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A Sequential Analysis of Parent Reassurance and Child Postoperative Distress

Sarah Martin

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by

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Under the direction of Dr. Lindsey L. Cohen

ABSTRACT

Children undergoing surgical procedures often experience pain in the recovery room where parents are typically responsible for managing children's distress. Research suggests that parents' behavior influences children's distress; however, no study has used time-window sequential analysis to examine the likelihood of parents' reassurance and children's distress interactions. The purpose of this study was to utilize time-window sequential analysis to examine the likelihood of parents' distress preceding and following the start of children's distress. Participants included 148 families with children 2-11 years old undergoing outpatient surgery. Reassurance was positively associated with children's distress, but sequential analyses revealed that children's nonverbal distress was significantly less likely to start and stop following parents' reassurance and children's verbal distress was significantly less likely to occur after fathers' reassurance. These data suggest that reassurance does not prompt distress to start; however, it may maintain children's distress.

INDEX WORDS: Pediatric pain, Postoperative distress, Parent reassurance, Sequential analysis

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1 INTRODUCTION

Annually, approximately 5 million children undergo surgical procedures (DeFrances, Lucas, Buie, & Golosinskiy, 2008; Cullen, Hall, & Golosinskiy, 2009). Pediatric surgeries are performed for a variety of reasons including illness prevention, chronic disease treatment, or trauma or injury care. Each year, insertion of ear tubes (667,000), tonsillectomy (530,000), and adenoidectomy without tonsillectomy (132,000) are the most common pediatric outpatient procedures (Cullen et al., 2009).

Although surgery is necessary and beneficial to children, these young patients experience a range of negative emotional and behavioral side-effects before and after the event. Surgery can be divided into three distinct phases – preoperative, operative, and postoperative – each with their own unique qualities and stressors. The preoperative phase begins when the family arrives to the hospital and typically spans an hour while the family waits for surgery. This preoperative phase can be especially anxiety provoking for children due to their unfamiliarity with the environment and healthcare providers, their uncertainty about the upcoming surgery, and their thoughts about separation from their parents. Toward the end of the preoperative period, children are typically separated from their parents, escorted to the operating room (OR), and anesthetized via an anesthesia mask. Indeed, the time immediately preceding the start of surgery when the mask is placed on the child has been considered the most stressful event for children throughout the preoperative period (Kain & Mayes, 1996; Kain, Mayes, O'Connor, & Cicchetti, 1996), and most children experience moderate to high anxiety during the preoperative phase (Baldwin Jr, 1966; Carnevali, 1966; Ryan, 1975). In fact, a recent study showed that distress steadily increased throughout the preoperative period and the majority of children observed displayed some form of distress behavior with 17% displaying significant distress (Chorney & Kain, 2009). The operative phase varies in length depending on the procedure and medical complications, however, children are sedated and there are usually no psychosocial issues with the pediatric patients during this time.

Typically, surgical patients spend the majority of their hospital visit (M = 79 minutes; SD = 3.2; Cullen et al., 2009) in the postoperative phase in the recovery room (PACU). The PACU experience is variable for children, but most children wake up in the PACU disoriented, anxious, unfamiliar with their surroundings, and in pain from their surgery. The majority of children will have an intravenous catheter on their arm, which would have been inserted during the surgery when the children were sedated. One study, controlling for intraoperative and postoperative analgesics, found that at the time of discharge from the PACU, 41% of children continued to experience significant pain (Fortier, MacLaren, Martin, Perret-Karimi, & Kain, 2009). Additional postoperative negative outcomes include nausea, vomiting, and maladaptive behavior, such as defiance and disruptiveness (Kain, 2000; Kain, Mayes, Caldwell-Andrews, Karas, & McClain, 2006; Kain, Mayes, Wang, & Hofstadter, 1999).

Researchers have explored predictors of preoperative and postoperative child distress in order to guide treatment plans to reduce psychosocial distress during these times. Based on data that suggest the presence of parents in the operative environment is not reliably beneficial to the child (Kain, Caldwell-Andrews, et al., 2003; Kain, Mayes, et al., 1996, 2000) and studies examining predictors of children's acute procedural (e.g., immunization injections) distress (for a review, see Schechter et al., 2007), parents' behavior has been identified as the critical predictor of children's distress. In fact, parents' behavior accounts for 53-64% of the variability in children's distress associated with brief acute medical procedures (e.g., immunizations; Cohen, Bernard, Greco, & McClellan, 2002; Frank, Blount, Smith, & Manimala, 1995; Mahoney, Ayers, & Seddon, 2010). Fine-grained analyses of brief medical procedures identified that parent reassuring (e.g., “It’s OK”), apologizing (e.g., “I’m sorry honey”), giving too much control to the child (e.g., “Let me know when you are ready for the shot?”), criticizing (e.g., “You are acting like a baby”), and empathizing (e.g., “I know you’re scared”) behaviors are positively associated with child distress; and parent distracting (“This toy is cool”) and coaching in coping (“Take deep breaths”) behaviors are positively correlated with child coping (for a review, see Blount, Piira, & Cohen, 2003).

Based on these acute pain findings, researchers have examined whether similar parent behaviors were reliable predictors of child distress during the preoperative period. The first attempt to measure and identify important parent preoperative behavior borrowed largely from the pediatric acute pain literature. Specifically, the Perioperative Child-Adult Medical Procedure Interaction Scale (P-CAMPIS; (Caldwell-Andrews, Blount, Mayes, & Kain, 2005), which examines behavior during the preoperative period, is a modified version of the acute procedure measures, the Child-Adult Medical Procedure Interaction Scale-Revised (CAMPIS-R; Blount et al., 1997). The P-CAMPIS consists of 40 verbal and nonverbal behavioral codes that described adult-to-adult communication (e.g., nonprocedural talk, providing medical information), child-to-adult communication (e.g., humor, nonprocedural talk, reassurance), child distress behaviors (e.g., crying, verbal fear/pain), child coping behaviors (e.g., humor, nonprocedural talk), and nonverbal behaviors (parent empathetic touch and child resistance). Similar to the acute procedural pain data (e.g., for a review, see Blount, Piira, & Cohen, 2003), Chorney et al. (2009) found that adult behavior accounted for 50% of the variance in child distress, and adult use of reassurance and empathy were positively related to child distress and negatively related to child coping.

Sadhasivam et al. (2009, 2010) developed a similar preoperative coding measure designed to code behaviors in real-time (Perioperative Adult Child Behavioral Interaction Scale; PACBIS) and found associations among parent behaviors and child distress. Specifically, “Parent Negative” (e.g., reassurance and empathy) was found to be positively associated with child distress and “Parent Positive” (e.g., distraction, humor, and coping commands) was positively associated with child coping (Sadhasivam et al., 2010).

Based on the parent-child behavioral findings, recent studies have examined the impact of training parents and healthcare providers to engage in specific behaviors in order to reduce children’s preoperative distress. Specifically, Kain et al. (2007) evaluated the effect of educating and training parents to provide distraction and avoid excessive reassurance to children during the preoperative phase. Results demonstrated a significant decrease in children’s preoperative distress and negative postoperative behavior (e.g., emergence delirium) for children whose parents underwent the preparation program. Similarly, in a recent pilot study aimed at training healthcare providers to utilize coping related behaviors (e.g., distraction) and minimize distress related behaviors (e.g., reassurance), researchers found favorable outcomes for children during the preoperative period (Martin et al., 2011).

Given that data consistently indicate that reassurance is the most common parent behavior during acute pediatric procedures (e.g., Blount et al., 1989; Mahoney et al., 2010) as well as during the preoperative phase of surgery (Chorney et al., 2009), researchers have more closely analyzed parents’ reassurance during children’s medical events and have suggested that reassurance is “distress promoting.” Using event sequential coding and lag sequential analysis, Blount et al. (1989) found that adult reassuring comments were the most common antecedents and consequences for the majority of distress behaviors in children undergoing bone marrow aspirations and lumbar punctures. A more recent study that examined adult behavior and children's distress during venipuncture using similar coding and analyses procedures (i.e., event sequential coding and lag sequential analyses), reported both similar and conflicting results (Taylor, Sellick, & Greenwood, 2011). Taylor et al. found that reassurance was significantly likely to precede and follow distress while also likely to precede coping and information seeking behaviors. An experimental investigation during children's routine immunization injections provided preliminary data indicating that parents' reassurance might heighten children's verbal fear behavior and children's need for restraint but not other distress behavior (Manimala, Blount, & Cohen, 2000). One explanation for these findings is that parents' reassurance might focus children's attention on their own distress and threatening aspects of the procedure; thus, reassurance is argued to prompt or exacerbate children's distress (Blount et al., 1989). However, it is also likely that parents reassure in an effort to soothe an upset child or parents' attempts to allay their own anxiety in response to their child's procedural distress; thus, children's distress might cause parents to reassure.

Past research suggests that reassuring statements are related to, and might cause children's distress; however, few studies have used advanced coding procedures and statistical analyses such as sequential analyses to examine the specific temporal contingencies of the reassurance-distress relation. Although Blount et al. (1989) and Taylor et al. (2011) used event sequential data coding and lag sequential analyses to examine adult-child interactions during bone marrow aspirations and found that reassuring comments were the most frequently occurring behavior to precede and follow distress, these findings are limited. Specifically, this type of sequential coding creates a single or sequence of codes, and though this form of coding allows for an examination of interactive behaviors over time, the single string of codes does not allow for the analysis of co-occurring behaviors (e.g., simultaneous occurrence of parents' reassurance and child distress) and does not reveal important information about the duration of a behavior or the start and stop points of these behaviors. Thus, it is difficult to determine if in fact reassurance "promotes" or prompts distress to start. Further, *t*-tests conducted in the Blount et al. study to determine if differences existed among *z*-scores revealed that child distress was more likely to occur following adult reassurance than adult coping commands; however, sequential analysis literature published after this study has advised against using *z*-scores in subsequent analyses (e.g., *t*-tests) as *z*-scores are affected by the number of tallies for each dyad and thus are not comparable across experimental subjects (Bakeman & Gottman, 1997).

Timed-event sequential data coding, on the other hand, is an alternative form of sequential coding that places different behaviors into separate strings, which allows for co-occurring behavioral codes to be analyzed simultaneously. Timed-event sequential data coding is particularly advantageous when the temporal contingencies between, and the duration of, behavior codes are important (Bakeman & Gottman, 1997). Further, this type of coding allows researchers to capture important information about when behavior codes start and stop, which can allow for an examination of whether certain behaviors (e.g., reassurance) promote and/or maintain a target code (e.g., distress). Whereas event sequential coding is typically analyzed using lag sequential analysis, which examines whether a behavior occurs immediately before or after another behavior, timed-event sequential coding allows for researchers to utilize *time-window* analysis and examine the likelihood of whether or not a behavior will occur within a specific time window preceding or following a given behavior (e.g., whether children are more likely to start to cry within 4 seconds of a parent reassurance than at any other time), which allows for more flexibility in interactions. Chorney et al. (2010) provides an introduction to time-window sequential analysis, outlines the use of this analysis strategy with pediatric preoperative data, and details the importance of utilizing this analytic strategy in pediatric behavioral research.

Despite the advances in exploring and treating children's preoperative distress, research has lagged behind in terms of the postoperative phase of pediatric surgery. This is unfortunate given that children often spend the majority of their time in the PACU, experience high levels of pain and distress, and their PACU visit will be their final experience before they are discharged home. Further, at least one parent is with the child at all times in the PACU and the family may have minimal interactions with healthcare providers, which results in the parents being primarily responsible for managing their child's distress. Given the host of potential negative outcomes and prolonged parent-child interactions during postoperative recovery, this setting warrants additional research and poses an ideal environment to examine naturally occurring parental distress-related behaviors over time.

Further, little is known about how demographic variables (e.g., child sex, parent sex, and child age) may influence this distress-reassurance relationship. Developmental literature has suggested mothers and fathers may have unique familial roles and/or parenting styles and that mothers may be more responsive than fathers (Baumrind, 1991; Lamb, 2004; Parke & Buriel, 1998); however a recent study examining mothers and fathers use of reassurance during painful procedures revealed no differences among parents (Moon, Chambers, & McGrath, 2011). An experimental study suggested that reassurance (as part of a collection of other trained parent behaviors including mild criticism, apologies, empathy, giving control to the child) might cause or exacerbate girls' but not boy's distress in a lab-induced pain study (Chambers, Craig, &

Bennett, 2002). Research has reported that younger children display more distress during needle procedures (Jacobsen, Manne, Gorfinkle, & Schorr, 1990; Young, 2005); however few studies have specifically examined the relationship among parent reassurance and age. One study examining children's distress during bone marrow aspirations reported that only in younger children (2-7 years old), parents' reassurance was positively associated with distress (Dahlquist, Power, Cox, & Fernbach, 1994). Another study examining parents' behavior and children's distress during venipuncture did not find a significant relationship among parents' "distress promoting" behavior and children's age (Mahoney et al., 2010).

1.1 Study Aims and Hypotheses

The primary aim of the current study was to examine how parents' reassurance functions in the postoperative environment and its relation to children's distress. Specifically, this study utilized time-window sequential analysis to determine 1) whether it is more likely for children's nonverbal and verbal distress to start following mothers' and fathers' reassurance than at any other time, and 2) whether it is more likely for mothers' and fathers' reassurance to occur following the start of children's nonverbal and verbal distress than at any other time. Given that Blount et al. (1989) and Taylor et al. (2011) found that reassurance was the most common behavior to precede and follow distress during acute medical procedures, it was hypothesized that parents' reassurance would be likely to precede and follow children's distress in the postoperative setting.

A second aim was to evaluate whether demographic variables (i.e., child sex, parent sex, and child age) or parent anxiety influence the likelihood of the primary objectives. Based on findings by Chambers et al. (2002), it was expected that the likelihood of parents' reassurance preceding and following children's distress would be stronger in girls than boys. Given that data suggest that parents use reassuring comments to alleviate their own anxiety (Manimala et al., 2000), it was hypothesized that the likelihood of parents' reassurance preceding and following children's distress would increase as parents' state and trait anxiety increases. Due to equivocal findings regarding the influence of parent sex and child age on the reassurance-distress relation, no a priori hypotheses were posited for these secondary analyses.

2 METHOD

2.1 Participants

To justify using a summary statistic assigned to a particular cell (i.e., *z*-statistic) or chi-square statistic assigned to a contingency table (i.e., Yule's *Q*), a minimum number of tallies and observations are needed (Bakeman & Gottman, 1997). Bakeman and Gottman recommend that the total sample should be at least 4 times the number of cells and that the marginal sums of the behaviors observed in the rows and columns in a 2x2 contingency table (df=1) exceed 5. Thus, the total sample size needed for a 2x2 table is 16. For all analyses, a statistical software option was selected in which a 2x2 table was only defined when all row and column sums were at least 5. The analyses included using a summary statistic (i.e., Yule's *Q*) as a continuous variable, which was analyzed to determine if contingencies were more likely to occur than would be expected by chance. For a binomial test with a medium effect size (*g* value of .15), a sample of 119 parent-child dyads would be needed for a statistically significant alpha level of .05 with a power of .95. Secondary analyses determined whether demographic variables influenced the likelihood of the contingencies (e.g., whether the likelihood of reassurance following distress was more or less likely in boys than girls). Thus, for a one sample *t*-test with a medium effect size (*r* value of .50), a sample size of 54 parent-child dyads was needed for a statistically significant alpha level of .05 with power of .95. Given exploratory analyses were planned, a larger sample was recruited.

Participants in this study included 148 children 2-11 years of age undergoing elective (*M* = 4.87, *SD* = 2.23; 50% female) outpatient surgery and their parents. All children were in good health (American Society of Anesthesiologists health status classification I or II). Parents and children who were not fluent in English and children with a developmental delay or chronic illness were excluded from this study. Ear, nose, and throat surgery (e.g., tonsillectomy; 40%) was the most prevalent with the remaining children undergoing endoscopy (19%), general (14%), urological (11%), plastic (7%), orthopedic (6%), and other (2%) surgical procedures. The sample was disproportionally White (89%) and Non-Latino (85%) with the remaining participants identifying as Latino (15%), African American (5.4%), Multiracial (4.5%), or Native American/Pacific Islander (.9%). In terms of income, 47% of parents reported earning more than $100,000, 22% reported earning $51-80,000, 17% reported $81-100,000, 7% earned $31-50,000, 3.6% earned $21-30,000, 2% earned $11-20,000 per year, and 3.4% earned less than $10,000.

2.2 Measures

2.2.1 Baseline Demographics

Demographic data collected included caregiver status (i.e., mother or father), child gender, child and caregiver age, child and caregiver ethnicity, type of surgery, and caregiver age, income, and education (Appendix A).

2.2.2 Parent Anxiety

The State-Trait Anxiety Inventory (Appendix B; STAI; Spielberger, Gorsuch, & Lushene, 1970) is a 20-item self-report rating scale used to measure state and trait anxiety. Individuals respond to items (e.g., “I feel confident”) on a scale ranging from 1 (“almost never”) to 4 ("almost always"). Scores range from 20-80 with higher scores indicating higher anxiety. The STAI is a well-validated, reliable, and widely used measure to assess state anxiety in a variety of settings (Metzger, 1976; Spielberger, 1970) and has been used in prior studies examining parent anxiety during children's surgery (Kain et al., 1999, 2000, 2006). Using Cronbach's alpha, the internal consistency of this scale in the current sample was .92 and .85 for state and trait, respectively. The total state and trait anxiety scores were used in analyses.

2.2.3 Parent Reassurance and Child Distress Behavior

Child Behavior Coding System-Post Anesthesia Care Unit (Appendix C; CBCS-P; Chorney, Tan, Martin, Fortier, & Kain, 2012). The CBCS-P is an observational coding system designed to code adult and child behaviors from video data collected during the postoperative period, which was found to have good to excellent interrater reliability and criterion validity (Chorney et al., 2011). The CBCS-P includes 23 verbal and nonverbal child codes and 40 verbal and nonverbal adult codes. The CBCS-P is adapted from previously validated observational measures (CAMPIS-R and P-CAMPIS) to include operationally defined adult and child behaviors specific to the postoperative recovery room (e.g., Eating/drinking, TV talk). For the purposes of this study, only the parent reassurance and child distress codes were used for analyses. In line with the intercorrelations among different distress behaviors reported in the development of the CBCS-P (Chorney et al., 2011), consistent with prior studies utilizing the CAMPIS-R (Blount et al., 1997, 1989; Cohen, Blount, & Panopoulos, 1997; Manimala et al., 2000) and to decrease the number of analyses, the following theoretically derived behavior codes were combined to create verbal and nonverbal child distress composites. The verbal distress composite included verbal pain (e.g., "ouch"), verbal resistance (e.g., "stop it"), verbal request for support (e.g., "Mommy!"), and verbal negative emotion (e.g., "I'm scared"). The nonverbal distress composite included cry, scream, nonverbal request for support (e.g., reaching for parent), guarding (e.g., covering or holding a pain site), and nonverbal resistance (e.g., pushing parent away).

2.3 Procedure

The data for this study were collected at the Yale New Haven Children's Hospital and data analyses were conducted at Georgia State University. Both the Yale and Georgia State University Institutional Review Boards approved the data collection and analyses for this study. Parents and children 7 years of age and older provided written consent and children under 7 provided verbal assent to participate. All families were screened for eligibility and recruited over the phone up to two weeks prior to surgery. Parents completed baseline measures (i.e., demographics and STAI-T) during a preoperative hospital visit 2-7 days prior to surgery. Parents completed the state anxiety form (STAI-S) when they arrived to the hospital on the day of surgery.

2.3.1 Day of Surgery

Upon arrival to the preoperative holding area, parents and children were greeted by research associates. One parent accompanied the child into the operating room and left following the induction of anesthesia. Children did not receive preoperative sedatives and were induced in accordance with the clinical standards at the Yale New Haven Children's Hospital.

All children were taken to the PACU immediately following surgery. The children enrolled in this study were videotaped from the moment they entered the PACU until they were discharged. Up to two caregivers were allowed to be present with the child during their stay in the PACU.

2.3.2 Coding Process

Video data was captured using digital video cameras installed over the PACU beds. Video computer files were then imported into Observer XT Software for behavioral coding. Considering that children can spend an average of two hours in the PACU following outpatient surgery (Kain et al., 2006), three 5-minute time segments were selected from the PACU video to maximize coding time efficiency and ensure that a range of behaviors were obtained during probable periods of distress. The following three segments were chosen: 1) the first 5 minutes the child was awake and exhibiting purposeful behavior (not emergence delirium), 2) the 5 minutes surrounding intravenous catheter removal (2 minutes before and 3 minute after), and 3) a 5-minute period around a child's distress behavior (2 minutes before and 3 minutes after) within a randomly selected 15-minute time interval that was identified by a random number generator. The coding of behaviors using CBCS-P was facilitated by Observer XT Software (Noldus Inc, Netherlands), which allows for real-time second-to-second data coding. This system also allows raters to code the behaviors of multiple subjects over a period, which is necessary to utilize timed-event coding and obtain data on the timing, frequency, and duration of codes for both children and parents (Bakeman & Gottman, 1997).

2.3.3 Training of Coders

Two research assistants coded the video data for this study. Both raters underwent comprehensive training, which included thorough education on the Observer XT coding interface and the operational definitions of the CBCS-P behavioral codes. During the training process, raters met daily to discuss coding questions and disagreements. Raters were considered "trained" once they met a kappa criterion of .80 agreement with the lead trainer. While coding study data, raters attended weekly reliability meetings with the principal investigator on this study to assess kappa criterion and discuss coding disagreements.

2.3.4 Reliability Analyses

Reliability analyses for parent reassurance and child distress were conducted using Generalized Sequential Querier 5.1.11 Software (GSEQ; (Bakeman & Quera, 1995). Bakeman and Gottman (1997) recommend using the Cohen kappa statistic to calculate inter-rater reliability as kappa statistics have stringent properties (i.e., point-by-point agreements are needed), which are necessary to determine agreement at the detailed level required for sequential analysis. Time-unit and event-based kappas were calculated as the true kappa is likely to fall within those two kappas (Bakeman, Quera, & Gnisci, 2009). Time-unit kappa examines inter-rater agreement between successive pairs of time units tallied. A 2-second time tolerance was used to assess agreement (i.e., agreement occurred if a code was assigned by one rater 2 seconds before or after the same code was assigned by another rater) and a kappa criterion of at least .80 was considered acceptable. Event-based kappa examines the order of events and focuses on when behavior changes. To calculate this kappa, the GSEQ program aligned the codes using a predefined algorithm (Bakeman et al., 2009), which allowed for the examination of agreements, omission errors, and commission errors. In this analysis, an agreement was tallied if there was an event alignment of .60 or better, which indicated that observers are at least 90% in agreement (Quera, Bakeman, & Gnisci, 2007).

Reliability analyses for fathers' reassurance indicated good to excellent agreement with an event alignment of .71 and a time-unit kappa falling between .87-.92. Agreement among mothers' reassurance was excellent with an event alignment of .75 and a time-unit kappa falling between .93-.95. Analyses of children's non-verbal distress revealed good to excellent agreement with an event alignment of .62 and a time-unit kappa of .90. Similarly, excellent agreement was found among children's verbal distress with an event alignment of .81 and a time-unit kappa falling between .95-.96.

3 DATA ANALYSIS

3.1 Preliminary analyses

Descriptive analyses were conducted on study outcome data (i.e., frequency or proportion of reassurance and child distress). To evaluate whether the child distress or parent behavior differed on any demographic variables, appropriate analyses were conducted. Specifically, correlational analyses were used to assess the associations between age and income and outcome variables. Analyses of Variance (ANOVAs) were used to examine differences in sex, race, and type of surgery on outcome data.

3.2 Primary analyses

First, correlational analyses were performed to determine if associations existed among the target parent and child behaviors. Time-window sequential analysis was utilized to examine the temporal relations between parents' reassurance and children's distress. Time-window analyses assess whether the presence of a "given" behavioral code (e.g., parent reassurance) increases the probability that a "target" code (e.g., child distress) will occur within a specified time window following the given behavior. For the purposes of this study, a 4-second time window was used for each research question. Although no specific statistical guidance exists on the desired length for time windows, it is recommended that researchers define time windows based on the nature of the data (Yoder & Tapp, 2004). As such, given the rate of interactions in the perioperative environment, a short duration time window of 4 seconds was chosen for this data, which is consistent with a prior study of sequential analyses in a perioperative setting (Chorney et al., 2010). An example of a hypothetical time window is displayed in Table 1.

Table 1: Hypothetical 4-second Time-window following Father's Reassurance

Time:	1:00	1:01	1:02	1:03	1:04	1:05	1:06	1:07
Father Reassures	0	R	0	0	0	0	0	0
Child Displays Distress	0	0	0	**D**	**D**	0	*D*	0

Bold **D**'s indicate distress that occurred within the 4-second window and the italicized *D* indicates a distress that occurred outside of the window.

A total of eight different contingencies were defined and entered into GSEQ in which either children's verbal or nonverbal distress preceded or followed mothers' or fathers' reassurance. GSEQ computed a Yule's *Q* index of sequential association, which ranges from -1 to +1 and allows for the examination of sequential patterns across parent-child dyads (Bakeman, 2000). A positive Yule's *Q* indicates an increased probability that target behavior will occur while a negative Yule's *Q* indicates a decreased probability that the target behavior will occur (Bakeman, 2000). Yule's *Q* values of 0.2, 0.43, and 0.6 are considered small, moderate and large, respectively (Rosenthal, 1996).

To examine the primary aims and determine if the contingencies were significantly more likely to occur than would be expected, by chance, a binomial test was conducted. First, the proportion of contingencies that demonstrated a positive or negative association were determined and the binomial test was conducted to establish if the proportions were significantly more likely than chance, or significantly different from .50, which is consistent with recommendation for testing sequential connection (Gottman & Roy, 1990).

4 RESULTS

4.1 Preliminary Analyses

Mothers were present in all 148 videos and fathers were present in114 videos. Out of the entire sample, 91% of children displayed at least one instance of either verbal or nonverbal distress; 88% demonstrating an instance of verbal distress and 57% demonstrating nonverbal distress. At least one utterance of reassurance was observed in 82% of the overall parent sample. One hundred fifteen (78%) mothers and 59 (52%) fathers uttered at least one reassuring comment. Tests of normality indicated that the proportion of children's nonverbal and verbal distress and mothers' and fathers' reassurance were positively skewed. As such, non-parametric analyses were conducted. Wilcoxon paired samples test showed that fathers' rate of reassurance was significantly lower than that of mothers', $Z = -5.86$, $p = <.001$, and the proportion of time children spent displaying verbal distress was significantly lower than that of nonverbal distress, $Z = -7.71$, $p = <.001$. The median proportions and rates are displayed in Table 2. Analyses revealed no significant relations or differences among demographic variables and outcome variables.

Table 2: Rates and Proportions of Target Behaviors

Behavior	N	Proportion of time exhibiting behavior (median, range)	Rate of behavior per second (median, range)
Nonverbal distress	145	.001, .01	
Verbal distress	145	.01, .01	
Fathers' reassurance	114		.06, .21
Mothers' reassurance	144		.22, .47

4.2 Primary Analyses

Analyses revealed that mothers' and fathers' reassurance was significantly positively associated with children's verbal and nonverbal distress. Children's verbal and nonverbal distress was also positively correlated. Correlational results are displayed in Table 3.

Table 3: Correlations among Parents' Reassurance and Children's Distress

	N	Fathers' reassurance	Mothers' reassurance	Verbal distress	Nonverbal distress
Fathers' reassurance	114	1.00	.18	.34**	.28**
Mothers' reassurance	144		1.00	.31**	.58**
Verbal distress	145			1.00	.56**
Nonverbal distress	145				1.00

Note: Spearman rank order correlations; **$p \leq .01$

Descriptive analyses of the Yule's *Q* statistics for contingencies in which distress followed reassurance and reassurance followed distress indicated that Yule's *Q* distributions for all contingencies were positively skewed and resistant to transformation (i.e., following transformations the data did not pass normality tests). As such, non-parametric analyses were conducted. Median Yule's *Q* statistics were calculated for each contingency and are displayed in Table 4. Contingencies in which distress followed reassurance consistently had a large negative effect. With the exception of fathers' reassurance following children's nonverbal distress, contingencies in which reassurance followed distress had a small to moderate positive effect.

Table 4: Yule's Q Descriptives

Contingency	N	Median	IQ Range
Nonverbal Distress following Reassurance			
Mothers' Reassurance	66	-1.00	1.61
Fathers' Reassurance	27	-1.00	0.00
Verbal Distress following Reassurance			
Mothers' Reassurance	66	-1.00	1.61
Fathers' Reassurance	44	-1.00	1.54
Reassurance following Nonverbal Distress			
Mothers' Reassurance	58	.64	1.84
Fathers' Reassurance	21	0.00	1.00
Reassurance following Verbal Distress			
Mothers' Reassurance	59	.20	1.70
Fathers' Reassurance	21	.44	1.81

Binomial tests conducted to determine whether it is significantly more likely for children's verbal and nonverbal distress to start within 4 seconds following mothers' and fathers' reassurance than would be expected by chance (Aim 1), revealed that nonverbal distress was significantly less likely to start within 4 seconds of both mothers' (Z=3.28, p< .01) and fathers' reassurance (Z=2.69, p< .01). Verbal distress was also significantly less likely to occur than would be expected following fathers' reassurance (Z=1.96, $p \leq .05$). Verbal distress was not more or less likely to follow mothers' reassurance (Z=1.35, p>.05).

To determine whether it is significantly more likely for mothers' and fathers' reassurance to occur following the start of children's nonverbal and verbal distress than would be expected by chance (Aim 2), another binomial test was conducted to examine the proportions among the positive and negative associations. Results revealed no significant findings for reassurance following the start of distress. Binomial test results are displayed in Table 5.

Table 5: Yule's Q Binomial Test Proportions

Contingency	N	Less likely (%)	More likely (%)	*p* value	Power
Nonverbal Distress following Reassurance					
Mothers' Reassurance	45	76	24	<.01	-
Fathers' Reassurance	27	78	22	<.01	-
Verbal Distress following Reassurance					
Mothers' Reassurance	66	56	44	.39	.55
Fathers' Reassurance	44	66	34	.05	-
Reassurance following Nonverbal Distress					
Mothers' Reassurance	57	39	61	.11	.95
Fathers' Reassurance	21	62	38	.38	.60
Reassurance following Verbal Distress					
Mothers' Reassurance	59	44	56	.44	.56
Fathers' Reassurance	21	29	71	.08	.98

In light of the above findings, subsequent analyses were conducted to determine whether or not reassurance maintains distress. Specifically, analyses were conducted to examine if it is more or less likely for parents' reassurance to occur prior to nonverbal distress stopping.. Further analyses with verbal distress were not applicable because verbal distress is a point behavior and thus does not have a start or stop point. Descriptive Yule's *Q* results are displayed in Table 6. For mothers, reassurance was less likely to occur within 4 seconds prior to distress stopping with 75% of the contingencies producing a negative effect (Z=2.6, p<.01). Father-child interactions produced similar results with 67% of contingencies producing a negative effect (Z=3.1, p=.01).

Analyses also indicated that both mothers and fathers were significantly less likely to use reassurance 4 seconds after nonverbal distress had stopped (Z=2.43, p=.02 and Z=2.83, p=.01, respectively). Results are displayed in Table 7.

Table 6: Yule's Q Descriptives for the Stop of Distress

Contingency	N	Median	IQ Range
Reassurance preceding Stop of Distress			
Mothers' Reassurance	96	-1.00	1.51
Fathers' Reassurance	27	-1.00	0.00
Reassurance following Stop of Distress			
Mothers' Reassurance	52	-1.00	1.54
Fathers' Reassurance	58	0.00	1.00

Table 7: Yule's Q Binomial Test Proportions for the Stop of Distress

Contingency	N	Less likely (%)	More likely (%)	*p* value
Reassurance preceding Stop of Distress				
Mothers' Reassurance	45	76	24	<.01
Fathers' Reassurance	27	78	22	<.01
Reassurance following Stop of Distress				
Mothers' Reassurance	53	67	33	.02
Fathers' Reassurance	58	67	33	.01

To examine the secondary aim as to whether the parent reassurance-child distress associations differed by child sex, parent sex, child age, and/or parent anxiety, dyad Yule's Q statistics were analyzed. Correlational analyses were conducted and results indicated a significant negative relation among the mothers' reassurance following verbal distress contingency and child sex (r_s=-.30, $p \leq .05$; see Table 8). A follow-up nonparametric Mann-

Whitney test was conducted and confirmed that the effect of mothers' reassurance following verbal distress was significantly stronger for boys (Z=-1.96, $p \leq .05$). A post hoc analysis revealed, however, that due to the small sample size of this comparison (n=44), there was insufficient power (i.e., power = .46) to reliable detect a difference. As displayed in Table 9, no significant relations were found among father contingencies and child demographics. Curve fit analyses conducted for each of the contingencies to determine if a quadratic, non-linear, association existed among child age and the likelihood of parent-child contingencies revealed no significant non-linear effects. In regards to parent anxiety, analyses revealed a significant positive relationship among mothers' state anxiety and the likelihood of mothers' reassurance following the start of nonverbal distress (Table 10). Table 11 displays no significant relations among father anxiety and father contingencies. A Wilcoxon signed rank test revealed no significant differences between mother and father contingencies (Table 12). Post-hoc power analyses conducted on the secondary analyses showed that the power for the non-significant results ranged from .05-.62.

Table 8: Mother-Child Correlations

	1	2	3	4	5	6
1. Sex (N=113)	1.00					
2. Age (N=113)	.04	1.00				
Start of Nonverbal Distress						
3. Distress following Reassurance	-.17	.20	1.00			
	36	43	45			
4. Reassurance following Distress	.01	-.15	.05	1.00		
	44	56	32	57		
Verbal Distress						
5. Distress following Reassurance	.08	-.05	.08	.31	1.00	
	50	59	32	38	62	
6. Reassurance following Distress	-.30*	-.00	.20	.15	.37*	1.00
	44	56	31	53	39	59

Note: Spearman rank order correlations; *$p \leq .05$

Table 9: Father-Child Correlations

	1	2	3	4	5	6
1. Sex (N=113)	1.00					
2. Age (N=113)	.037	1.00				
Start of Nonverbal Distress						
3. Distress following Reassurance	-.03 N=22	.30 N=26	1.00 N=27			
4. Reassurance following Distress	.33 N=18	-.13 N=21	-.30 N=9	1.00 N=21		
Verbal Distress						
5. Distress following Reassurance	.11 N=33	.13 N=40	.47* N=21	.29 N=17	1.00 N=41	
6. Reassurance following Distress	.02 N=18	.03 N=21	-.31 N=9	.27 N=21	.46 N=17	1.00 N=21

Note: Spearman rank order correlations; *$p \leq .05$

Table 10: Maternal Anxiety Correlations

	1	2	3	4	5	6
1. Trait Anxiety (N=73)	1.00					
2. State Anxiety (N=57)	.11	1.00				
Start of Nonverbal Distress						
3. Distress following Reassurance	.25 N=22	-.00 N=29	1.00			
4. Reassurance following Distress	.00 N=32	.37* N=35	.10 N=23	1.00		
Verbal Distress						
5. Distress following Reassurance	-.07 N=32	.14 N=36	.06 N=21	.15 N=30	1.00	
6. Reassurance following Distress	.09 N=31	.07 N=35	.02 N=21	.12 N=43	.35 N=30	1.00

Note: Spearman rank order correlations; *$p \leq .05$

Table 11: Paternal Anxiety Correlations

	1	2	3	4	5	6
1. Trait Anxiety (N=20)	1.00					
2. State Anxiety (N=17)	.07	1.00				
Start of Nonverbal Distress						
3. Distress following Reassurance	-.35	.00	1.00			
	N= 5	N= 4				
4. Reassurance following Distress	.632	-.63	-1.00**	1.00		
	N= 4	N=5	N=2			
Verbal Distress						
5. Distress following Reassurance	.35	.	-.25		1.00	
	N=5	N=4	N=5			
6. Reassurance following Distress	-.73	-.06	-1.00**	-.287	.	1.00
	N=4	N=5	N=2	N=5	N=3	

Note: Spearman rank order correlations; ** $p \leq .01$

Table 12: Mother and Father Contingency Comparisons

Nonverbal Distress following Reassurance		N	*Z*-score	*p*-value	Power
Father – Mother	Negative Ranks	4	-.53	.59	.06
	Positive Ranks	5			
	Ties	17			
	Total	26			
Reassurance following Nonverbal Distress					
Father – Mother	Negative Ranks	5	-1.69	.09	.18
	Positive Ranks	2			
	Ties	5			
	Total	12			
Verbal Distress following Reassurance					
Father – Mother	Negative Ranks	14	-.50	.62	.49
	Positive Ranks	12			
	Ties	12			
	Total	38			
Reassurance following Verbal Distress					
Father – Mother	Negative Ranks	2	-1.28	.20	.11
	Positive Ranks	8			
	Ties	2			
	Total	12			

5 DISCUSSION

Research indicates that parents' behavior is one of the single best predictors of children's distress during painful procedures, reassurance is the most common parent behavior, and parents' reassurance is positively correlated with children's pain-related distress across a range of ages and medical procedures (Blount et al., 1989, 2003; Cohen et al., 2002; Frank et al., 1995; Mahoney et al., 2010; Racine, Pillai Riddell, Flora, Garfield, & Greenberg, 2012). In addition to the well-documented parent reassurance-child distress correlations, a small sample lag-analysis of audio taped interactions (Blount et al., 1989), partial findings from another lag analysis study (Taylor et al., 2011), and an experimental study (Manimala et al., 2000) provide support for the claim that parent reassurance causes or promotes child distress during medical procedures (see McMurtry, McGrath, & Chambers, 2006). However, there are studies that do not support this causal direction (Gonzalez, Routh, & Armstrong, 1993) or suggest that reassurance might promote non-distress behaviors (Taylor et al., 2011), and there are no published time-window sequential analyses or experiments evaluating whether the reassurance-distress correlation is better explained in the opposite direction – children's distress might prompt or cause parents' reassurance behavior. Thus, the primary aims of this study were to examine the temporal relations between parents' reassuring comments and children's distress in the postoperative environment through the use of time-window sequential analysis, which allows for analysis of whether a behavior is likely to occur within a specified window before and/or after a target behavior (e.g., distress) and the examination of the likelihood of specific contingencies. Secondary aims explored potential associations among demographic variables, mothers' and fathers' reassurance, and boys' and girls' verbal and non-verbal distress.

Our analyses provided a more thorough inspection of the reassurance-distress relation by separately analyzing children's verbal and nonverbal distress, which have been proposed to be theoretically distinct and consist of different intercorrelated behaviors (Blount et al., 1997; Chorney et al., 2011; Cohen et al., 1997). We also examined mother's and fathers' reassurance separately as limited data exists on fathers in the pediatric pain literature and researchers have consistently argued that mothers and fathers may have unique relationships with their children or hold differing roles in within the family (Lamb, 2004; Parke & Buriel, 1998).

Preliminary results showed that the majority of children displayed distress behavior, especially nonverbal distress, in the postoperative period. This is consistent with prior findings that children experience significant pain and distress following surgery (Fortier, MacLaren, Martin, Perret-Karimi, & Kain, 2009; Kain, 2000; Kain, Mayes, Caldwell-Andrews, Karas, & McClain, 2006; Kain, Mayes, Wang, & Hofstadter, 1999).

Additional preliminary findings were that the majority of both mothers and fathers made reassuring comments, and mothers' rate of reassurance was significantly higher than fathers' rate of reassurance. This finding contrasts with prior studies, which found no differences in mothers' and fathers' distress-related behaviors during a cold pressor procedure (Moon et al., 2011) or during routine cardiac consultations (Vatne, Ruland, Ørnes, & Finset, 2012). It should be noted that cold pressor procedures and cardiac consultations are relatively brief procedures. The postoperative environment allows for more prolonged parent-child interactions. Thus, it is possible that the postoperative environment allows for differences between mothers' and fathers' to emerge.

Consistent with the extant literature, both mothers' and fathers' reassurance in the postoperative period was positively correlated with children's verbal and nonverbal distress.

Time-window sequential analyses allowed for a fine-grained inspection of this correlation. Contrary to hypotheses and arguments that parents' reassurance is distress-promoting (e.g., Blount and colleagues, 1989, 1997; McMurtry et al., 2006; Taylor et al., 2011), analyses demonstrated that children's nonverbal distress was significantly *less* likely to start following mothers' or fathers' reassurance. The likelihood of verbal distress following reassurance showed a similar significant pattern in father-child interactions. Further, although mothers had a significantly higher rate of reassuring comments, sequential analyses revealed that the sequential relations among both parents' reassurance-distress contingencies were similar. These findings stand in opposition to the lag analyses by Blount et al. (1989) and Taylor et al. (2011), who found that adults' reassurance was likely to precede and follow children's distress. However, Blount et al. (1989) and Taylor et al. (2011) collapsed healthcare providers' and parents' reassurance into a single continuous string, which did not allow for analyses of co-occurring codes. Thus, there can be an allusion that behaviors are continuously occurring with no periods of non-occurrence. Further, because the duration of behaviors was not coded, a continuous behavior, such as cry, would have been coded as multiple instances of cry, which could be misinterpreted as cry starting and stopping throughout a prolonged cry episode. Consequently, although lag analyses identifies behaviors that occur before or after other behaviors, the lack of detailed duration information obtained from the behavioral coding does not allow for an accurate interpretation about what occurs at the onset of a given behavior.

Our provocative initial results suggest that parents' reassurance may reduce children's postoperative distress behaviors. However, subsequent analyses complicate the story. Specifically, although children's nonverbal distress is less likely to *start* following parents' reassurance, nonverbal distress is less likely to *stop* following both mothers' and fathers' reassurance, and once distress stops, parents are less likely to reassure. Taken together, our data suggest that when a child is distressed, parents' use of reassurance may reinforce or prompt children's distress. One potential explanation may be that parents utilize other forms of communication (e.g., distraction) when a child starts showing signs of distress, but may resort to reassurance when distress continues, which data suggest is not effective and might maintain children's distress.

When examining the relations among the contingency Yule's *Q* and demographic variables, the likelihood of mothers' reassurance to follow children's verbal distress was found to be significantly stronger for boys than girls. Literature on gender differences in pain perception suggests that boys may learn to display stoicism when in pain (Jackson, Iezzi, Gunderson, Nagasaka, & Fritch, 2002; Jackson et al., 2002; McGrath, 1993). As such, when boys do verbally express pain, parents may be more inclined to react, which may explain the differences observed in the current study. However, given that this analysis was not adequately powered and this sex difference was not consistent across contingencies, this finding should be interpreted with caution. No other significant findings emerged among demographic variables and likelihoods. Given that post-hoc power analyses revealed that there was insufficient power for non-significant findings, a larger sample may be needed to determine if relationships do exist among these variables.

Analyses examining the associations among paternal anxiety and the likelihood of the contingencies revealed a positive relationship among maternal state anxiety and the likelihood of mothers' reassurance following the start of nonverbal distress. This finding suggests that mothers who are more anxious on the day of surgery may be more responsive to the start of nonverbal distress. Similar to another study examining maternal trait anxiety during immunizations (Frank et al., 1995), no significant relationships were found among paternal trait anxiety. Indeed, a study examining parents' real-time self-reported anxiety during an intravenous cannulation reported an increase in parents' anxiety and heart rate during the procedure and also found that anxiety significantly predicted children's reported pain (Smith, Shah, Goldman, & Taddio, 2007). Considering these findings, it may be more beneficial to measure parental state anxiety on the day of surgery given that the hospital environment may be particularly distressing for parents.

The results of the current study emphasize the benefits of employing timed-event coding and time-window sequential analyses when examining parent-child interactions. The ability to code several behaviors by multiple participants allowed for a more accurate account of co-occurring behaviors as well as provided important information about the duration of behaviors. In addition, the ability to analyze temporal associations among behaviors allowed for greater precision in interpretation of the behavioral relations. Previous studies utilizing correlational and lag sequential analyses reveal some information about parents' behavior and children's distress; however, the current results highlight the limitations of these prior methods and suggest that researchers might have misinterpreted the parent reassurance-child procedural distress relation.

The current study provides novel information about the sequential associations among parent-child interactions in the postoperative environment, but it is not without limitations. First, it was beyond the scope of this study to examine the influence of other parent behaviors (e.g., distraction) so it cannot be concluded that reassurance influences distress more or less than other parent behaviors. Second, although the coding utilized in this study allowed for a detailed account of the parent and child behaviors, it must be acknowledged that other behaviors not included in this study (e.g., nonverbal parent behaviors) may have influenced these interactions. Third, the current study was the first of its kind and included a fairly homogenous sample in regards to socioeconomic status and race. Future studies should seek to examine these associations in more diverse samples in different environments. Lastly, although a large sample was recruited, the subsamples for each contingency were small, which may have limited the power to detect significant associations among demographic variables. Despite the limitations, the current study contributes novel results to the pediatric pain literature regarding the complex relations among mothers' and fathers' reassurance and boys' and girls' verbal and nonverbal distress.

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APPENDICES

Appendix A. Demographic Self-Report Measure

1a. Child’s racial identity:
0 African American/Black
0 American Indian/Alaskan Native
0 Asian
0 Hispanic/Latino
0 Native Hawaiian/Pacific Islander
0 White
0 More than one race (please indicate):

1 b. Parent's racial identity:
0 African American/Black
0 American Indian/Alaskan Native
0 Asian
0 Hispanic/Latino
0 Native Hawaiian/Pacific Islander
0 White
0 More than one race (please indicate):

2. Please indicate the number of years of schooling you have completed (12 = 12th grade, etc.)

3. Household income range:

0 less than $10,000	*0* $51,000 - 80,000
0 $11,000 - 20.000	*0* $81,000 - 100,000
0 $21,000 - 30,000	*0* $100,000 - 200,000
0 $31,000 - 50,000	*0* more than $200,000

4a. Mother’s age: _____

4b. Father’s age: _____

Appendix B. STAI Trait Anxiety Self-Evaluation Questionnaire (STAI-T)

DIRECTIONS: A number of statements which people use to describe themselves are given below. Read each statement and then circle the number, to the right of each statement, that corresponds with how you **generally feel**. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you **generally feel**.

	Almost Never	Sometimes	Often	Almost Always
1. I feel pleasant	1	2	3	4
2. I tire quickly	1	2	3	4
3. I feel like crying	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I am losing out on things because I can't make up my mind soon enough	1	2	3	4
6. I feel rested	1	2	3	4
7. I am "calm, cool and collected"	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that doesn't really matter	1	2	3	4
10. I am happy	1	2	3	4
11. I am inclined to take things hard	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I try to avoid facing a crisis or difficulty	1	2	3	4
15. I feel blue	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thoughts run through my mind and bother me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Appendix C. STAI State Anxiety Self-Evaluation Questionnaire (STAI-S)

DIRECTIONS: A number of statements which people use to describe themselves are given below. Read each statement and then circle the number, to the right of each statement, that corresponds with how you **feel at this moment**. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you **feel at this moment**.

	Almost Never	Sometimes	Often	Almost Always
1. I feel pleasant	1	2	3	4
2. I tire quickly	1	2	3	4
3. I feel like crying	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I am losing out on things because I can’t make up my mind soon enough	1	2	3	4
6. I feel rested	1	2	3	4
7. I am “calm, cool and collected”	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that doesn’t really matter	1	2	3	4
10. I am happy	1	2	3	4
11. I am inclined to take things hard	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I try to avoid facing a crisis or difficulty	1	2	3	4
15. I feel blue	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thoughts run through my mind and bother me	1	2	3	4
18. I take disappointments so keenly that I can’t put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Appendix D. Abbreviated Child Behavior Coding System-Post Anesthesia Care Unit (CBCS-PACU)

Adult Reassurance Events	***Description***	***Examples***
1. Reassuring Comment Observer Code: Reassure Comment	A procedure related comment to the parent or child with the intent of neutralizing the situation or suggesting that the environment is non-threatening or that the child is overreacting.	"It is alright." "It's OK." "You are okay." "You're fine." "We're almost done." "It's all over." "It wasn't that bad." "Your Daddy's here." "I'm here."
Child Distress Events	***Description***	***Examples***
1. Child Cry Observer Code: Cry/Moan	Coded when child is whimpering, moaning, or audibly crying. Child may or may not have tears.	Sobbing. Crying Sounds. "Waah"
2. Scream Observer Code: Scream	Vocal expression of pain at high pitch/intensity, usually unintelligible, but can be double coded with verbal categories. Verbalizations such as "No!", "I don't want to." that occur during screaming are coded simultaneously	Sharp, shrill tone. "Ahhhh!" "Owwwh!" Shrieks
3.Verbal Pain Observer Code: Verbal Pain	Statement (not a question) of pain or being hurt. Statement includes a pain word such as "ouch" "hurt" "pain" These statements can occur before, during, or after a procedure. Do not have to be in response to procedure (child bumps head in play, etc) If comment is general negative feeling without pain word, code as Informs Negative Physical Status "my tummy feels funny" "I don't feel good"	"Owww" "That hurts." "My tummy hurts." "Ouch."

4. Negative Verbal Emotion Observer Code: Neg Verbal Emo	Statement that expresses the child or parent's negative *emotional* state. Anger, self-pity, resentment, sadness, frustration, fear would be common ones. These are negative emotion statements only. Note: If negative verbal emotion indicates desire to leave situation ("I want to get out of here" "I want to go home") code as verbal resistance, not nonverbal emotion.	Child: "I hate you." "I don't like this." "I'm scared." "Why does this have to happen to me?" Parent: "That was hard." "I didn't like doing that."
5. Verbal Request for Support Observer Code: Verb Req Support	Any verbal attempt to solicit hugs, hand holding, physical comfort from another subject by an individual. Can also be asking for help from an anxiety producing situation.	"Can I have a hug?" "Hold me!" "Mama Please!" "Help me!" Parent: "I need a hug" "come sit on my lap" Child nods in response to a parent asking: "Do you want me to get Daddy?" Non example: "Get me out of here." Coded as Verbal Resistance
6. Verbal Resistance Observer Code: Verbal Resist	Any intelligible verbal expression of desire to delay, terminate, escape, or resist a procedure. Child responds to a request from adult non-affirmatively. Can occur during screaming/crying whining.	"No!" "Stop." "No more, take me home." "Make her quit!" "I just want to go." "I want to go home."
7. Child Cry Observer Code: Cry/Moan	Coded when child is whimpering, moaning, or audibly crying. Child may or may not have tears.	Sobbing. Crying Sounds. "Waah"
8. Scream Observer Code: Scream	Vocal expression of pain at high pitch/intensity, usually unintelligible, but can be double coded with verbal categories. Verbalizations such as "No!", "I don't want to." that occur during screaming are coded simultaneously	Sharp, shrill tone. "Ahhhh!" "Owwwh!" Shrieks

<u>9. Non-verbal Resistance</u> Observer Code: NV Proc Resist	Conscious physical attempts to block adult from completing a procedure. Trumps Guarding	Child covers face/mouth with hand, buries face in arms, kicking, struggling, pushing away adult and or medical instrument, trying to remove bracelet or arm board, running away, hiding. Pushing parent away who is trying to hug child
<u>10. Guarding</u> Observer Code: Guarding	Child holds body position that protects or covers area in pain.	Touching throat, curling body posture to protect stomach Note: guarding is coded only when child is not being approached by another person with the intent to touch painful area. If child protects painful area from someone touching, code nonverbal resistance.