthy et al. in 1978 to measure child anxiety in hospital settings through their drawings of themselves. The instrument has since been validated for use in dental settings by Aminabadi et al. (2010). The original prompt for the CD:H was "Draw a picture of a person in the hospital". For this study, a similar statement was posed during interviews – "draw all about you at the dentist today" – changing the subject of the sentence from an arbitrary person to the child participant themselves, as well as changing the setting from the hospital to the dentistry clinic. Colour use is an important aspect of the analysis. According to the CD:H manual (Clatworthy et al., 1999), additional colours are counted based on the closest primary color. For example, the use of the colour pink would be counted as the colour red. For this reason, multiple colours of crayons, particularly red, purple, blue, green, yellow, orange, black, and brown were presented to each participant.

Scoring of the drawing by the CD:H is divided into three parts: A, B, and C. In Part A, each criteria is scored on a scale from 1-10 and includes categories regarding the size, width, and length of the child; child clothing and body parts; facial components of the child, such as the portrayal of eyes and mouth; the number of colors and prominent color used; the position and size of drawing on the page; the inclusion and size of equipment; and the perceived development of the child. Part B considers particular elements of the drawing that indicate higher levels of

anxiety and account for a larger point increase of 5 or 10 points each, mainly: omission of one or more than one body part; exaggeration or de-emphasis of a body part; distortion of the body (for example, if the head is not attached to the body or the head is disproportionate to the body); transparency, meaning that body parts seem to be see-through; shading of the background, including ceilings and floors; and if the face or body have a mixed profile in the drawing. Lastly, Part C is comprised of a single gestalt element graded from 1-10 (1: coping; 10: disturbed) and is a subjective measure of the rater's overall perspective of the drawing. The total score for each drawing is calculated as the aggregate score from each section of the instrument. This end score explains the level of anxiety in the child dependent on the thresholds outlined by the manual: ≤ 43 very low, 44-83 low, 84-129 average, 130-167 above average, and ≥ 168 very high.

Clatworthy et al. (1999) developed the scoring system and manual for the CD:H, so that the instrument could be easily used and not require training or calibration. For this study, the primary researcher and a research assistant first discussed their understanding of each of the scoring sheets in the CD:H manual prior to conducting any scoring. This ensured that there were no misinterpretations when each rater scored the drawings individually. Then, the scores by each rater were inputted into an Excel spreadsheet from which inter-rater reliability using Fleiss' Kappa and Weighted Kappa was calculated for the total anxiety score for each drawing.

Analysis of the Verbal Interviews

Given the nature of the interviews, where the children were asked about the content of their drawings, a combination of deductive and inductive forms of thematic analysis was employed (Neale, 2016; Clarke & Braun, 2012, 2017). The process of analyzing the interviews was iterative and concurrent with the data gathering phase of the study.

Following Neale's approach on iterative categorization (2016), audio recordings from the interviews were transcribed using Otter (Otter.ai, 2016), an online software that translates speech to text using artificial intelligence and machine learning. The transcriptions were then reviewed and revised by the researcher to ensure accuracy. All identifying information, such as names and ages, were removed. These transcripts were each exported as single Word 2016 documents. From here, analysis began by the researcher deducing the important features in the data according to the literature. Then, the analysis continued inductively with what emerged from within the data (Neale, 2016). This process served to create a codebook that was used to facilitate the identification of the positive and negative influences on child participants' perceptions of the dental experience.

To create the codebook, the researcher first performed a search of the literature to identify concepts that other studies previously found. Then, the process outlined by Braun & Clarke (2012, 2017) regarding thematic analysis was followed, in which the researcher identifies, analyzes, and interprets patterns of meaning from the interview transcripts, the context of the research setting and its target population, and the existing literature. This analytical approach is cyclical and multilayered, consisting of four steps: familiarization with the data, search for themes, review of themes, and defining and naming of themes. The middle two steps reoccur until a final adequate set of themes is identified. This process was completed independently by the principal researcher at first and was later reviewed with one of the thesis supervisors. To become familiar with the data, coding took place in two steps. First, the codes were briefly counted for frequency of occurrence and recorded in an Excel spreadsheet. Neale refers to this process as 'charting' of the data (Neale, 2016). Second, a line-by-line detailed coding was

conducted, searching for repeated and interesting content. This dual process was then compared to determine consistency of its occurrence in the transcripts.

In searching for themes, these broader codes identified were categorized and collapsed into distinct codes. Each step of the process was performed multiple times and in conjunction with one of the supervisors, with whom each category and code were discussed until consensus was reached. Finally, the supervisor and the researcher organized and named the codes under overarching domains and formulated a definition for each of them to create the codebook to be used in the next step of distinguishing the positive and negative factors that affect children's perspectives of dentistry. The final codebook can be found in Appendix B.

Once the final set of codes was determined and defined in the codebook, the next step of the analysis was identifying which of the codes were related to a positive or negative dental experience for each participant.

The first step in this process was to further classify the codes in the codebook regarding the context in which they appeared within the interview transcripts. Depending on the context, each code present was assigned a positive, negative, or neutral ranking for each interview transcript. This form of analysis is like the one conducted by Frauches et al. (2018) in their study. It provides additional insight on the factors that attributed to the children having a positive or negative experience. Once this was finished, the interview in its entirety was appointed an overall positive, negative, or neutral rating depending on the context. This was performed by the researcher and the supervisor separately and for each individual interview. The raters met several times to ensure a mutual, clear understanding of the codebook and what constituted a positive, negative, or neutral rating. The reliability of the raters was assessed using Fleiss' and Weighted Kappa.

Research Question 2: How do children's perspectives inform dental student evaluation?

To answer the second research question, correlation analyses between the child variables (their anxiety level, if their experience was positive or not, their age, and their sex) themselves first, and then between the child variables and the student variables (their grades on each criteria item) were conducted using the Phi Coefficient. The Phi Coefficient was chosen as it measures the correlation between two binary variables and is interpreted similarly to the Pearson correlation coefficient (Cramer, 1946). The variables exhibiting significant correlations were explored in this section of the study.

The criteria items that made up the outcome (student) variables are Technical Skills (*Skills*), Evidence-Informed Practice (*EIP*), Tolerance for Procedural Error (*TPE*), Time Management (*Time*), Instructor Intervention (*Intervention*), Communication and Professionalism (*Communication*), and Overall Progression (*OP*). The first outcome (student) variable, Technical skills (*Skills*), outlines the sets of abilities and knowledge needed to perform specific tasks in dentistry. Next, evidence-informed practice (*EIP*) measures the level of application of evidence used by the student to identify the best course of treatment for their patient. Tolerance for Procedural Error (*TPE*) measures the students' ability to practice and perform procedures independently. Time Management (*Time*) looks at the student's time management and their ability to complete procedures within the allotted time. The amount of instructor intervention or supervision required by the student during the procedure is displayed by the variable *Intervention*. The variable for Communication and Professionalism, *Communication*, focuses on the level of professional conduct and interpersonal skills demonstrated by the student before, during, and after the procedure with respect to the patient and their family. Finally, Overall

Progression (*OP*) describes whether the students' performance is at the expected level for their year of study.

After the Phi Coefficient analysis, a series of binary logistic regressions were conducted for each of the criteria items (*Skills, EIP, TPE, TimeManagement, Intervention, Communication, OP, and Score*) as outcome variables and using the child variables as predictors. A binary logistic regression was chosen because the criteria items are not marked on a percentage based on a continuous scale from 0 to 100%, but rather on the five-point scale. In this scale, scores of 1 and 2 are failing grades, 3 is the minimum passing grade, and 4 and 5 constitute higher grades. Given that there was a very small number of students who received scores of 1 or 5, an ordinal logistic regression did not perform as well. As such, each item response was dichotomously recoded to separate high performers (those who received a score of 4 or 5 on the five-point scale) and the acceptable and low-scoring performers (those who received a grade of 2 or 3). None of the students received a score of 1 in any of the criteria items. The full model for the binary logistic regression of an outcome variable is presented below:

$$Outcome_i = \frac{1}{1 + e^{\beta_0 + \beta_1 Anxiety_i + \beta_2 Positive_i + \beta_3 Older_i + \beta_4 Female_i + u_i}}, i = 1, 2, 3, \dots, 42$$

The final model for each of the outcome variables consisted of the model containing the combination of predictor variables that best predicted the outcome variable. Models without significant predictor variables, as determined by the Wald's Test and the confidence interval of the Odds Ratio, and models that did not perform statistically significantly better than their corresponding empty model (i.e. a model with just a coefficient), were discarded from further analysis.

Each of the models went through an iterative maximum likelihood procedure. The first models compared for every outcome variable were a full model (shown above) and an empty model, which is a model containing only a constant and none of the predictor variables. If the full model did not perform better than the empty model, then it was assumed that the child variables were not related to student grading for that specific criteria item. If the full model performed better than the empty model, then analysis continued to the next step. For the next step, the independent variables that were not statistically significant, according to the Wald Test, were dropped from the full model and a restricted model that did not have those variables was run. If the full model performed better than the restricted model, then the full model became the final model for the outcome variable (or criteria item). If the restricted model performed better than the full model, then the restricted model became the final model for that outcome variable (or criteria item).

How well each model performed in relation to another model was measured using their sensitivity of prediction, as well as the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC). In model comparison, the model with the lowest AIC and BIC score is preferred (Dayton, 2003). Whether individual variables improved the model was tested using Wald's Test and the Odds Ratios for each variable. The Odds Ratio determines the size of the effect the predictor variable has on the outcome variable.

Chapter 4: Results

In this section, the results of the study are outlined. The analysis is divided into two research questions. For the first question, the drawings and the interview were analyzed individually. The drawings were analyzed with the Child Drawing: Hospital (CD:H) instrument (Clatworthy, 1979), which identifies the level of anxiety each child expressed through their drawing. Then, thematic analysis was used to locate themes and specific features of the dental appointment. These themes were derived from the participant interviews and whether these contributed in a positive or in a negative manner to the child's experience at the dental clinic. For the second question, the relationships between the drawing/interview data and the student clinical assessment data are explored using correlations and regressions.

Population

Recruitment of participants occurred during clinic days assigned for pediatric dentistry. In total, sixty-one participants agreed to participate in this study. Only one parent stated they did not want their child to participate, given they had no time to do so. Throughout data cleaning, ten participants were removed from the study because they did not complete the interview portion of the activity, had their parents present during the interview, and/or did not create a drawing that featured themselves or the dentist. The unrelated drawings are featured in Figure 1. All these children were five years of age, the youngest age allowed in the study, therefore this could imply these participants did not fully understand or want to do what was asked of them. As children provided assent for their own participation, there were 5 children who expressed they did not want to draw and were then taken to their parents/ guardians.

Figure 1.*Unrelated Drawings*

After these children and their data were excluded, a total of 51 remaining participants' drawings and interviews were analyzed. Table 1 contains the descriptive statistics for the demographic variables of age and sex for these participants, as well as whether their sibling or other children were present during the drawing and interview activity. The age range of the study was children aged five to eight years, with a mean age of seven years ($SD = 1.0$). The

participants were divided into younger and older age categories, with the older category being comprised of children ages five and six (Age Group 1) and the older category of children ages seven and eight (Age Group 2). The sex of the participants was evenly distributed, with 25 male and 26 female participants. In the younger age group, 9 of the children were male and 2 were female (11 total). In the older age group, 16 were male and 24 were female (40 total).

Distribution of participants by age and gender is presented in Table 2.

In the drawing activity, nearly half (47%) of the children participated on their own, while the rest had other children present as they drew. As presented in Table 3, in total, 27 of the participants had another child present (53% of participant pool), 13 of these being their sibling (25% of participant pool). There were nine sets of siblings in the study, including two pairs of twins.

Table 1.

Summary of Descriptive Statistics for Participants

Variable	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
Age	51	5	8	7.2	1.0
Age Group	51	1	2	1.8	0.4
Sex	51	0	1	0.5	0.5
Others present	51	0	1	0.5	0.5
Sibling present	51	0	1	0.3	0.4

Table 2.*Distribution of Participants by Age and Sex*

Age	Sex		Total
	Male	Female	
5	4	1	5
6	5	1	6
7	8	7	15
8	8	17	25
<i>Total</i>	25	26	51

Table 3.*Distribution of Others Present During Drawing*

	Others Present	Sibling Present
No	24	38
Yes	27	13
<i>Total</i>	51	51

Research Question 1

This section will delve into the results related to the first research question. First, the analysis of the drawings and the results of the anxiety scores according to the CD:H instrument are demonstrated. Second, the results from thematic analysis of the transcripts from the verbal component of the interview are explained.

Drawings

To analyze the drawings, two raters (the principal researcher and a research assistant) scored each of the drawings using the Child Drawing: Hospital (CD:H) instrument. A Kappa Analysis was conducted to ensure the reliability between the raters. Then, the results regarding

the total anxiety score for each participant's drawing are shown according to participant demographics. Finally, a count of the elements found in the drawings is presented.

Inter-Rater Reliability. Weighted and Fleiss' kappa were used to assess the reliability of the raters' CD:H scoring for each drawing. The Weighted Kappa for the overall scores for each drawing produced a κ -value of 0.98 ($p < .001$), which indicates almost perfect agreement between the raters (Landis & Koch, 1977). For the individual categories, Fleiss' Kappa was used. The results of the Fleiss' Kappa can be seen in Table 4, where in the Rating Category column the number 1 indicates "very low", 2 "low", 3 "average", and 4 "above average" levels of anxiety. There was perfect agreement between the two raters for average and above average levels of anxiety ($\kappa = 1$, $p < .001$). For the very low and low levels of anxiety there was almost perfect levels of agreement between the two raters with κ -values of 0.94 ($p < .001$) and 0.98 ($p < .001$), respectively.

Table 4.

Fleiss' Kappa for Individual Anxiety Categories

Rating Category	Conditional Probability	Kappa	Asymptotic Std. Error	Z	Sig.	Asymptotic CI Bound	
						Lower 95%	Upper 95%
1	.94	.93	0.14	6.64	.00	0.7	1.2
2	.98	.96	0.14	6.86	.00	0.7	1.2
3	1.00	1.00	0.14	7.14	.00	0.7	1.3
4	1.00	1.00	0.14	7.14	.00	0.7	1.3

The maximum value that can be afforded in the CD:H is an anxiety score of 200. As shown in Table 5, the highest total CD:H score awarded by Rater 1 was 138 and by Rater 2 was 144, which are scores representative of above average levels of anxiety displayed by the child. This maximum score was awarded to the same participant by both raters. No child participant received scores indicative of very high stress (scores of 168 and over). Rater 1 awarded a

minimum CD:H score of 24, while the lowest score by Rater 2 was 26, both indicating very low levels of anxiety displayed by the child in their drawing. This minimum score was awarded to the same participant by both raters. The mean CD:H score was higher for Rater 2 than for Rater 1 at 80.2 (SD = 27.6) and 73.6 (SD = 27.6), respectively. This rater difference was statistically significant ($t(50) = 4.81, p < .001$). According to the Z-test, the distribution of participants' anxiety scores between the two raters was not significantly different ($Z = 1.21$). Both tests indicate that the raters were consistent in their scoring and produced the same distribution of scores, but Rater 1 had consistently lower scores. The distribution of CD:H scores for both raters is in line with similar studies that used the CD:H in children of similar age groups (Aminabadi et al., 2010; Pala et al., 2016).

Table 5.

Distribution of Rating for the CD:H

Rater	Range	Min	Max	M	SD
1	114	24	138	73.6	27.6
2	118	26	144	80.2	27.6

Anxiety Scores. The average total Child Hospital: Drawing (CD:H) scores between the two raters for each participant was calculated. Using the CD:H thresholds outlined in the manual (Clatworthy, 1979), each participants' average total CD:H score was assigned a level of anxiety – very low (1), low (2), average (3), above average (4), and very high (5). The mean average anxiety score was 2.3 (SD = 0.8) with a maximum score of 4, or above average anxiety, and a minimum of 1, or very low anxiety. Of the participants, none received a score indicative of very high levels of anxiety and three (6%) received a 4 (or above average anxiety levels). The most common level of anxiety was level 2 for low anxiety, which was present in 24 participants

(47%), followed by level 3, average anxiety, for 16 participants (31%). Lastly, level 1, meaning very low levels of anxiety, was seen in 8 participants, accounting for 16% of the sample. Table 6 displays these results.

Table 6.

Distribution of the Average Anxiety

Anxiety Level	Frequency	Percent
1	8	15.7
2	24	47.1
3	16	31.4
4	3	5.9
<i>Total</i>	51	100.00

To distinguish the levels of anxiety by age of the participants, a cross tabulation was performed. The results are displayed in Table 7 and illustrated in Figure 2. For anxiety level 1, or very low anxiety, seven out of eight (88%) children were in the older age category of seven- and eight-year-olds. Similarly, for level 2, 79% of children that displayed low levels of anxiety were in the older age category. Of the six children who were six years of age at the time of study, however, four displayed low levels of anxiety. The remaining two six-year-olds presented average levels of anxiety (level 3), alongside 60% of the five-year olds. The highest level of anxiety demonstrated by participants was level 4, or above average levels, which was solely present in three of the oldest children at eight years of age.

Table 7.*Distribution of Average Anxiety by Age*

Average Anxiety	Age				Total
	5	6	7	8	
1	1	0	3	4	8
2	1	4	6	13	24
3	3	2	6	5	16
4	0	0	0	3	3
<i>Total</i>	5	6	15	25	51

Table 8.*Distribution of Average Anxiety by Sex*

Average Anxiety	Sex		Total
	Male	Female	
1	2	6	8
2	11	13	24
3	11	5	16
4	1	2	3
<i>Total</i>	25	26	51

To distinguish the levels of anxiety by sex of the participants, a cross tabulation was performed. The results are displayed in Table 8 and illustrated in Figure 3. The anxiety levels were approximately evenly distributed between the sexes for levels 2 (low anxiety) and 4 (above average anxiety). For the first anxiety level, or very low anxiety, six of the eight children were female, although only accounting for 23% of the female participants. Of the male participants, only 8% displayed very low levels of anxiety. Most participants displayed low or average levels of anxiety, levels 2 and 3, with 88% of males and 69% of females being in this category. The highest level of anxiety, level 4, was exhibited by one male and two females.

Figure 2.

Graph of Average Anxiety by Age

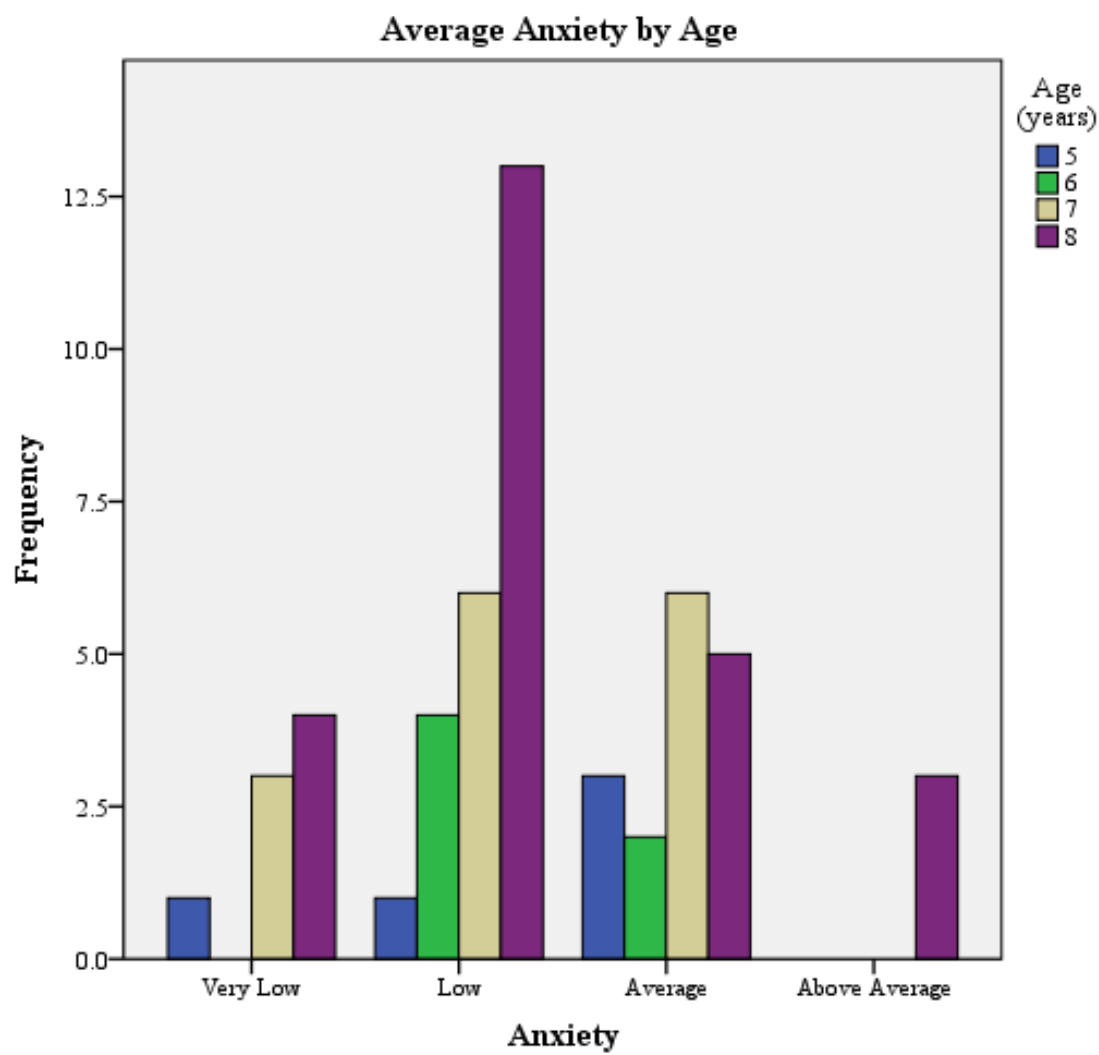
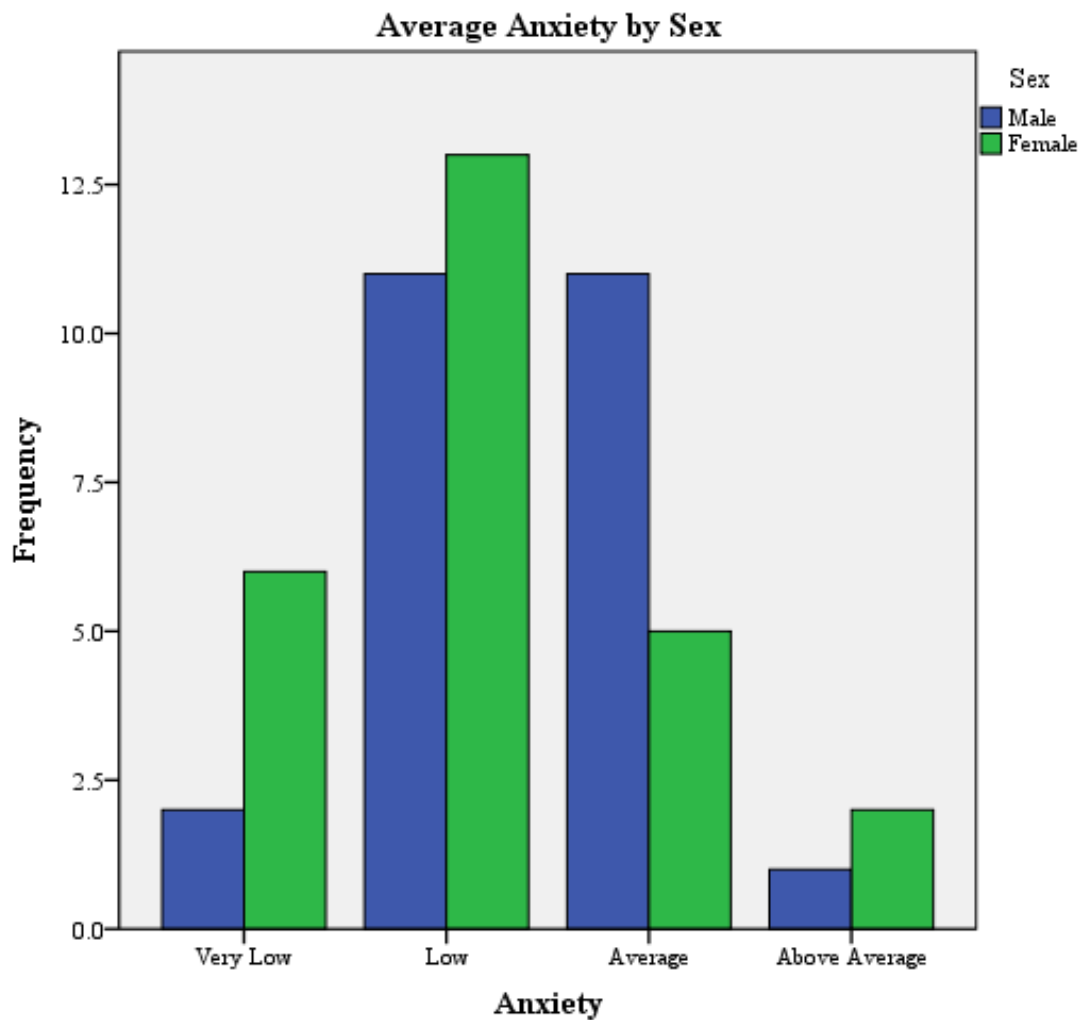


Figure 3.*Graph of Average Anxiety by Sex*

Elements in the Drawings. The table showing the elements gathered from the count and the number of times each element was featured in the drawings is available in Appendix A, Table A.1. The elements most featured in drawings are the dental chair (44 times), the dentist (33 times), an emphasis on hair (32 times), and the dental tools (27 times). In Appendix A, Table A.2

shows creative elements that appeared in the drawings, which do not belong to the original setting and are rather demonstrations of the child's imagination.

Verbal Interviews

For the verbal portion of the interviews, a thematic analysis was conducted, which included the creation of a codebook and the designation of a positive, negative, or neutral to certain aspects of the pediatric patients' experience, as well as their overall experience at the dental clinic. The codes were granted a positive, negative, or neutral designation according to the literature on children's drawings in dentistry and the context under which they were mentioned by the children. First, the results from the positive presented. Then, the distribution of positive, negative, and neutral ratings is explained. Finally, a Kappa Analysis was conducted to assert the two raters' (the principal researcher and a supervisor) reliability in designating the positive, negative, and neutral ratings to the codes and to each interview.

In Table 9, the total numbers for positive, negative, and neutral designations for the individual codes is displayed, as well as their incidence of appearance in the verbal interviews. The codes that were most commonly mentioned by the participants included the child's self-image (35 times), whether the dentist is smiling or not (34 times), the dental chair (30 times), and the participants' awareness of their surroundings (29 times). Other notable codes included the tools and the procedure, which were each mentioned 22 times, as well as specific details of the dentist, up emotions, and down emotions, each mentioned 26 times.

The codes which were assigned a mostly positive rating included the child participants' representations of themselves, the prizes, up emotions, and having familiarity with the dentist, such as with mentions of joking between them or even knowing their name. The code with the most negative rating percentage was the explorer, which was frequently described as "pokey" or

“pointy”. The suction had the opposite effect with mostly positive mentions. The positive view of the suction could be explained by the behaviour guidance technique of allowing children to hold the suction to help the child patient feel like they were in control of the situation (Nash, 2006). The needle was marked as positive when the children stated they did not mind it or that it did not hurt as much as the child participant thought. Other codes that were mostly negative included the child participant having an open mouth in the drawing, the other dental personnel (i.e. the instructor and the dental assistant), down emotions, the notion of having to wait or spend time waiting, and the concept of the appointment being done. There were several codes that were given an overall designation of “Either”. This means depending on the context, these codes could have a positive or a negative influence on the child’s experience. Some examples of this included the influence of the siblings and the family on the child’s perspective of the dentist, if they had knowledge of the procedure, and the participants’ use of detail for their depiction of the dentist. Finally, the dental chair and the awareness of light and surroundings appeared as the most neutral elements in the interviews.

Inter-Rater Reliability. A Kappa Analysis of the reliability of the identified codes between the two raters was performed. The Weighed Kappa, regarding the overall participant experience, produced a κ -value of 0.54 ($p < .001$), which indicates moderate agreement between the raters (Landis & Koch, 1977). For individual designations (Table 18), Fleiss’ Kappa was used. Here, the raters had the highest reliability value for positive designation (1), with a κ -value of 0.78 ($p < .001$) showing substantial agreement. For neutral designations (2), the κ -value also indicated a substantial level of agreement between the raters at 0.65 ($p < .001$). Finally, the lowest level of agreement occurred in negative designations (3) with a κ -value of 0.56 ($p <$

.001), representing a moderate level of agreement. Regardless of the subjectivity of the analysis, using the codebook led to adequate levels of agreement between the raters.

Table 9.

Count of Codes by Rating

Code	Positive	Negative	Neutral	Overall	Code Count
Self-Image	21	1	12	Positive	35
Smile	11	0	1	Positive	11
Open Mouth	3	13	3	Negative	18
Interests	6	5	2	Either	13
Family	3	4	0	Either	8
Sibling Influence	4	3	0	Either	7
Prizes	6	0	1	Positive	19
Writing	4	1	1	Positive	6
Colours	14	2	7	Positive	21
Extra Elements	4	2	1	Positive	7
Commentary	2	2	1	Either	5
Drawing Uncertainty	2	4	6	Neutral	13
Up Emotions	25	1	1	Positive	26
Down Emotions	2	24	3	Negative	26
Waiting	0	4	3	Negative	3
Being Done	1	3	1	Negative	11
Enclosure	4	4	8	Neutral	16
Surroundings	5	6	16	Neutral	29
Chair/cushion	6	1	27	Neutral	30
Awareness of Light	6	3	12	Neutral	17
Dental Personnel	1	6	5	Negative	9
Familiarity with the Dentist	5	0	2	Positive	17
Dentist Smiling	7	1	2	Positive	34
Dentists' Detail	10	10	9	Either	26
Procedure knowledge	20	10	4	Either	22
Tools	7	6	13	Either	22
Needle	2	3	0	Either	4
Explorer	0	6	0	Negative	4
Suction	3	0	2	Positive	5

Research Question 2

Of the 51 participants analyzed for Research Question 1, the corresponding student assessment data were available for 42 of them. This is due mainly to the type of procedure the child required that clinic day. For example, simple procedures such as retainer fittings were not graded by instructors and therefore student assessment data for that clinic day is not available. These children were removed from this phase of the study analyses. Mahalanobis Distance was used to locate outliers, but no outliers were present in the data.

In this section, a correlation analysis was performed using the Phi Coefficient to see the correlations between the predictor (or child) variables themselves first, and then with the outcome (or student) variables. After that, binary logistic regressions were performed for each of the outcome variables to see the predictive ability of the child participant variables in regard to the students' grades for each criteria item.

Outcome (Student) Variables

The outcome variables used in the Phi Coefficient analysis and the logistic regressions are the criteria items used to grade students in each clinic day. These are *Skills*, *EIP*, *TPE*, *Time*, *Intervention*, *Communication*, and *OP*. For most the criteria items, excluding Instructor Intervention, the lowest score received by a student was a 2 and the highest a 4, with mean score of 3. For Instructor Intervention, all students received either a 3 or a 4 on the grading scale. For analysis, the criteria items were recoded into dichotomous variables, where 0 was assigned to a score of 2 or 3, and 1 was assigned to a score of 4 or 5.

In terms of distribution of grades, for the first criteria item, technical skills (*Skills*), thirty-eight percent of students received a high score. Next, in evidence-informed practice (*EIP*), thirty-three percent of students received a high score. In the tolerance for procedural error (*TPE*)

criteria item, thirty-six percent of students received a high score. The lowest-scoring criteria was the students' time management (*Time*), with only nineteen percent of students receiving a high score ($M=0.19$, $SD=0.397$). Alternatively, the highest-scoring criteria item was communication and professionalism (*Communication*) with almost half of the students receiving a high score ($M=0.45$, $SD=0.504$). Next, in the criteria for the amount of instructor intervention (*Intervention*) required by the student, of the 42 students, 13 received a high score. Finally, for Overall Progression (*OP*), twenty-nine percent of students received high scores in this criteria item. A summary of these statistics can be found in Table 10. The average overall score received by the students in the sample for the entirety of their pediatric clinical rotation is 78%, with the highest score being 93% and the lowest of 63%. It is important to note that for all the criteria areas, the passing grade is a 70% (or a score of 3). For the overall score, the acceptable grade that students should achieve is a 75%.

Table 10.

Recorded Count for Outcome Variables

Outcome Variable	Recorded Count	
	0	1
Skills	26	16
EIP	28	14
TPE	27	15
Time	34	8
Intervention	29	13
Communication	23	19
OP	30	12

Predictor (Child) Variables

There were four predictor variables that corresponded to the child participants which were used for the Phi Correlations and logistic regressions. Two of the variables were demographic – the sex and age group of the child participant – while the other two stemmed from the interview and drawing – the child’s overall experience and anxiety level. The variable *Female* is dichotomous and distinguishes the sex of the participant (1 for female and 0 for male). The participants’ sex is evenly distributed, with half being female and half being male ($M = 0.5$, $SD = 0.5$). *Older* is a dichotomous variable that characterizes the age group the participant belongs to. Participants between the ages of five and six and belong to the younger group, while participants between the ages of seven and eight belong to the older group (older = 1, younger = 0). Seventy-six percent of the participants were in the older age group category ($M = 0.8$, $SD = 0.4$). The variable *Positive* is dichotomous and allots a value of 1 to participants who had a positive overall rating and a value of 0 to those who had a neutral or negative rating assigned to the context of their interview. Twenty-five of the participants had negative or neutral experience, while 17 had a positive experience ($M = 0.4$, $SD = 0.5$). Lastly, *Anxiety* is a dichotomous variable that assigns a value of 1 to participants who presented with anxiety (i.e. received an anxiety score corresponding to average or high levels of anxiety in the CD:H), and a value of 0 to participants who received an anxiety score corresponding to low or very low levels of anxiety in the CD:H. Fourteen participants exhibited average or high levels of anxiety ($M = 0.3$, $SD = 0.5$). The descriptive statistics for the predictor variables can be found in Table 11.

Table 11.*Summary Statistics: Predictor (Child) Variables*

Predictor Variable	<i>M</i>	<i>SD</i>
Female	0.5	0.5
Older	0.8	0.4
Positive	0.4	0.5
Anxiety	0.3	0.5

Correlation Analysis

Correlational analyses were performed using a Phi Coefficient (ϕ) for dichotomous variables. The only correlations that were statistically significant were between the child participant variables of *Female* and *Older* and between the student variables of *EIP* and *TPE* with the child variable *Anxiety*. The variables *Female* and *Older*, had a moderate correlation ($\phi = 0.34$, $p = 0.03$), meaning that female participants tended to be older. The student evaluation criteria items of *EIP* and *TPE* demonstrated a moderate positive correlation with the child variable *Anxiety*. This indicated that the students who treated child participants who scored average or high levels of anxiety on the CD:H were more likely to be scored higher in the evidence-informed practice ($\phi = 0.36$, $p = 0.02$) and tolerance to procedural error ($\phi = 0.32$, $p = 0.04$) criteria items.

Logistic Regression

A binary logistic regression was performed using each outcome variable and the set of independent variables described. There were seven final regression models, one for each of the criteria items. However, only those models that performed better than the corresponding empty model (i.e. a model containing only a constant) were included in the analysis. Final models were

achieved for *Skills*, *EIP*, and *TPE*. The summary of these models can be found in Table 12 and will be discussed next.

Table 12.

Summary of Regression Models

Outcome Variable	Name	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>Sig.</i>	<i>Exp(B)</i>	95% C.I. for <i>EXP(B)</i>	
							Lower	Upper
Skills	Anxiety	1.81	0.85	4.57	0.03	6.13	1.16	32.35
	Positive	1.71	0.87	3.83	0.05	5.52	1.00	30.59
	Older	-1.73	0.89	3.74	0.05	0.18	0.03	1.02
	Constant	-0.60	0.82	0.55	0.46	0.55		
EIP	Anxiety	2.33	0.93	6.34	0.01	10.30	1.68	63.31
	Positive	1.86	0.96	3.78	0.05	6.41	0.97	41.71
	Older	-1.47	0.90	2.63	0.11	0.23	0.04	1.36
	Constant	-1.34	0.91	2.19	0.14	0.26		
TPE	Anxiety	2.10	0.89	5.58	0.02	8.15	1.43	46.50
	Positive	1.66	0.87	3.64	0.06	5.28	0.96	29.18
	Constant	-2.11	0.77	7.42	0.01	0.12		

Table 13.

Summary of Tests for Regression Models

Outcome Variable	Model	-2LogLikelihood	Sensitivity	Nagelkerke	AIC	BIC
Skills	Empty	55.82	69.00			
	Full	45.30	73.80	0.30	55.30	63.99
	Final	45.78	73.80	0.30	53.78	60.73
EIP	Empty	53.47	66.70			
	Full	41.93	78.60	0.33	51.93	60.62
	Final	42.30	78.60	0.32	50.30	57.25
TPE	Empty	54.75	64.30			
	Full	43.09	76.20	0.33	53.09	61.78
	Restricted	43.87	76.20	0.31	51.87	58.83
	Final	46.25	66.70	0.25	52.25	57.46

Technical Skills (Skills) Model:

$$Skills_i = \frac{1}{1 + e^{-0.603 + 1.814 \text{ Anxiety}_i + 1.709 \text{ Positive}_i - 1.727 \text{ Older}_i}}, i = 1, 2, 3, \dots, 42$$

The model that offered the best fit for the outcome variable *Skills* contains the predictor variables of *Anxiety*, *Positive*, and *Older*. Although the variable *Older* ($W = 3.75$, $p = 0.05$) is not statistically significant for the final model at $p > 0.05$, a more restricted model containing only the predicted variables of *Anxiety* and *Positive* did not significantly improve the model ($\chi^2_4 = 9.49$, $p = 0.82$). The Likelihood Ratio Tests determined that the final model ($-2LL = 45.78$) performed better than the empty model ($-2LL = 55.82$; $\chi^2_4 = 10.04$, $p = 0.02$) and the full model ($-2LL = 45.30$; $\chi^2_1 = -0.48$, $p = 0.49$). This is corroborated by the AIC and BIC statistics. In terms of AIC the final model produced the minimum number at 53.78, compared to the full model's AIC at 55.30. This makes the final model 2.14 times as probable as the full model to minimize the information lost by the prediction, indicating that the final model performs at least as well as the full model with less predictor variables. For BIC, the results are similar, with the final model having a smaller BIC than the full model at 60.73 and 63.99, respectively. These tests are summarized in Table 13 for each of the models.

Table 12 shows the logistic regression coefficient, Wald's test, and odds ratio for each of the predictors. Employing a $p < 0.05$ criterion of statistical significance, the child participant's age, level of anxiety, and if their dental experience was positive overall had significant partial effects. Inverting the odds ratio for the variable *Older* indicates that, when holding all other variables constant, a student treating a younger child is 5.6 times more likely to receive a higher score category in technical skills. It is important to note, however, that this effect is not significant. The effect of the child participants' experience was smaller than that of their anxiety, with having a positive experience leading to odds of 5.5 times higher, compared to having

anxiety leading to odds 6.1 times higher in terms of the student receiving a higher score in technical skills.

Univariate analysis indicated that there was no statistically significant difference between any of the child participant groups regarding their effect in predicting students' scores in technical skills. This means that there is no statistically significant difference between the effect that treating a younger child as opposed to an older child has on the students' scores on technical skills ($\chi^2_1 = 2.67$, $p = 0.10$). Similarly, there was no statistically significant difference between treating a child who had a positive experience or not ($\chi^2_1 = 0.97$, $p = 0.32$) or a child who presented with anxiety or not ($\chi^2_1 = 3.23$, $p = 0.07$) on the students' scores on the technical skills component of the criteria.

Evidence-Informed Practice (EIP) Model:

$$EIP_i = \frac{1}{1 + e^{-1.341 + 2.333 \text{ Anxiety}_i + 1.858 \text{ Positive}_i - 1.467 \text{ Older}_i}}, i = 1, 2, 3, \dots, 42$$

The final model for the evidence-informed practice component of the student pediatric clinical grading criteria features most of the predictor variables, except for the child participants' sex, the variable *Female*. Given that the predictor variables, *Positive* ($W = 3.78$, $p = 0.05$) and *Older* ($W = 2.63$, $p = 0.12$) are not significant in the final model, a more restricted model that contained only the predictor variable *Anxiety* was attempted. Although the Likelihood Ratio Test revealed that there was no statistically significant difference in the rise in Log Likelihood between the final model ($-2LL = 42.30$) and the *Anxiety*-only model ($-2LL = 48.22$; $\chi^2_2 = -5.92$, $p = 0.05$), which indicates that the *Anxiety*-only model was more appropriate, the p-value was on the threshold of significance at 0.05. Given that the final model provided a sensitivity percentage of

78.6%, which is higher than that of the *Anxiety*-only model at 71.4%; the marginal p-value of the Log Likelihood test between these models; and the smaller AIC value of the final model (AIC = 50.30) compared to the *Anxiety*-only model (AIC = 52.22), the final model was deemed as a more appropriate fit for the data. These tests are summarized in Table 13.

The information for the coefficients for the final model is displayed in Table 12. As mentioned previously, only the child's anxiety had a significant partial effect on the score the students received in evidence-informed practice ($W = 6.34$, $p = 0.01$). The odds ratio shows that, when holding all other variables constant, treating a child that presented with anxiety made it 10.3 times more likely that the student would receive a higher score in the evidence-informed practice criteria item. Inverting the odds ratio for the variable *Older* indicates that, when holding the child participants' and their experience constant, a student treating a younger child is 4.3 times more likely to receive a higher score in evidence-informed practice. Lastly, the effect of the child participants' experience was greater than that of the child participant being younger, with having a positive experience leading to odds of receiving a higher score in evidence-informed practice being 6.4 times higher, when holding all other variables constant.

Univariate analysis indicated that treating child participants who presented anxiety made the student significantly more likely to receive a higher score than those who treated child participants with low anxiety ($\chi^2_1 = 5.36$, $p = 0.02$). There was no statistical significance between treating child participants who had a positive experience or not ($\chi^2_1 = 0.97$, $p = 0.37$) or with treating older children or not ($\chi^2_1 = 1.64$, $p = 0.20$).

Tolerance for Procedural Error (TPE) Model:

$$TPE_i = \frac{1}{1 + e^{-2.106 + 2.099 \text{ Anxiety}_i + 1.664 \text{ Positive}_i}}, i = 1, 2, 3, \dots, 42$$

The final model for the tolerance for procedural error criteria item was made up of the predictor variables *Anxiety* and *Positive*. The Likelihood Ratio Test showed that the final model (-2LL=46.248) was significantly more adequate in representing the data than the empty model (-2LL=54.748; $\chi^2_4 = 8.499$, $p=0.014$) and the full model (-2LL = 43.09; $\chi^2_2 = -3.16$, $p = 0.21$). In the full model, the demographic predictor variables were not significant, with the variable *Older* having a p-value of 0.09 ($W = 2.83$) and the variable *Female* having a p-value of 0.39 ($W = 0.75$) in the Wald's Test. This is the initial reason behind dropping these predictor variables from the final model. As indicated above, the Likelihood Ratio Test determined that the final model performed better than the full model without these two predictor variables. This was corroborated by the AIC and BIC statistics. AIC determined that the final model (AIC = 52.25) is 1.53 times as probable as the full model (AIC = 53.09) to minimize the information lost by the prediction. Similarly, the BIC statistic was smaller for the final model (BIC = 57.46) than the full model (BIC = 61.78). This means that the final model is at least as effective in predicting the data as the full model, but with less predictor variables, making the final model the most appropriate fit for the data. Results from these tests can be found in Table 13.

In terms of the two predictor variables in the model, whether the child participant had anxiety had a significant effect in whether the student treating them received a higher score in their tolerance to procedural error ($W = 5.58$, $p = 0.02$). Treating a child participant who presented with anxiety affected whether the student received a higher score on tolerance to procedural error by 8.2 times, as opposed to those students who treated child participant with

lower anxiety. Treating a child participant who had a positive experience had an effect 5.3 times greater on the student receiving a high score in the same criteria than those who treated a child who did not. However, whether the child had a positive experience was not statistically significant in whether the student received a high score in the tolerance to procedural error criteria item according to the Wald's Test ($W = 3.64, p = 0.06$). The summary of this model can be found in Table 12.

Univariate analysis showed that treating child participants who had anxiety made the student significantly more likely to receive a higher score in the tolerance to procedural error criteria item than those who treated child participants with low anxiety ($\chi^2_1 = 4.20, p = 0.04$). There was no statistical significance regarding how well the students performed in the criteria item between treating child participants who had a positive experience or not ($\chi^2_1 = 1.60, p = 0.21$).

Chapter 5: Discussion

As increased attention is given to the rights and views of children, the movement towards research and clinical convention surrounding children and their families as well as the adoption of child-centered research and clinical decision-making has gained prominence (Torriani et al., 2014). One of the first major developments on this topic extends as early as the 1980s when the United Nations debuted *The Convention on the Rights of the Child* (1989). This document “recognises children’s right to participate in decisions affecting their lives and to communicate their own views” and “that state parties should ensure that a child who is capable of forming [their] own view should have the right to express these views freely on all matters affecting the child, and that those views should be given weight in accordance with age and maturity” (Convention on the Rights of the Child, 1989; Einarisdóttir, 2007). Since then, several other documents and policies recognizing the importance of the inclusion of children in decisions relating to themselves have been introduced. As health care institutions increasingly consider patient stories, contexts, and experiences in their policies, health professions education programs should take studies such as this one into consideration to thus continue to incorporate the philosophies of patient-centered care and child-centered principles that guide the dental student curricula to ensure that future dental professionals are at the forefront of this cultural shift in health care.

Children’s perspectives in health care is particularly related to children’s rights in decision-making. Research regarding children’s perspectives in health care provides a venue for identifying their unique needs in these types of settings (Ford, 2011) and to inform updates on health care curricula. By exploring children’s perspectives in these environments, health care

professionals and researchers can gain insight into what aspects of health care interactions make children feel out of control, lost, or with increased anxiety, fear, or pain.

This study explored children's perspectives of their experiences in a teaching dental clinic at the University of Alberta using the standard research practice of interviewing alongside an art-making method, drawing, to explore the application of children's perspectives in dental student clinical assessments. This section presents a summary of the methods introduced in this study, elaborates on the results of this study and their connection to the current body of knowledge, and also the potential limitations of the approach used. Finally, an outlook on the future developments required for the application of children's perspectives into dental student clinical assessments is discussed.

Summary of the Study

The study occurred in two phases – one for each research question. The first phase explored the insights that could be gathered from the perspectives of the child participants. It involved the use of a projective method of expression – drawing – during interviews. Using art in combination with the interview can facilitate communication between the adult and the child in both clinical and research settings (citation). The interview and the drawings were analyzed separately using different methods. The drawings were analyzed using the Child Drawing: Hospital (CD:H) instrument by Clatworthy (1999a) and the verbal portion of the interviews were analyzed using a combination of inductive and deductive reasoning following the work of Braun & Clarke (2016) and Fereday and Muir-Cochrane (2006). The second phase of the study looked at how the children's perspectives were being implemented into the current clinical grading criteria for the undergraduate dental students at the University of Alberta. The implications of these methods and the contributions to dental professions education are discussed next.

For the first research question, children were asked to draw all about themselves at the dentist and then verbally explain to the researcher what they drew in order to find out their perspectives regarding their dental experiences with the dental students. The drawings were analysed using the Child Drawing: Hospital instrument by Clatworthy et al. (1999a), which provides anxiety scores based on the drawings and has previously been validated for use in dental settings (Aminabadi et al., 2011; Frauches et al., 2018). For the verbal portion of the interview, a thematic analysis was performed, which included the development and description of a codebook using a dualistic inductive and deductive technique following the work of Braun & Clarke (2016) first and then the work of Fereday and Muir-Cochrane (2006) for the codebook. The analysis of the interviews also involved the subjective interpretation of the codes in the codebook, in which two researchers assigned a positive, negative, or neutral rating to each code and to the child participants' overall experiences. For the second research question, the relationships between these ratings and the anxiety scores with the dental students' scores on the clinical criteria were explored using correlational and regression analyses.

Reflections on the Study

During the data collection section of this study, there were a few challenges that are valuable to discuss. Mainly, these pertain to the children who did not want to draw or drew something unrelated, who had preconceived preferences for their dentist or interviewer, and regarding the structure of the interviews.

In their study, Einarisdóttir found that “research using diverse methods has revealed that young children are reliable informants and give valuable and useful information” (2007). This idea extends to children who seem to provide unrelated information or appear to give no information at all. As participants could opt-out of any portion of the research activity, there

were a few participants who either chose not to draw, drew something unrelated, or chose to not take part in the verbal interview. In similar pediatric dentistry studies, it was reported that there were children who struggled with drawing (Frauches et al., 2018), as well as children who drew pictures which did not show any components that reflected dentistry or dental settings (Torriani et al., 2014). Upon being faced with this complication in their study, Taylor et al. (1976) asked children who did not create drawings related to the task to repeat the activity. They found that in their second drawings, children tended to place their art to the left side and low on the page, which, in accordance to the CD:H manual (Clatworthy et al., 1999b), indicates an orientation to past experiences and insecurity, respectively. It is stipulated that unrelated drawings could represent the child's thoughts at the time or be indicative of high levels of anxiety. In the latter case, an avoidance mechanism is implemented by the child to prevent themselves from thinking about the dental experience (Torriani et al., 2014). In the present study, the children who did not want to draw or did not draw the task were all part of the younger age group and some presented language difficulties, such as having an alternative language to English spoken at home. Both these circumstances could suggest an increased difficulty in the child's ability to fully understand the activity. Moreover, most of these children had also endured treatments under Nitrous Oxide gas, which could mean that the drawings might represent what the children were thinking about under the dream-like influence of the gas. While some children did not participate or complete the interview activity, this may suggest the child has higher levels of anxiety and may need further guidance before, during, and after treatment. This knowledge can help the instructors to pair children with the adequate student, as well as help the dental student understand their patient's needs.

Another challenge that was encountered is the preferences children have regarding interacting with adults. During the study, there were multiple occasions in which children would not interact with or would respond differently to their dentist, myself, or the research assistant due to our gender presentations. This occurred early in the research when, in the process of receiving consent from a parent, they expressed that their child would be comfortable with the principal researcher as they are female. This is corroborated by AlSarheed's (2011) study on children's preferences regarding their dentist. They discovered that children preferred to be treated by a dentist who had the same gender presentation as them. As a result, a male research assistant was asked to join the study to minimize situations like these in data collection and to create a more comfortable environment for participants.

Alberta's diverse population in culture and language also affects how children react to, respond to, and treat adults. There is great diversity in the population that attends the University of Alberta's pediatric dentistry clinic as it is the only public and lower-cost dental care institution serving Central and Northern Alberta. These areas of the province contain the Treaty 6 and 8 First Nations populations and eight Metis Settlements (Government of Alberta, 2019), various Francophonie communities (Government of Alberta, 2018a, 2018b), and the Eastern European and Anabaptist farming communities (Statistics Canada, 2016). Moreover, the province also has the highest population growth in Canada, constantly receiving inter-provincial and international newcomers (Statistics Canada, 2020). In the study, this cultural diversity was apparent in a few incidents. For instance, there were children who would not answer any of the principal researcher's questions, however, once the male research assistant began taking over, they would engage with him and answered his questions, often ending sentences with "sir". This shows that the ethnographic diversity of the population served by the clinic lends itself to cultural

differences that could include specific views of gender. Ultimately, it is common for children to have a preference with whom they interact (AlSarheed, 2011), which is an important note, both in research and in clinical situations. When it comes to young children, simple details influence their ability to form connections and communicate with adults. Adapting to child preferences and maintaining an awareness of the context of the clinic's population increases the quality of both the treatment and the results of the study.

The last important challenge endured during the data collection phase of the study is concerned with the group structure of the interview and the possible effects this may have on the results. The first issue with the way data collection was organized is that, whether the children participated individually or in a group was not controlled. Since there was a limited amount of time allotted each clinic day and a small research team, the interviews occurred as children arrived in the research room once the dental student finished treatment for the day. This led to having a randomized assortment of children who interviewed individually and with others. The participants' interactions were thoroughly observed and documented by the research team in the form of field notes. For the research team, however, it became clear that the children were expressing their own experiences, even if they copied certain aspects of another child's drawing, such as adding goggles or the mask the dentist wore. This was supported by the interviews, in which children carefully explained each component of their drawings, at times adding that they copied a detail from someone's drawing because it was impactful to themselves as well.

Elementary-age children have a familiarity with group-like settings, often spending time together at school where they learn and express themselves amongst their peers. In this way, "group interviews are based on interactions, so the children discuss the questions, help each other with the answers, remind each other about details, and keep the answers truthful" (Einarsdóttir,

2007). This indicates that imitation does not denote “lack of own thought” but rather affects recall patterns (Parkinson, 2001). That is, children are cued by other children’s productions and they choose what is important to add to their representation of themselves. Lastly, group settings help to balance the power relations in the child and adult dichotomy, allowing children to ask each other questions and, therefore, serve as interviewers themselves. This relaxes the ambience of the research room compared to individual interviews in which the child is alone with an adult (Parkinson, 2001; Einarsdóttir, 2007).

In this section, the challenges endured during data collection were described, and the effects that these could have on the results gathered and analyses conducted were explored. These challenges were regarding children’s choices, their predetermined preferences and attitudes, and the context of the research. To conclude, adapting to the context of both the participants and the setting of the study is an important consideration in research and in clinical situations. Children have pre-established preferences with respect to the adults they interact with and the way these interactions occur. The children’s cultural and socioeconomic background, as well as their age, can have an influence on these preferences. In the end, student clinical assessments and future studies should consider the challenges mentioned that stem from children’s free will and individual identities.

Research Question 1

Children’s Notion of Control

The CD:H manual (Clatworthy et al., 1999b) recognizes certain items in drawings as indicative of specific components of the child’s experience. For instance, a lack of control felt by the child. These include portrayals in which the scene and the characters are void of action; a smaller depiction of self relative to the environment, the dental equipment, or the adults; and

lastly, faces devoid of expression. These have been corroborated by the literature. In their study, Burns-Nader (2017) observed that hospitalized children depicted less action in their drawings when compared to the drawings of children who attended a medical appointment only. Other items identified by the literature included depictions of the child having a reclined position in the chair, an open-mouth, and rigid t-shaped arms – all of which impede the use of several of the child's capabilities (Torriani et al., 2014). In general, representations of rigidity are found to be projections of the child's need to maintain control. Due to this, the codebook included whether the child had an open mouth or if they were smiling in the drawing as one of the codes. Seventy percent of children in the study depicted themselves with an open mouth, even at times featuring a tool, water, or the dentist's hand inside of their open mouth. This supports the notion of having a lack of control in health situations, with studies suggesting that when children portray themselves connected to the health care provider through dental equipment, it is indicative of dependency of the child to the professional and an imbalance in the child's understanding of the situation (Corsano et al., 2012; Burns-Nader, 2017). This perceived lack of control and enhanced dependency can have lasting results on the child if not addressed adequately. Pala et al. (2016) compared the results of children's drawings using the CD:H instrument to other scales of pain and distress. Their results showed that there were instances of low distress in the scales while the drawing presented a helpless or crying child in the dental chair. They suggest this is an indication that "observational and self-report measures represent fleeting emotions, whereas drawings symbolise the lasting feelings of a dental treatment" (Pala et al., 2016). Awareness of these lasting effects could illuminate approaches to behaviour guidance techniques and help in implementing future oral health adherence in the child.

Another important element of the drawings was the depiction of dental equipment. Dental equipment is a significant component of the dental treatment and was present in most of the drawings in the form of the dental chair, the overhead light, or the tools. The code with the most negative rating percentage was the explorer, which was frequently described as pokey or pointy. The needle also received a mostly negative rating, while the suction had the opposite effect with a mostly positive rating. The positive view of the suction could be explained by the behaviour guidance technique of allowing children to hold this instrument as an attempt to help them seem in control of the situation (Nash, 2006). It is important to note that while the suction, explorer, mirror, and needle were individually highlighted by the children, the dental tools as a unit were perceived as neutral in the interviews, with the children merely mentioning them as tools or sticks. According to the CD:H manual (Clatworthy et al., 1999b), if children include and depict specific dental equipment as enlarged, it is often an item that is bringing them concern. Taylor et al. (1976) noticed that the children's drawings in their study tended to feature abnormal representations of dental lights, as well as of syringes and forceps-like instruments, which was also found in this study. This suggests that the explorer, mirror, and syringes often cause unpleasant feelings in children. Burns-Nader (2017) found that medical equipment is a source of worry for hospitalized children, observing that hospitalized children included more medical equipment in their drawings than children merely attending a medical appointment. This could mean that an important behaviour guidance technique, Tell-Show-Do, which provides information about medical equipment and procedures to the patient in order to minimize the anxiety and fear these may cause (Hatava, Olsson, & Lagerkranser, 2000), is not being utilized optimally by the students and the negative perceptions of pediatric patients could be improved through more comprehensive use of this technique.

The representation of overhead lights as an immense presence can be representative of these being overwhelming for the child. Torriani et al., 2014 explain that children may have difficulty maintaining visualization outside of the dental cubicle, as laying in the chair underneath the overhead lights tends to obstruct and tunnel the child's view (Torriani et al., 2014). In line with this, in this study, awareness of light (i.e. overhead light, the ceiling lights, and rays of light) and details of the dentist (i.e. loops, masks, and hairstyle) were some of the most featured items in the children's interviews and drawings. This could be indicative that the lights in dental settings tend to limit or overwhelm children's view, making it common in for the drawings to include only the lights and the dentist at work. Perhaps in future studies it would be interesting to see if the dental professional's ability to widen a child's view through human connection and behaviour guidance can lead to more drawings that indicate the child perceives dental visits as part of their lives.

Coyne and Kirwan (2012) found hospitalized children reported the need to be included in conversations and to have the medical team communicate with vocabulary that they could understand, as the child's ability to communicate with the medical team helped them feel more secure. Many of the participants in the study had knowledge of the treatment they were receiving and/or used technical terms to explain the procedure being performed by their dentist. For instance, several children used the word extractions to indicate their teeth were being removed, with a child explaining that the reason his teeth were being extracted was "because like there's just a certain age, like an average age to have teeth, so they have to pull them out because they weren't out yet." Children also often expressed that their dentist explained their actions prior to conducting them. The Tell-Show-Do technique uses demonstration and explanation of the tools being used and of the procedure to be conducted verbally and through touch (Davies &

Buchanan, 2012). The child participants' knowledge of dental vocabulary related to procedures and the reasons behind the procedures indicates that part of the behaviour guidance technique (BGT), Tell–Show–Do, is being readily utilized. However, as shown previously, the dental students are not using this technique to explain the tools they are using as readily.

Children's Representation of Themselves

Children's depictions of themselves tended to highlight the aspects of themselves that they liked. For instance, emphasis on hair was an ongoing motif observed throughout the study. Children often depicted their hair in alternative colours to their own, such as in purple or blue, or with styles they indicated they liked more, such as with different coloured ends of the hair or in a braid. Studies in the development of children's drawing attribute this phenomenon to three possible theories: first, this could be a feature that children like about themselves and mention frequently; second, the child is drawing their hair differently to express how they might prefer it or wish that it was; and lastly, the difference in colouring could be an attempt to increase the feature's prominence (Deguara & Nutbrown, 2018). These differences were apparent in several drawings in the study. One child explained in their interview that the reason they chose the colour purple to depict their hair was because they had recently received a haircut that they really liked and wanted to express that in their representation of themselves. Another child in the study added blue dyed ends to her hair and explained that it was a representation of how she would like her hair to look. There were also several instances of children highlighting their shoes in the study, often making them larger in proportion to their legs or by making them their favourite colour. Finally, it was observed that children included specific details of the clothing they were wearing in the drawings, such as zippers, patterns, and graphics.

Children's Representation of the Dentist

Understanding the relationship between the dentist and the child is fundamental, since communication in any form, verbal, non-verbal, or compounded, plays a vital role in dental treatment, especially in the evaluations of pain and the causes of fear, as well as the consequent uncooperative behaviours – all which affect the child's oral health (Frauches et al., 2018; Pala et al., 2016). An important finding of this study concerns the concept of familiarity between the dental student and the pediatric patient as expressed by the content of the children's drawings and interviews. The personal relationship established between the child and their dentist was mainly illustrated through the child's representation of the dentist. Approximately half of the participants depicted their dentist in the drawing, however, half of these drawings displayed their dentist as a black stick figure, or a person covered by a mask, gloves, and/ or a robe. Torriani et al. (2014) determined that a relationship is established when the child depicts the professional with colourful clothing and hair that is symbolic of their person. This demonstrates that out of the children who drew their dentist in the portrayal of the dental setting that day, half of them did not gain a level of familiarity with their dental professional that constituted individual details of the person who is the dental student. This is further highlighted by most children in the study being unable to remember their dentists' name (Torriani et al., 2014). Children who remembered their dentists' name in the study tended to draw their dentist in the picture with specific details to the dental student, at times including additional details, such as writing the dental student's name beneath their depiction or expressing interest in their dentist during the interview. Aminabadi et al. (2010) stated that positive perceptions of the dentist in children's drawings were demonstrated by happy facial expressions and friend-like depictions, as well as representations of trust and safety. In the study, a few children alluded to a prank or a joke between them and the dental

student, which are examples of friend-like relationships. These findings reveal that rapport is important in establishing a positive perspective of the dental setting and the dental professional within a child. The depictions of the dentist hair were also important in children's portrayals of the dentist, with the child placing special attention to the specific hair colour and hairstyle the dentist was sporting. Deguara & Nutbrown (2018) identified that children create a distinction between each of their family members through the different hairstyles that are representative of each person. In the same way that the hairstyles depict each person in the family as an individual, some of the children depicted the student's individual hairstyle in the drawing. This demonstrates that the student was successful in developing a certain level of rapport with their patient. As such, this shows that children pay attention to the appearance of the dentist, and, if the dentist was successful in developing a certain level of familiarity with the patient, their individual characteristics behind the dentist clothing are highlighted in the children's drawings.

In some of the drawings, children depicted additional dental personnel present during treatment, these depictions include the instructor and the dental assistant. In the drawings in which other dental personnel were illustrated, none of the adults were represented as having features recognizable of each individual. Instead, the adults were depicted as copies of each other or as black stick figures. In the interviews, several of the children referred to the dentist and the other dental personnel present as doctors, nurses, teachers, and other dentists, demonstrating that children were not aware or introduced to the adults and their roles in the child's treatment. Overall, these results show that the image of the dental personnel perceived by the child depends on the communication and relationship established between them. This shows that knowledge and understanding of children's perspectives can lead to positive changes or adjustments that

would make children more comfortable in the dental environment, improve the quality of their visits, and inform teaching practices that could support student learning.

Children's Creativity in Drawing

Outside of the children who drew unrelated depictions, there were several instances of creative liberties children took in the drawing activity. These included made-up colours, windows that were not present, monsters, stars, and animals. This is in line with a study by Torriani et al. (2014), which highlighted children's ludic representations of health as one of the important themes derived from children's drawings of oral health. They stated that in children's drawings a playful element is persistent, extending into interviews, as children often described their dental experiences using fantastical elements in their narratives. These lucid representations also included metaphorical portrayals of the events, such as representing an unhealthy mouth with a bug (Torriani et al., 2014). This was noticed in this study as well. One of the child participants drew a monster under the dental chair, which could be a metaphorical representation of the experience being scary.

There were a few instances of children who drew their dental visit as occurring inside of a building, often including the outside weather in their picture as well. Some studies suspect that children who portray these types of images have a recognition of context regarding health care visits in their lives, including them as part of it (Torriani et al., 2014). On the opposite end,

Placing emphasis on children's expressions of themselves and their connection with others and the environment can provide insights into the details and behaviours within the dental setting that are either successful or require adjustments in order to achieve a comfortable and productive dental experience, achieve maximal standards in quality of care, and establish the best circumstances for dental students' learning in pediatric dentistry.

Limitations

Additional limitations with the collected data were due to the age categories and the time constraints— all leading to restrictions in the results of the study. Some of these limitations include the uneven distribution of age and anxiety in the sample. The older child population was significantly more represented. There was also a very small number of children in the higher spectrum of the anxiety measure present in the sample. Moreover, the sampling technique chosen for the study did not account for the different age group. Instead of using one sampling technique across the age of five to eight, participants should have been recruited separately between the two age groups, creating approximately equal sample sizes. These limitations could have an impact in the results of the study. In the end, there were some limitations to the data used in this study that were caused by a variety of factors, all which future studies should keep in mind.

Alongside this study, several others found a lack of daily oral hygiene representations in drawings and interviews, implying a possible gap in patient education and disease prevention during visits (Torriani et al., 2014). In this study, only two children represented the most common instruments of daily oral health prevention as part of dental treatment, drawing toothbrushes and/ or toothpaste. This may suggest that greater emphasis is required on the importance of preventative care during the dental appointment.

Lastly, it is important to highlight that most children had a positive overall outlook of their dental experience. This is in line with the literature which states that children tend to have positive views of the dentist. Frauches et al. (2018) found that children tended to have a positive view of both the dentist and of dental treatment. They noted, however, that children who had positive views of the dentist did not necessarily have a positive view of dental treatment. This is

an important distinction, highlighting the multifactorial element of children's thoughts, fears and anxieties, and health care needs.

Research Question 2

Although this study found some relation between the child indicators and the current clinical grading criteria for upper-year undergraduate dental students at the University of Alberta, in general, there is room for improvement in the criteria's consideration of the patient's experience. The analysis portion of the study showed that some child participant variables were related to the grades students received in the criteria items that evaluated their technical skills, use of evidence-informed practice, and tolerance for procedural error. The child participant's anxiety had the largest effect on the students' grades, as treating a child with higher levels of anxiety was more likely to lead to higher grades for the students in the three criteria items. Whether the child had a positive experience or not and the age group the child belonged to did not have an effect on the three criteria items. Lastly, the child's sex was not related to student grades in any of the criteria items. These results could suggest that students are utilizing higher levels of skills and evidence in their practice when phased with the difficulties that accompany increased anxiety in patients. Instructors could also be giving higher scores to students who treated more anxious and/or younger children and were able to maintain a certain level of technical skills and support their decisions with evidence. Most notably in the clinical grading criteria, none of the child predictor variables were related to the students' score in professionalism and communication.

The full extent to which the patient's perceptions of the dental treatment are acknowledged in student grading cannot be captured by this study due to the limitations of current student assessment data in which verbal feedback is not recorded. Documenting

instructors' verbal feedback in future studies might provide richer student data and help provide a more holistic picture of clinical grading practices.

This study found some important things that affect the child's experience in the dental setting and that the way students are currently graded is not related to these. Given children's inherent difficulty with the abstract task of describing experiences using verbal language, combining art with verbal forms of providing thoughts, feelings, and perceptions of an experience can help children express themselves and provide feedback to the institutions and people that provide them with services and care. Further studies should look at the development of a drawing tool that can be used quickly and easily in clinical teaching, which perhaps students can implement themselves and analyze on the spot. This could be a reflective learning tool or a way for instructors to evaluate other levels of professionalism and communication.

Recommendations for Improving Patient Experience

There are certain observations from the study that lead to important considerations that can help improve patient experience in clinical teaching and practice. These observations are closely related to the way behaviour guidance techniques (BGT) are applied by dentists and dental students. The American Academy of Pediatric Dentistry defines BGT through its goals: "... to establish communication, alleviate fear and anxiety, deliver quality dental care, build a trusting relationship between dentist and child, and promote the child's positive attitude toward oral/dental health and oral health care" (AAPD Reference Manual, 2011). Examples of these techniques include "verbal and nonverbal communication, Tell-Show-Do, modeling, distraction, positive reinforcement, flexibility, foreshadowing, visualization, relaxation, and the presence of parents" (Feigal, 2001, p.1371).

The first observation is the concept of isolation perceived by a child before, during, and after a dental appointment. One of the participants in the study drew a scene of isolation for their drawing (Figure 4). The participant depicted the dental student with a talk bubble with “laughing” written inside. The participant explained that the dental student was laughing with the other dental personnel, but that the participant themselves was not in on the joke. Behaviour guidance literature has established that it is crucial for the dentist to make the child the center of attention starting at the initial meeting (Weinstein, 2008). In excluding the child from the joke, the dental student shifted their focus away from the child causing feelings of isolation. Weinstein (2008) also advocates for the dentist’s use of play during appointments, which includes making jokes *with* the child or asking about the child’s interests in an effort to build trust. The child’s choice to illustrate this scene as their drawing demonstrates how notable not being in on the joke was for them. As such, making the child center of attention has important consequences that improve patient experience and avoid the development of negative perceptions of the appointment.

A second interesting observation from the study is that several of the child participants did not know the title or the role of the other personnel present in the appointment. In the teaching clinic, there are registered dental assistant helping the students, as well as an instructor that supervises a group of students. The BGTs of Tell-Show-Do and desensitisation are important in this context. Desensitization is the exposure of a child to a series of dental experiences and Tell-Show-Do introduces the child to aspects of the appointment through verbal explanation, as well as visual and sensory demonstrations (Roberts et al., 2010). Both techniques allow the child to learn about and understand what occurs in a dental appointment and are mostly used to familiarize a child with a tool or to explain what will happen in the procedure. However,

it is important to note that these techniques also include familiarizing the child to the dental setting and the people that will be involved in the appointment. Moreover, part of making the child the center of the appointment is to introduce them to the people who will participate in the appointment. In the child not having a name for the personnel and not understanding their role in the appointment, a degree of separation between the personnel and the child is formed. This impedes the ability of the dental personnel to successfully connect with the child and create a positive experience. Ultimately, it is important to consider all aspects of desensitisation and Tell-Show-Do to introduce the child to not only include the tools and the procedure, but also the surroundings and the people who participate in the appointment.

Figure 4.

Participant Drawing (Isolation)



Another considerable observation is the depiction of the overhead and ceiling lights in the participants' drawings. An example of a participant's illustration both the overhead and the ceiling lights is found in Figure 5. In the picture the participant drew themselves to be significantly smaller (approximately 3 times smaller) than the overhead light. They also drew the ceiling lights as five blue, coloured-in circles and shaded-in the white ceiling. This could be partly attributed to the clinic itself as this depiction is true to the setting and there are no distractions available to divert children's attention. In the clinic, the overhead light and the ceiling are the only available structures for the child to focus on during the appointment. Distraction is a BGT that can be achieved in several ways, such as by giving the patient a short break during the procedure or by employing visual and auditory forms of distraction (Appukuttan, 2016). Many dental clinics use television sets or music to help the patients relax and to provide them with an outlet for their focus. Having a distraction has been proven to reduce the activity of the sympathetic nervous system of the patient and helps patients' decreased perceptions of unpleasant experiences during the appointment (Moola, Pearson, and Hagger, 2011). As a result, implementing forms of distraction in the Pediatric Dental Clinic can improve the experience of the patients, help avert negative behaviour, and alleviate patient pain and anxiety (Appukuttan, 2016; Moola, Pearson, and Hagger, 2011).

Figure 5.*Participant Drawing (Awareness of Light)*

The last important takeaway from this study is that the children tended to enjoy drawing the drawing activity and having an opportunity to express themselves and their thoughts.

Drawings act as a narrative of children's experiences and emotions and provide a method for communication with children. They are easy and familiar activities that, when accompanied by interviews, help understand sources of uneasiness, detachment, or anxiety that lead to negative treatment experiences and health outcomes. Most importantly, drawing gives children a chance

to have input, be involved in, and improve the dental setting in a meaningful way to their experience. In the study, several children drew the drawing activity as part of the dental experience that day, with one child expressing that they drew a happy face at the top of the page to show that “[they were] happy about drawing.” It is important to note that the act of not wanting to draw is expressive of the child’s state as well. At the very least, the drawing exercise helps children express themselves creatively and leave the dental clinic distracted and sometimes in a better mood (Pala et al., 2016). In research, drawing also inadvertently provides children a focus other than the interviewer and helps to provide a form of decompressing at the end of the experience (Driessnack, 2005).

Conclusion

The value of seeking children’s perceptions regarding their experience in educational clinic settings is gaining momentum in undergraduate dental student education (Rodd et al., 2010). Children’s perceptions of the dentist are affected by their caretakers’ and siblings’ attitudes towards the dentist, the clinic environment and the dentist (AlSarheed, 2011), as well as the child’s own dental fear and anxiety, previous experiences (Gao et al., 2013), and the child’s demographic variables (Haskett et al., 2016), amongst others. Yet, a child’s perception of the dental experience is mostly affected by the dental student’s communication and interpersonal skills (Weinstein, 2008). Given this and the distinct value system that children have regarding their health provider (Bardgett et al., 2016), the child’s perspective provides a unique lens of evaluation of student performance when compared to instructors, student peers, or the student themselves (Rassbach et al, 2018).

This study was successful in demonstrating a framework of using the combined approaches of interviewing with a drawing activity as a model that is appropriate for gathering

children's perceptions of their experiences in educational clinic settings. When combined, these approaches lead to richer and more in-depth feedback that is more representative of the child's perspective and allow for a more thorough understanding of the multiplicity of factors that affect a child's experience in dental settings.

The study found that in current clinical grading metrics being used by the University of Alberta, the lens of the patient is missing in student evaluation. Out of the seven criteria items, only three, technical skills, evidence informed practice, and tolerance to procedural error, were related to the patient's anxiety data and their overall experience. Students tend to receive higher grades in those three categories when performing treatment on children that present some level of anxiety.

In addition to this, the study found two important themes stemming from the child data regarding the students' communication and interpersonal skills. These were the constructs of familiarity with the dentist, the dental setting, and a perceived lack of control. Familiarity with the dentist was represented by the level of detail the dentist had in the drawings and by the child knowledge of their dentist's name or their allusion to jokes between the child and the dentist. Their depictions of the dental setting surrounded the child's awareness of lights and focus on specific tools. Lastly, the construct of control, in which the child participants depicted a lack of control was heavily featured in the study as well. This construct was depicted positively mainly through children's depiction of the Tell-Show-Do technique of holding the suction. On the other hand, depictions of the child as rigid, missing body parts, and/or smaller than the environment or the tools show the child's perceived impediment of movement (Torriani et al., 2014). The perceived familiarity and lack of control have long-term implications on the child's perception of the dental setting. By exploring children's perspectives in this way, dental educators and

researchers can determine the aspects of the dental experience and the skills of the dental student that lead to these concepts. Ultimately, this study helps to highlight areas of both success and improvement within the student performance and the clinical assessment systems, but it requires further refinement for effective use as an education tool.

Future Directions

Although this study provided a framework for exploring children's perspectives of their experiences in teaching clinical settings, further work is required to develop a more refined and efficient instrument that can be used in student evaluation. This study was successful in demonstrating that an interview combined with a drawing activity is a child-centered model that is appropriate for young patients; provides richer, narrative feedback that is more representative of the child's perspective; and does not limit patient responses to the content of survey items. This combination of traditional and projective methods helps to capture a more thorough understanding of the multiplicity of factors that affect a child's experience in dental settings more so than questionnaires. Children's perceptions of the dentist are affected by their caretakers' and siblings' attitudes towards the dentist, the clinic's décor, their dentist's attire and equipment (AlSarheed, 2011), as well as the child's own dental fear and anxiety, previous experiences (Gao et al., 2013), and the child's demographic variables (Haskett et al., 2016), amongst others. In the study, for example, it was observed that children had preferences regarding the gender presentation for both the dentist and the researcher. Drawings, and other art activities, increase children's abilities to recollect, organize, and make sense of their thoughts and feeling during the interview (Driessnack, 2005). They are also a typically fun activity that can help children decompress after treatment (Pala et al., 2016).

There is an opportunity and a need for undergraduate dental education curricula to employ child-centered approaches that allow for more meaningful insight into young patients' experiences and evaluation of treatment. In studies regarding patient feedback in medical residents' evaluation metrics, it was found that patient feedback was more readily accepted and utilized by the students when accompanied with a curriculum that incorporated reflection and discussions with instructors about the feedback (Bogetz et al., 2018; Rassbach et al., 2018). Incorporating a discussion component with an instructor can improve student's ability to actively apply the patients' feedback (Raasbach et al., 2018) and lead to an increased ability to modify behaviours and induce learning (Jones et al., 2019). Studies found that feedback on student performance when triangulated from multiple lenses, such as those of the patient, the instructor, and the students themselves, leads to a more holistic evaluation of competence (Moreau et al., 2019). As such, future developments and implementations of tools or instruments based on the framework presented by this study should consider the inclusion of facilitated discussion with the dental student alongside a component for student reflection regarding the child's perception of their experience with them. Future considerations also include how much weight to contribute to children's views and at what age these views can be deemed as sufficiently valid (Bardgett et al., 2016). In the end, a tool should be developed that uses the act of drawing combined with an interview to inquire into pediatric patient feedback, not only to give voice to young patients, but to also enhance the education of dental health professionals.

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Appendix A

Table A.1

Items	Totals	Items	Totals
suction	5	tools	27
needles	2	outfit	25
Pliers	1	dentist chair	9
explorer	7	dentist name	1
mirror	9	loops	2
water gun	3	tool arm	5
polisher	2	tool table	14
toothbrush/paste	2	computer	7
chair	40	mask	9
cushion	5	gloves	1
chair foot cover	4	dentist smile	13
light	19	wall	6
ceiling light	2	garbage hole	2
goggles	5	cubicle	10
open mouth	24	stairs	2
sad	3	building	2
no mouth	9	sky	4
copied eyes	4	ground	8
smile	17	prizes	6
just mouth	2	dialogue	4
hair emphasis	32	labeling	6
dentist	33	x-rays	1
light rays	5	silver tooth	1
silver tooth	1	tooth box	2
other personnel	7	water or blood	2

Table A.2

Creative Items
window
flowers
thumbs up
flag
sun
smiley faces
monster
purple or blue hair
extra smile
emotion faces
labeled
teeth as eyes
dentists laughing
owls
scenes
gold star

Table A.3

Line by Line
Drawing Concerns
Prizes
Siblings
Family (Adults)
Needle
Child Interests
Commentary
Child Appearance
Chair
Up and Down
Emotions
Open Mouth/ Smile
Dentist Name
Dentist Description
Dentist equipment
Other dental
personnel
Communication
Cubicle equipment
tools
Drawing Uncertainty
X-rays
Building
Pulling teeth
Lights
Cupboard
Writing
Waiting
Sky

Appendix B

Codebook

1. SELF

- a. Self-image: having to do with the child's reflective idea of themselves and what the child pictured themselves as, such as clothing and hairstyle
- b. Smile: was the child smiling in the drawing
- c. Open mouth: did the child have an open mouth in the drawing
- d. Interests: mention of activities or objects that the child has interest in, such as Disney or going on vacation

2. EXTERNAL MOTIVATION/SUPPORT

- a. Family: includes immediate or extended family mentioned by the child
- b. Sibling influence: includes any mention of child interaction with siblings regarding dentistry/ dental experiences
- c. Prizes: child mention of any prizes or goodie bags received at the dentist

3. DRAWING PROCESS

- a. Writing: includes any use of lettering or numbering by the child for the purpose of adding labeling, dialogue, etc....
- b. Colors: has to do with the child's choice and use of specific colors, including the use of strange colors (not the original color) and the mention of their favourite color
- c. Extra elements: objects drawn by the child which are not part of the original environment and showcase the imagination of the child (ex: windows, flowers, flags...)
- d. Commentary: process whereby the child describes the actions related to the drawing which they are creating. (ex: "I am going to draw ____")
- e. Drawing Uncertainty: any expression of the child regarding weariness/uncertainty towards drawing as an activity or towards their drawing abilities.

4. INTERNAL

- a. Up: positive expressive feelings/emotions or reactions to the dental experience
- b. Down: negative expressive feelings/emotions or reactions to the dental experience
- c. Waiting: mention of time or the act of waiting, including wishing for distractions
- d. Done: mention of being finished/done with the procedure, as well as expressions of relief

5. DENTAL SETTING

- a. Enclosure: dealing with structural components of the dental setting, such as floors, ceiling, walls, or stairs, etc., as well as background components, such as sky
- b. Surroundings: background items belonging to the dental setting, such as cupboards, sink, etc.
- c. Chair: mention of the dental chair, including the cushion and the buttons used for chair movement

- d. Awareness of light: anything that has to do with lights, such as the overhead lights, the ceiling lights, the blue cementing light, rays, or goggles.
6. DENTIST
- a. Dental personnel: mention of additional dental personnel and items related to them
 - b. Familiarity with the dentist: includes a certain level of friendliness or intimacy between the child and the dentist, such as knowing the dentists' name, saying that they are nice, or telling them a joke
 - c. Dentist smiling: is there mention of the dentist smiling in the picture
 - d. Dentists' detail: characteristics of the dentist relating to their appearance or behaviour, such as wearing a mask or gloves
7. PROCEDURE
- a. Procedure: mention of the procedure(s) endured and reasons behind the procedure. Also inclusive of the dental appliances, such as the retainer.