

# Children's Expressions of Negative Emotions and Adults' Responses During Routine Cardiac Consultations

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**Objective** One function of expressing emotion is to receive support. The aim of this study was to assess how children with heart disease express negative emotions during routine consultations, and examine the interaction between children's expressions and adults' responses. **Methods** Seventy children, aged 7–13 years, completed measures of anxiety and were videotaped during cardiology visits. Adult–child interactions were analyzed using the Verona Definitions of Emotional Sequences. **Results** Children expressed negative emotion, mainly in subtle ways; however, adults rarely recognized and responded to these expressions. The frequency of children's expressions and adults' responses were related to the child's age, level of anxiety, and verbal participation. **Conclusion** Children do not openly express negative emotions frequently during routine cardiac consultations; they are more likely to provide subtle cues of negative emotion. When expression of negative emotions does occur, adults may consider using the opportunity to explore the child's emotional experiences.

**Key words** adult responses; cardiac examinations; expressing negative emotions; patient–provider communication.

Congenital heart disease (CHD) occurs in 4–12/1,000 live births (Pradat, Francannet, Harris, & Robert, 2003). Children may also acquire heart disease (HD) during childhood (Ostman-Smith, 2010). HD is associated with reduced quality of life (Latal, Helfricht, Fischer, Bauersfeld, & Landolt, 2009) as well as cognitive (Spijkerboer, Utens, Bogers, Verhulst, & Helbing, 2008), school related (Granberg, Rydberg, & Fisher, 2008), social (Connolly, Rutkowski, Auslender, & Artman, 2002), and emotional problems (Latal et al., 2009). Children with HD report feeling different from healthy children and uncertain about the future (Birks, Sloper, Lewin, & Parsons, 2007). Moreover, illness-related worries generally increase with age (Allen, 1984).

Children with HD regularly undergo cardiac examinations that per definition are neither invasive nor painful (National Cancer Institute, 2010). Child distress related to invasive medical procedures is well known (Salmon & Pereira, 2002), but even noninvasive procedures may evoke negative emotions (Tyc, Fairclough, Fletcher, & Leigh, 1995; Vatne, Finset, Ørnes, & Ruland, 2010). It is unknown, however, if children with HD express illness-related negative emotions during routine cardiac consultations.

Children's expressions of emotion are often subtle cues (e.g., “oh no!!”) and lack information about the emotional experience. Explicit concerns (e.g., “I am worried about the future”) are rare (Vatne, Finset, Ørnes, &

Ruland, 2010). One function of expressing emotion is to receive support from others, such as adults. The sensitivity and appropriateness of adults' responses (e.g., informative reassurances) may depend on the emotional experience of the child (e.g., procedural anxiety vs. general worry about future health; Birks et al., 2007; Manimala, Blount, & Cohen, 2000; McMurtry, McGrath, Asp, & Chambers, 2007). Therefore, we argue that adults need to explore the underlying experiences of children's subtle emotional expressions in order to provide appropriate support.

Adult responses may explore (e.g., "you seem afraid . . . what frightens you?") or reduce (e.g., "don't be silly") opportunities for disclosure of an emotional experience (Del Picolo et al., 2009). Studies report that healthcare personnel (HCP) infrequently address children's emotions (Thompson & Payne, 2000; Zwaanswijk, Van der Ende, Verhaak, Bensing, & Verhulst, 2003) and, instead, turn to parents to evaluate children's well-being (Lykke, Christensen, & Reventlow, 2008). If children feel that their symptoms and concerns are not addressed in the medical context, they may begin to lose faith in the HCP's ability to provide help (Woodgate & Degner, 2003). Knowledge regarding adults' abilities to recognize and explore children's emotional experiences during medical consultations is limited.

Of the research conducted, relationships between child characteristics, child emotional expressions, and adult responses in medical settings have been demonstrated. Emotional intensity is negatively associated with a child's ability to report emotion (Mahoney, Ayers, & Seddon, 2010; Peterson & Biggs, 1998) and positively related to behavioral distress (Broome, 1986). Overt behavioral distress (e.g., crying) during medical procedures decreases with age (Katz, Kellerman, & Siegel, 1980; Tyc, Klosky, Kronenberg, de Armendi, & Merchant, 2002) while the ability to verbalize emotion improves (Peterson & Biggs, 1998). During invasive procedures, girls typically show more anxiety than boys (Katz et al., 1980). Researchers have found mothers' behavior to be related to child anxiety during medical procedures. In one study, mothers were found to use more force and threat toward anxious children (Dolgin, Phipps, Harow, & Zeltzer, 1990), and another study found mothers to more frequently respond with minor clauses (e.g., "OK!") when they expected child distress (McMurtry et al., 2007).

The purpose of this study was to assess how children with HD express negative emotions during medical consultations, and to examine adults' (i.e., parent and HCP) responses to these expressions. Specifically, the aims of the study were to: (a) document the frequencies of children's expressions of negative emotions during the conversational

and examination portion of the medical consultation; (b) assess correlations between children's expressions of negative emotions and child age, level of anxiety, and verbal participation; and (c) examine the frequency of parents' and HCP's responses to children's expressions of negative emotions, and the correlation with child age, level of anxiety, and verbal participation. Consistent with previous findings, we expected older children and girls to provide more explicit concerns and younger children and more anxious children to express more cues. Furthermore, we expected few parents to demonstrate exploring responses, and that parental responses would be related to children's level of anxiety. We had no other a priori expectations of the relationships between adult responses and child variables.

## Methods

### Participants

The present work is part of a larger clinical trial investigating the effect of a symptom assessment tool ("Sisom"<sup>1</sup>) on patient-provider communication in pediatrics. A total of 122 families were recruited at the University Hospital of Oslo. Data were sampled by convenience; the first 75 families were assigned to the control group (i.e., treatment as usual) and the next 47 to the intervention group. The participants in this sample included those from the control group.

Eligible patients were children, ages 7–13 years, with HD, and their parents. Exclusion criteria included having a diagnosis of mental retardation, developmental disorder, Attention Deficit Hyperactivity Disorder, or a speech or hearing impairment. Of the 130 families approached from October 2007 to February 2009, 75 consented to participate, resulting in a 58% participation rate. Reasons for refusal were not documented. One child withdrew from the study and four video recordings were destroyed by accident, leaving 70 families in the final sample. Participating HCP were 10 physicians and 6 nurses.

### Procedures

#### Recruitment and Data Collection

Institutional Review Board (IRB) approval for the study was obtained. Eligible patients received an invitation to participate 30 min prior to their regularly scheduled cardiology

<sup>1</sup>Sisom is the Norwegian acronym for "SI det SOM det er", meaning "Tell it as it is", or "Selvrapportering Innen Symptomer Og Mestring", meaning: Self-reporting on Symptoms and Management.

visit. During the visit, families met with the project assistant (PA) and were provided with oral and written information regarding the study. Parents signed informed consent forms and completed questionnaires while children were interviewed by the PA. All HCPs received oral and written information and were informed that the purpose of the study was to explore the patient–provider communication; however, were not required by the IRB to provide explicit consent. The interaction between the family and the HCP during the clinic visit was videotaped without the PA present.

The clinic procedure consisted of the following steps: (a) the nurse guided the family to the examining room; (b) the nurse measured the child’s height, weight, blood pressure, O<sub>2</sub> saturation, and conducted an electrocardiography (ECG); (c) the nurse called for the physician and waited with the family; and (d) the physician conducted an ultrasound examination. For six families, the ultrasound exam was conducted by an echo technician (ET) rather than the physician. In these cases, the physician discussed the results with the ET before turning to the family.

#### Training of Coders and Reliability Testing

Training of coders involved consensus coding of four clinic visits and a review of the coding with a developer of the system. Ten percent of the visits were randomly selected for reliability testing. Inter-rater reliability (IRR) was measured with intraclass correlation (Shrout & Fleiss, 1979) and  $\kappa$  coefficient (Cohen 1960).

### Material

#### Illness Variables

Illness severity was classified by a psychologist (T. M. V.) and an experienced child cardiologist from “1” (no CHD established by normal cardiologic examination) to “4” (severe CHD, usually symptomatic, sometimes critically ill, and in need of treatment by surgery and/or catheter, often repeatedly; (Hoffman & Kaplan, 2002; Stene-Larsen et al., 2010). The classification does not cover acquired or nonstructural HD, which were classified as “Arrhythmias/other HD”.

#### Study Variables

Child anxiety was measured using the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973). The measure was translated to Norwegian by the first author and a bilingual scientist using a backward–forward procedure. STAIC includes two 20-item self-report scales measuring enduring tendencies to experience anxiety (trait) and temporal and situational variations (state;

Spielberger, 1973). The STAIC was administered as a structured interview and the internal consistency was acceptable (state coefficient  $\alpha = .75$ , trait coefficient  $\alpha = .88$ ).

Child verbal communication with the HCP was scored on a four-point scale developed by the two coders. Expressions of negative emotions were not included. A verbal participation score of “1” indicates a verbally inactive child, who provides less than three answers, and does not comment or ask questions during the consultation. A verbal participation score of “2” indicates limited verbal participation; the child provides more than three answers but does not comment or ask questions. A score of “3” indicates a moderately verbally active child who answers questions with longer utterances (four words or more) but provide less than three questions/comments during the consultation. A score of “4” indicates a verbally active child who answers more than three questions with longer utterances, and asks questions or provides comments more than three times. IRR was found to be 100%.

#### Outcome Variables

Child expressions of negative emotions were measured using the Verona Definitions of Emotional Sequences (VR-CoDES; Del Piccolo, Finset, & Zimmermann, 2008; Zimmermann et al., 2009). VR-CoDES-Cues and concerns (CC) categorizes patients’ emotional utterances. Explicit expressions of negative emotions are labeled “concerns” and hints of underlying negative emotions are labeled “cues” (Del Piccolo et al., 2008). For definitions, examples, and IRR of cues and concerns see Table I. VR-CoDES-CC has shown high validity in adult data sets (Eide, Eide, Rustøen, & Finset, 2011).

Adult responses were measured using the VR-CoDES-Provider (P), which assesses the providers’ responses to the patients’ expressions of negative emotions (Del Piccolo et al., 2009). Responses of “reduce space” were further categorized. For definitions, examples, and IRR of responses (see Table I).

### Analysis

#### Communication Analysis

A psychologist (T. M. V.) and a medical student (K. Ø.) coded the video recordings of the patient–provider communication using Observer software (Grieco, Loijens, Zimmerman, & Spink, 2007). The coding proceeded in real time, child turns with emotional content was identified and coded as a cue or a concern as defined in Table I. The immediate response of the adult (i.e., speech unit following any cue or concern) was coded according to

Table I. The Verona Coding Definitions of Emotional Sequences and Health Provider Responses (Del Piccolo et al., 2008, 2009). Examples and Inter Rater-Reliability.

Expression	Definitions	Examples	ICC <sup>a</sup> ( $\kappa$ )
Concern	Clear verbalization of an unpleasant emotional state	"I am nervous" "I hate being sick"	0.99 (0.92)
Cue	Expression in which the emotion is not clearly verbalized or might be present.	"I cannot stand it anymore" "I don't give a damn" "Sighing, crying, frowning"	0.96 (0.59)
Response			
Provide space	The response gives space for further disclosure of the cue/concern expressed by the patient	"I can imagine" "What worries you?"	0.92 (0.92)
Reduce space	The response reduces the space for, or shuts off space for, further disclosure about the cue or concerns expressed by the patient.		0.91 (0.42)
	Switching: Behavior that aims at changing the frame of concern	"What does your husband think about that?"	1.00 (1.00)*
	Postponement: Explicit suggest delay of further exploration	"We will talk about that later"	0.00 (**)
	Information-advice: Gives information but do not explore.	"Don't worry, its a routine procedure"	0.89 (0.74)
	Active blocking: Explicit refusal to talk about the concern.	"No no, it's stupid to worry"	0.89 (0.46)*
	Ignore: Complete ignore of concern, silence without eye contact.	(Silence, turns toward computer).	0.94 (0.80)
	Shutting down: Actively shutting down or move away from the concern.	"Lets move on"	0.00 (0.26)*

Note. <sup>a</sup>Intraclass correlation coefficient, \*n ≤ 6, \*\*not able to compute.

standard codes, as defined in Table I. Direction of the response was based on use of a personal pronoun, eye contact, and body position. Instances with HCP silence (i.e., a pause of three seconds or more) were coded as a response; however, as the parents' position in the room made it difficult to identify the direction of their responses, only the verbal response of the parents was coded. Nurses' responses were coded in Steps 2 and 3 and physicians' responses were coded in Step 4.

### Statistical Analysis

Descriptive statistics were used to assess the frequencies of child expression of negative emotions during the clinic visit (study aim 1). Bivariate correlations among demographic variables, study variables (child anxiety and child verbal participation), and the construct of interest (total number of cues and concerns) were used to examine correlates of children's expressions of negative emotions (study aim 2). Descriptive statistics and bivariate correlations among the demographic variables, study variables (child anxiety and verbal participation of the child), and the constructs of interest (mother responses, father responses, nurse responses, and physician responses) were used to assess frequencies and correlates of adults responses (study aim 3). As normal distribution of variables was not expected, Spearman's rank order correlation coefficient was used and group differences were

analyzed with independent samples Mann-Whitney U-tests. Missing data were treated throughout as missing; imputations were not performed. To our knowledge, this is the first study to explore the correlates of emotional expressions in a pediatric sample. Therefore, as recommended by Nakagawa (Nakagawa, 2004), we chose not to apply Bonferroni corrections for multiple comparisons, as we were interested in exploring trends and patterns in the data.

## Results

### Participant Characteristics

Characteristics of children and parents are provided in Table II. No differences emerged between participants and families who declined participation on child's age ( $z = -1.10$ ,  $p = .281$ ) and gender ( $z = 1.29$ ,  $p = .197$ ). The consultations lasted on average 58 min (SD = 15.5, range = 11–86), procedural parts for 28 min (SD = 11.7, range = 5–61), and conversation for 28 min (SD = 11, range = 3–56). Children were most often accompanied by both parents (44.3%), followed by mothers only (38.6%), and fathers only (17.1%). The majority of nurses were women (66.7%) with a mean age of 43.4 years (SD = 9.5, range 32–58) and 20.7 years of experience in pediatrics (SD = 12.2, range 7–36). The majority of physicians were male (80.0%) with a mean age of 49.1 years (SD = 10.3,

range = 36–66) and 18.0 years of experience in pediatrics (SD = 11.4, range = 0–37).

### Children's Expression of Emotion

Children expressed cues and concerns in 60% of the clinic visits. On average, cues (e.g., "I do not dare to move") were expressed 3.3 times (SD = 6.2, IQR = 4, Median = 1) per visit, while concerns (e.g., "I hate these (EKG) tags") were expressed 0.3 times (SD = 0.8, IQR = 0, Median = 0). Forty-two percent of children's cues and 41% of children's concerns were expressed during procedural parts (i.e., clinical exam) of the visit.

Children's total number of cues were negatively correlated with age ( $r = -.24$ ,  $p = .047$ ) but positively correlated with verbal participation ( $r = .44$ ,  $p < .001$ ). Their total number of concerns were significantly correlated with STAIC trait ( $r = .26$ ,  $p = .038$ ) and verbal participation ( $r = .42$ ,  $p < .001$ ). Gender differences were not found in expression of emotion; however, boys were significantly more verbally active ( $Z = -2.20$ ,  $p = .028$ ). Expression of cues and concerns were significantly correlated ( $r = .43$ ,  $p < .001$ ). Furthermore, STAIC state and STAIC trait were significantly correlated ( $r = .38$ ,  $p = .003$ ). No other significant correlations between study variables, demographic variables, and duration of the consultations were found.

Table II. Participant Characteristics

Characteristic	Mean $\pm$ SD or %	Range (possible range)
Child (N = 70)		
Child age	10.1 $\pm$ 1.7	7.1–12.8 (7–13)
Gender child (% females)	42.7	
STAIC state child (n = 64)	28.6 $\pm$ 3.1	20–38 (20–60)
STAIC trait child (n = 63)	32.1 $\pm$ 7	21–46 (20–60)
Severity heart defect (%)		
Mild	5.7	
Moderate	12.9	
Severe	55.7	
Arrhythmias/other HD	25.7	
Verbal participation (%)		
Inactive	2.9	
Limited	37.1	
Moderate	30.0	
Active	30.0	
Fathers (n = 43)		
Father age	41.7 $\pm$ 5.3	29–55
Mothers (n = 58)		
Mother age	38.7 $\pm$ 4.2	30–48

Note. STAIC, State Trait Anxiety Inventory for Children. Severity HD, classification developed based on Hoffman & Kaplans definitions (Hoffman & Kaplan, 2002).

### HCPs' and Parents' Responses

Reduce space responses (e.g., "it's ok", "calm down" or nonattentive silence) were the most frequent responses for both HCPs and parents, accounting for 81% of physicians' responses, 75% of nurses' responses, 71% of mothers' responses, and 88% of fathers' responses. Table III presents the frequencies of the responses by HCPs and parents. Further analysis of the subgroups of responses revealed that to "ignore" (45%) and to provide information advice (14%) were the most common responses by HCPs and parents. Table IV presents the frequency of these responses and examples from this study.

Correlations between demographic variables, study variables, and responses are shown in Table V. Of note, physicians' provide space responses and reduce space responses were significantly correlated with the child's verbal participation ( $r = .32$  and  $r = .40$ , respectively), but not with any other variable. Nurses' provide space responses were significantly correlated with STAIC state ( $r = .36$ ) and their reduce space responses were negatively correlated with child's age ( $r = -.24$ ) and positively correlated with verbal participation ( $r = .52$ ). Similarly, mothers' reduce space responses were negatively correlated with child age ( $r = -.40$ ). Mothers' reduce space responses were also positively correlated with STAIC state score ( $r = .29$ ). Fathers' reduce space responses were positively correlated with the child's verbal participation ( $r = .32$ ). Significant differences were not found in adult responses to boys and girls.

### Discussion

The purpose of this study was to explore the frequency and relationship between children's expressions of negative emotions and HCP and parental responses during routine cardiology clinic visits. Overt expressions of negative emotions occurred rarely during the consultations

Table III. Mean (SD) IQR (median) of HCP and Parents Responses

	Physician (n = 70*)	Nurse (n = 70*)	Mother (n = 58*)	Father (n = 43*)
Provide space				
Mean $\pm$ SD	0.34 $\pm$ .95	0.44 $\pm$ 1.37	0.26 $\pm$ 0.87	0.05 $\pm$ 0.21
IQR (median)	0.00 (0.00)	0.00 (0.00)	0.00(0.00)	0.00 (0.00)
Reduce space				
Mean $\pm$ SD	1.46 $\pm$ 3.03	1.31 $\pm$ 2.68	0.62 $\pm$ 1.63	0.33 $\pm$ 1.15
IQR (median)	2.00 (0.00)	2.00 (0.00)	0.00(0.00)	0.00 (0.00)
Total responses				
Mean $\pm$ SD	1.80 $\pm$ 3.51	1.76 $\pm$ 3.62	0.88 $\pm$ 2.31	0.37 $\pm$ 1.20
IQR (median)	2.00 (0.00)	2.00 (0.50)	1.00(0.00)	0.00 (0.00)

Note. \*n refers to number of consultations.

Table IV. Frequency of Subcategories of Reduce Space Responses as Percentage of Total Responses (N = 319)

Category	n (%)	Examples from the study
Reduce space	245 (76.8)	
Ignore	144 (45.1)	Child: "Is it (running fast) dangerous?" Physician: "Silence . . . (looks in his papers)"
Shutting down	16 (5.0)	Child: "Help help . . . heeeelp!" Mother: "Oh don't be silly . . ."
Information advice	66 (20.7)	Child: "I do not want to have surgery now." Physician: "It is not dangerous, we do it [surgery] all the time."
Switching	3 (1.0)	Child: "Why hasn't my father come back yet?" Nurse: "You do not know how many people that have got lost in these hallways . . ."
Postponing	0 (0.0)	
Active blocking	16 (5.0)	Child: (starts to cry) Physician: "You shouldn't cry because you have no reason to worry."

Table V. Spearman Rank Order Correlations ( $\rho$ ) Between Parent and HPC Responses, Demographic Variables, and Study Variables

Variables	Child age	STAIC state	STAIC trait	Verbal participation
Physician PS	-.07 (.588)	.03 (.827)	.15 (.230)	<b>.32 (.007)</b>
Physician RS	-.16 (.198)	.04 (.755)	.19 (.137)	<b>.40 (.001)</b>
Nurse PS	-.12 (.325)	<b>.36 (.004)</b>	.13 (.299)	.22 (.066)
Nurse RS	<b>-.24 (.043)</b>	.14 (.287)	.24 (.058)	<b>.52 (.000)</b>
Mother PS	-.20 (.126)	.25 (.065)	.06 (.689)	.20 (.124)
Mother RS	<b>-.40 (.002)</b>	<b>.29 (.035)</b>	.03 (.827)	.25 (.061)
Father PS	-.01 (.955)	-.04 (.822)	.04 (.798)	.26 (.088)
Father RS	-.17 (.276)	-.07 (.687)	.17 (.295)	<b>.32 (.036)</b>

Note. HPC, Healthcare personnel STAIC, State Trait Anxiety Inventory for Children. RS, reduce space response. PS, provide space response. Number of consultations per correlation range from .38 to .70.

studied. In general, children's negative feelings were expressed indirectly as cues of underlying negative emotions. Expression was related to age, trait anxiety, and verbal participation of the child. When children expressed negative emotions, HCPs and parents typically responded with expressions that reduce space for further disclosure, and their responses were related to the child's verbal participation, age, and state anxiety.

### Frequencies and Correlations of Children's Expression of Emotion

As expected, children's expressions of emotion were subtle; they expressed many cues during the examination and general conversation. Thus, adults are provided with limited information about the content of the child's experience. Verbally active children most frequently expressed negative emotions during clinic visits. Emotions of quieter children, however, are unknown. Consequently, HCPs should be encouraged to also pay attention to the nonverbal

cues of quieter children, as the possibility to acquire verbal information about their emotional state is limited. Quieter children might also gain from interventions that aim to help them express their experiences.

Contrary to our expectations, explicit concerns were not more frequent among girls than boys, which is surprising in light of the previous research indicating that girls show more anxiety in medical settings (Katz et al., 1980), use more emotion words (Aldrich & Tenenbaum, 2006), and develop emotion descriptive vocabulary at an earlier age (Peterson & Biggs, 2001). As explicit concerns were a rare phenomenon, a larger sample may be needed to detect possible weak gender related differences.

As expected, expressions of negative emotion were related to age. Consistent with the previous findings that young children are more distressed (Tyc et al., 2002) and show more distress behavior (Strayer & Roberts, 1997), this study found that young children expressed more cues of negative emotions compared to older children. Explicit concerns, however, were not more frequent among the older children, a finding contrary to previous research suggesting that older children have more illness related worries (Allen, 1984) and are better able to verbalize emotions (Aldridge & Wood, 1997). This suggests that HCPs should not rely on older children to explicitly state their concerns.

State anxiety did not correlate with expression of negative emotion. A possible reason for this may be that children with HD minimize their negative emotions (Giuffre, Gupta, Crawford, & Leung, 2008). In contrast, children's expressions of concerns were positively correlated to trait anxiety. As trait anxiety is correlated with worry (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998), our finding supports the validity of the definition of "concern" in the VR-CoDES-CC.

### **Frequencies of HCPs and Parents Responses**

This study revealed that adults seldom grasped the opportunity to explore children's emotional experiences during consultations. In fact, between 70% and 88% of their responses were coded as "reducing space," most frequently because adults did not respond to children's expressions. This may reflect the difficulties adults have when talking about emotions with children (Thompson & Payne, 2000), or a failure to recognize children's expressions as attention during the clinic visit is directed toward the parents (Lykke et al., 2008). Information–advice (e.g., "don't worry, it will be ok") were also found to be a frequent response, which is in line with previous findings that reassurance is a common response to a child's distress (Blount, Corbin, Sturges, & Wolfe, 1989).

Is a routine cardiology clinic visit the right setting to explore children's emotions? As past research indicates that while informative reassurance may increase distress in one situation (i.e., procedural anxiety; Manimala et al., 2000; McMurtry et al., 2007), information actually could be beneficial in another (i.e., general worries about the disease; Birks et al., 2007), we argue that adults should explore children's experiences when cues are expressed. A simple question, such as "you seem concerned... what worries you?" could provide knowledge about whether distraction, reassurance, or referral for supportive counseling is appropriate. As children's expressions are rare this should not be expected to be time consuming. We therefore encourage HCPs to view children's cues as important therapeutic opportunities.

### **Correlates of Parents and HCP Responses**

Mothers' and nurses' responses were found related to age and anxiety of the child. Nurses and mothers were equally likely to respond to younger children with reduce space responses, while their responses to more anxious children differed. Nurses often explored the expressions of more anxious children while mothers tended to provide reduce space responses. Expectations of distress (McMurtry et al., 2007) based on previous experiences might explain mothers type of responses to cues of young or more anxious children. As most nurses were very experienced, expectations based on previous experiences might also explain their responses to young children's distress. It is unknown how children's trait anxiety was signaled to nurses. One possibility, which challenges the validity of the VR-CoDES, is that nurses detected emotional cues of anxiety not assessed by the system.

The responses of HCPs and fathers were related to the child's general verbal participation. Efforts to prevent the

child from "disturbing" the clinical exam might explain the more frequent reduce space responses of HCPs and fathers to verbally active children. In previous studies, children reported that a feeling of "wasting the HCP's time" prevented them from participating in medical dialogues (Taylor, Haase-Casanovas, Weaver, Kidd, & Garralda, 2010). HCPs need to be explicit about whether and when child participation is desirable during consultations.

### **Study Limitations**

There are several limitations in this study that warrant attention. First, several kappa's were low and consequently, the reliability of the VR-CoDES on pediatric data should be further tested with a larger sample size. Second, the study design did not allow for more sophisticated statistics such as multilevel analysis, which could have allowed for further exploration of the relationship between study variables. Third, applying the STAIC as an interview may have affected the scores as interviews are more vulnerable to socially desirable responding than questionnaires (Moum, 1998). Fourth, the presence of a video camera may have caused children to put more effort into behaving in socially desirable ways, and thus have affected their expression of emotion. Fifth, those who volunteered for a study involving videotaped medical procedures may have differed from the nonparticipants in ways not measured in this study. Sixth, the relations found in this study should be investigated in future studies with larger samples. Finally, this study did not examine the impact of expressing negative emotion or the impact of adult's responses on children's well-being. Research on the impact of communication in pediatrics on children's well-being should have high priority in the future.

### **Conclusion**

In conclusion, children with HD express some negative emotions during routine cardiology visits and with a similar frequency during general conversation and clinical exams. Their expressions are subtle and frequently ignored by parents and HCPs. Expressions of negative emotion and adults' responses were related to child's age, verbal participation, and anxiety. These results could help HCPs in recognizing children's subtle expressions, and encourage the exploration of children's experiences. Furthermore, the results may assist future researchers in developing interventions to improve the patient–provider communication in pediatric care. Interventions to ensure detection and communication about the problems of seriously ill children, especially children who are quieter, are needed.

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