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**The effects of clown intervention on worries and emotional responses in children
undergoing surgery**

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The effects of clown intervention on worries and emotional responses in children undergoing surgery

Abstract

This study investigated whether clown intervention could reduce preoperative worries and the affective responses of children undergoing minor surgery. Parental anxiety was also tested. Child's age, previous hospitalization, and temperament were tested as predictors of the child's responses during this preoperative phase. Seventy children were assigned to one of two groups: children accompanied by their parents and a pair of clowns or, those accompanied by the parents but without the clowns. The results emphasized the relevance of clown intervention on the reduction of preoperative worries and emotional responses, not only in children but also in their parents.

Key words: clown intervention, worries about surgery, parental anxiety, emotional responses, preoperative care, temperament

Surgery and hospitalization are considered negative life events, usually causing distress that may be traumatic for children (Karanci & Dirik, 2003). Even a minor pediatric surgery can have negative consequences, both in the short and long term, on the emotional, behavioral, cognitive, and academic development of a child (Caldas, Pais-Ribeiro, & Carneiro, 2004). Feelings of tension, nervousness, and fear are some of the many possible symptoms that children may experience during the preoperative period (Kain, Mayes, O'Connor, & Cicchetti, 1996; Kain, Mayes, Weisman, & Hofstadter, 2000). Children's anxiety during the induction of anesthesia also tends to be related with negative behaviors postoperatively, such as eating problems, separation anxiety, and sleep disorders (e.g., Kain, et al., 1996; Kain, et al., 2000).

Parental anxiety is also very common during the child's hospitalization (Kain, Mayes, Wang, Caramico, & Hofstadter, 1998; Shirley, Thompson, Kenward, & Johnston, 1998). Perception of the child's pain and their personal worries and fears are some of the possible explanations for parental anxiety (Lamontagne, Hepworth, Salisbury, & Riley, 2003; Vessey, Bogetz, Caserza, Liu, & Cassidy, 1994). On the other hand, research has shown that children's preoperative anxiety is usually associated with parental anxiety (Bevan, et al., 1990; Kain, et al., 1996).

In an effort to minimize the anxiety symptoms of children undergoing surgery and familiarize them with the procedures to enhance their coping skills, healthcare professionals have developed preoperative preparation programs (O'Byrne, Peterson, & Saldana, 1997; Rice, Glasper, Keeton, & Spargo, 2008) and investigated the benefits of some interventions, such as the presence of a family member during the induction of anesthesia (McCann & Kain, 2001; Shirley, et al., 1998; Wollin, Plummer, Owen, Hawkins, & Materazzo, 2003), educational videos (Cassady, Wysocki, Miller, Cancel, & Izenberg, 1999), books (Felder-Puig, et al., 2003), and the use of several distracters such as music (Augustin & Hains, 1996; Heiser, Chiles, Fudge, & Gray, 1997; Kain, et al., 2004), video games (Patel, et al., 2006), and toys (Golden, et al., 2006).

Based on the assumption that humor is associated with the well-being of patients (Bennett & Lengacher, 2006a, 2006b, 2008; Martin, 2001; Stuber, et al., 2007), there has been an increase in interventions provided by “clown doctors” in pediatric settings (Koller & Gryski, 2008). The few existing studies concerning clown intervention suggests a decrease in the child’s and the parent’s distress and an increase in children’s cooperation with medical procedures (Golan, Dobija, Lazar, & Keidan, 2007; Smerling, et al., 1999; Vagnoli, Bastiani, Turchi, Caprilli, & Messeri, 2007; Vagnoli, Caprilli, Robiglio, & Messeri, 2005). It is important to emphasize that most studies were conducted with professional clowns who dressed like doctors. Therefore, the positive outcomes obtained from work with these groups should not be generalized to other interventions that are based upon the use of common clowns. In Portugal, there is one such professional association of clown doctors - “Operation Red Nose.” Besides their artistic training, they undergo continuous training on hospital procedures and routines with vulnerable children [Insert Footnote1].

Another relevant issue relates to the outcomes that we intend to measure. Most studies concerning the benefits of clown interventions for children focus mainly on general symptoms of state anxiety and have not measured the specific worries concerning surgery. A clearer distinction should also be made between “worry” and “anxiety” (Silverman, La Greca and Wasserstein, 1995). Anxiety is usually defined as a “multicomplex response system, involving affective, behavioral, physiological, and cognitive components” (Silverman, et al., 1995, p. 671). Worry is considered a cognitive component of anxiety, usually involving both intrusive thoughts and images regarding future aversive events and potential dangers, and also some possible rehearsals of ways to avoid or deal with them (e.g., Silverman, et al., 1995). Therefore, worry can be adaptive. However, when excessive, worry can be dysfunctional. In fact, excessive worry is defined in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994) as a relevant response of most anxiety disorders, with a central role in the Generalized Anxiety and the Separation Anxiety Disorders.

Silverman and colleagues (1995) have also assessed the specific areas of worry in nonclinical samples of children aged 7-12 years, showing “health” concerns to be one of the three most common areas of worry. They have also provided empirical support for the relationship between self-reported anxiety and worries, and showed at the same time the independence of these constructs. For instance, higher reports of anxiety in younger children but no age differences in worries, suggesting that higher anxiety in these age groups may not be due to greater worries but to other anxiety components, such as affective, behavioral or physiological. The need to identify specific worries about surgery was emphasized by Quiles, Ortigosa, Méndez, and Pedroche (2000). The authors developed a questionnaire allowing the measurement of worries about hospitalization, medical procedures, illness, and its negative consequences. The assessment of these specific worries and the emotional states of children will be of particular interest in the present study.

As to emotional states, we based our work on the dimensional structure of emotions proposed by Russell’s circumplex model (1980). This approach has considered emotions to be structured by two orthogonal dimensions: valence and arousal, which are considered linear-independent: valence corresponds to the directionality of the emotional response—from positive to negative affect; arousal corresponds to the intensity of the emotional experience – from “calm” to “very aroused” (Lang, Bradley, & Cuthbert, 1990). The evaluation of these dimensions will allow us to examine children’s affective states during the pre- and postoperative phases.

Other factors that may predict children’s responses to hospitalization will be considered. These factors include the child’s temperament (Kain, et al., 2000), age (Bevan, et al., 1990; Kain, Mayes, O’Connor, et al., 1996), and previous hospitalization (Kain, Mayes, & Caramico, 1996; Watson & Visram, 2003). Regarding child’s temperament, some studies have shown that shyness, high emotionality, low sociability, and low activity are usually positively associated with worry and nervousness (Laredo, et al., 2007; Masi, et al., 2003). Concerning age, the cognitive ability to understand the situation and to cope with the stress of hospitalization also

tends to increase as children get older (Brewer, Gleditsch, Syblik, Tietjens, & Vacik, 2006). Other studies have shown that younger children are more likely to suffer from separation anxiety and experience more state anxiety during the induction of anesthesia (Bevan, et al., 1990). Previous hospitalization may also affect a child's reaction to the medical procedures. Watson and Visram (2003) have found that children who felt more distress during a previous medical procedure were more likely to experience high levels of anxiety in futures interventions. However, Quiles and colleagues (2000) have found that Spanish children with previous surgery experience had lower worry levels as compared with those who had none.

In sum, the present study has been undertaken to provide clearer evidence concerning the impact of clown intervention on children's cognitive and affective responses, as well as on parental state anxiety. The few previous studies that have addressed the benefits of clown doctors' intervention have generally not analyzed other potential predictors of children's responses. Therefore, exploratory analyses will be conducted to identify other potential predictors, such as previous hospitalization, age, temperamental disposition, and parental state anxiety. We hypothesized that the children in the clown group will report being less worried about the surgery; will express a more positive emotional state (higher positive affect), and will feel calmer when compared with children in the group without clowns. We also expect that children's parents in the clown group will report less state anxiety than parents in the comparison group.

Finally, we intend to ascertain the opinions of the Portuguese healthcare professionals regarding the utility of clown intervention.

Method

Participants

The study took place in a hospital located in Lisbon, Portugal. The project was approved by the Hospital Board Committee. The inclusion criteria were as follows: being scheduled for minor ambulatory surgery; accompanied by a family member (mother and/or father); between 5

and 12 years of age; and having parental consent to participate. Children under the age of 5 were not included because younger children may lack the necessary skills to report their own thoughts and emotions and may misunderstand the response scale options used (Besenski, Forsyth & Baeyer, 2007; Chambers, & Johnston, 2002). For the same reasons, the exclusion criteria included children with a history of neurological or psychopathology disorder, as reported by their parents.

The final sample included 70 children (53 males), between 5 and 12 years of age ($M=7.93$; $SD=2.36$), who were admitted for a minor ambulatory surgery at the hospital (the most common surgical procedures were circumcision, herniorrhaphy, excision, orchiopexy and cystoscopy). Children were assigned to one of the two groups: the clown group ($n=35$), which consisted of children being accompanied to the ambulatory room by their parents and a pair of clowns; or the comparison group ($n=35$), which consisted of those accompanied by their parents to the ambulatory room, without the clowns. The main characteristics of the sample (i.e., child's and parent's age, sex, level of education, nationality, and number of child's previous hospitalization) did not differ between the groups (all $p > 0.05$).

The healthcare sample was composed of 28 hospital staff professionals (21 females; $M_{age} = 37.54$ years; $SD_{age} = 11.96$): 10 surgeons, 14 nurses, one secretary, two anesthesiologists, and one medical aid assistant.

Measures

Demographic and clinical data were obtained from parents and from the preoperative admission record registered by the hospital nursing services.

The Child Surgery Worries Questionnaire (CSWQ; Quiles et al., 2000) was used to assess children's worries about surgery. This self-report measure (23 items), allows the assessment of three type of worries: (1) hospitalization (eleven items: e.g., *I'm worried about the way the hospital staff will treat me*); (2) medical procedures (six items; e.g., *I'm worried about how they will anesthetize me*); and (3) illness and its negative consequences (six items: e.g., *I'm worried*

about not being able to bear the pain of the illness). Responses are expressed using a 5-point scale (from 0 = *not at all worried* to 4 = *extremely worried*). Because this scale was originally used by children aged between 11 to 14 years, a thermometer image was included to maximize the children's understanding of the multiple response options. The thermometer scale options showed a good reliability for children below 9 years of age (Cremeens, Eiser, & Blades, 2007). Therefore, the children were asked to indicate on the thermometer the degree of worry regarding each statement. The mean values were computed. Higher scores corresponded to higher worries about the surgery. In the original version, the questionnaire showed good reliability and construct validity (Quiles, et al., 2000). The present study showed good internal consistency: global score (Cronbach's $\alpha=0.92$), hospitalization ($\alpha=0.85$), medical procedures ($\alpha=0.82$), and illness and its negative consequences ($\alpha=0.84$).

The conceptual framework for measuring emotional responses was derived from the Circumplex model of emotion (Russell, 1980), which proposes that all emotional states can be understood by a combination of two independent dimensions—valence and arousal. The Self-Assessment Mannequin (SAM) scale (Bradley & Lang, 1994) was used to measure both dimensions. SAM is composed of five graphic figures (mannequins) in each dimension: valence range from a happy to an unhappy mannequin; arousal range from a highly aroused to a calm mannequin. The SAM has several advantages: 1) a theoretical orientation; 2) it is easy to implement; 3) it is language- and culture-free (i.e., SAM uses figures instead of words); 4) children are capable of understanding both dimensions and can easily indicate the SAM figure that resembles their own affective state (e.g., Lang, 1985). SAM has been recently used in several studies with very young children: 2–5 years of age to measure children's likes and dislikes (Capaldi & Privitera, 2008); 4–12 years to assess children's pleasure (Caprilli & Messeri, 2006); 5–8 years (Hajcak & Dennis, 2009) to evaluate both dimensions of valence and arousal. In our study, children were asked to indicate any of the five figures or between any two figures based on how happy or sad (valence dimension) and how aroused or calm (arousal

dimension) they were feeling at the moment, making a nine-point scale for each dimension. Higher values indicate greater positive affect and arousal. SAM has provided good convergent validity with other measures of emotions (i.e., high correlations between SAM dimensions and semantic differential of Mehrabian and Russell) (e.g., Bradley & Lang, 1994; Morris, 1995).

To evaluate parent's preoperative state anxiety, the Portuguese version (Santos & Silva, 1997) of the State-Trait Anxiety Inventory–Form Y (Spielberger, 1984) (STAI) was used. STAI is divided into the trait and state anxiety scales, each containing 20 statements. For the present study, the 20-item state-anxiety scale was used, because we were only interested in measuring the level of anxiety felt by parents during a temporary period of time. Parents were asked to indicate, on a four-point scale (from 1 = *not at all* to 4 = *very much*), each statement's applicability to the way they were feeling at the moment of filling in the application. An average score was computed (ranging from 1 to 4), with higher scores indicating higher state anxiety. STAI has demonstrated reliability and validity in previous studies (Santos & Silva, 1997; Silva & Campos, 1998). In the present study, coefficient alpha was 0.88.

The children's temperament was assessed by their parents through completion of the EAS Temperament Survey for Children: Parental Ratings (Buss & Plomin, 1984). Buss and Plomin (1984) defined temperament as heritable personality traits that emerge in early life and are relatively stable during development. The EAS measures four temperamental dimensions, each one with five items: emotionality, assessing how intensely and easily the child reacts with emotions to the environment (e.g., "*Cries easily*"); activity, reflecting the child's level of energy and speed of action (e.g., "*Is very energetic*"); sociability, related to the child's level of interaction with others and preference for being with others instead of being alone (e.g., "*Likes to be with people*"); and shyness, assessing the child's inhibitions and tense behavior in new social settings and a tendency to escape from these new encounters (e.g., "*Tends to be shy*"). The EAS 20-item uses a five-point Likert-type response format (from 1 = *not characteristic or typical for the child* to 5 = *very characteristic or typical for the child*). All items correspond to

behaviors that might be observable in a wide age range (young children of age through adolescence). Several studies provided support for the reliability and validity of the EAS questionnaire among children (e.g., Boer & Westenberg, 1994; Gasman et al., 2002). In the present study the internal consistency indicated relatively low, but acceptable, values of reliability for all dimensions ($\alpha = 0.78$ for emotionality; $\alpha = 0.64$ for activity; $\alpha = 0.71$ for sociability; and $\alpha = 0.67$ for shyness).

The questionnaire to ascertain the opinion of the healthcare professionals relative to the effectiveness of clowns was based on Vagnoli and colleagues' study (2005). This questionnaire is composed of four items of dichotomous response, in which the staff were asked to give their opinion regarding the effectiveness of clown presence in the ambulatory room (*"What do you think about the presence of the clowns in the ambulatory room?"*), the utility of this activity (three items: *"In your opinion, clown activity is useful for the... children / parents / healthcare professionals"*), possible disturbances (*"Do you think the clowns are a disturbance in the hospital?"*), and the continuation of this activity (*"Do you favor the continuation of the clowns' activity in the ambulatory room?"*).

Procedures

The staff working in the hospital unit in which the study was conducted were briefed beforehand about the clown visitors. The informed consent of parents was requested. Parents were told that the main research purpose was to investigate the relevance of some factors such as age and temperamental dispositions in the way children undergoing surgery may feel regarding clinical intervention. They were all guaranteed anonymity. All parents agreed to participate and signed the consent form. Children provided assent as well.

Children were assigned to the clown group or to the comparison group, depending on the day of their procedure. The two groups were scheduled for different days in order to avoid the awareness of the comparison group about the presence of clowns with the children in the

treatment group. Therefore, a quasi experimental design was used. In the comparison group, children were accompanied by their parents without the clowns. The clown group consisted of children accompanied by their parents and a pair of clowns (female and male).

The clowns arrived at the ambulatory room about 30 minutes before the child went to the operating room, staying 15 minutes with the child. The clowns used different methods of entertainment, adapted to the child's age, which included magic tricks, music, jokes, games, and the indispensable humor that characterizes them.

All participants underwent the same hospital procedures and the sequence of scales and questionnaires were identical for both groups. In the clown group, the researcher waited for clowns to leave the ambulatory room before requesting the children to complete the scales. The CSWQ was administered first, followed by the SAM. Parents were not allowed to help their children and were asked to report their own state anxiety (STAI) and to evaluate the child's temperament (EAS). Parents remained with the child in the ambulatory room until the child went to the operating room.

During the postoperative phase (after making sure that the children were not in pain or under the effect of anesthesia), the children were asked whether they felt like answering one more scale. The SAM scale was then administrated one more time. Parents were debriefed after the completion of the study.

Finally, the healthcare professionals were asked to give their opinions regarding the value of the presence of clowns in the ambulatory room.

Results

Children's temperament as a function of group condition

Temperamental dispositions are considered relatively stable over time. Therefore, we did not expect to find significant differences in these traits between the two groups. However, as the present study used a post test comparison-group, in which all self-reported scales were administered after the intervention started, we felt that it would be relevant to compare the two

groups on these important traits. As expected, no significant differences in temperamental dispositions between the two groups were found: $t(68) = -0.43$ for shyness, $t(68) = -1.18$ for emotionality, $t(68) = 1.70$ for activity, and $t(68) = 0.77$ for sociability, all $p > 0.05$.

Children's preoperative worries about surgery as a function of group condition

To determine the effects of clown intervention on children's worries about surgery, a multivariate analysis of variance (MANOVA) was performed, with worries about (1) hospitalization, (2) medical procedures, and (3) illness and its negative consequences as dependent variables. The choice for a MANOVA was related to the high correlations between these three variables ($0.65 < r < 0.73$, all $p < 0.001$). MANOVA also has the advantage of reducing Type I errors than several analyses of variance (ANOVAs).

Results showed that the overall multivariate test was statistically significant [Wilks' $\lambda F(3, 66) = 31.56, p < 0.001, \eta_p^2 = 0.59$]. We have further examined the univariate F tests, for each dependent variable (confidence intervals adjusted by the Bonferroni procedure). The results revealed that the children in the clown group reported significantly less worries than those in the comparison group on the three dimensions (all $p < 0.001$): $F(1, 68) = 62.33, \eta_p^2 = .48$ ($M=0.85, SD=0.45$ vs. $M=1.95, SD=0.67$) for hospitalization; $F(1, 68) = 39.54, \eta_p^2 = 0.37$ ($M=0.95, SD=0.73$ vs. $M=2.20, SD=0.92$) for medical procedures; and $F(1, 68) = 74.23, \eta_p^2 = 0.52$ ($M=1.04, SD=0.75$ vs. $M=2.61, SD=0.78$) for illness and its negative consequences.

Emotional states as a function of group condition and operative phase

Two independent ANOVAs, with a 2×2 design (group condition: clown group vs. comparison group; operative phase: preoperative vs. postoperative), were conducted to examine the predictions regarding the effect of group in both operative phases. The choice for conducting two ANOVAs instead of one single MANOVA was based on the Circumplex model of emotions, which states that these two dimensions are independent (e.g., Russell, 1980).

The results on affective valence revealed the significant effects for group condition [$F(1, 68) = 38.58, p < 0.001, \eta_p^2 = 0.36$] and operative phase [$F(1, 68) = 10.19, p < 0.01, \eta_p^2 = 0.13$].

The effect of group condition was in line with the hypothesis: children in the clown group reported a higher positive affect ($M= 8.14$; $SD= 1.19$) than those in the comparison group ($M= 6.06$; $SD= 1.59$). Regarding the main effect of operative phase, results indicated a significant increase in positive affect from pre-operation ($M= 6.56$; $SD= 2.38$) to post-operation ($M= 7.64$; $SD= 2.13$).

The ANOVA 2×2 (group condition \times operative phase) on affective arousal also revealed significant main effects of group condition [$F(1, 68) = 28.04, p < 0.001, \eta_p^2 = 0.29$] and of operative phase [$F(1, 68) = 57.60, p < 0.001, \eta_p^2 = .46$]. We found that children in the clown group expressed lower arousal ($M= 1.66$; $SD= 0.69$) than those in the comparison group ($M= 3.36$; $SD= 1.77$); and experienced a significant reduction in arousal between the pre-operative ($M= 3.53$; $SD= 2.55$) and the post-operative phase ($M= 1.49$; $SD= 1.24$). There was also a significant interaction between group condition and operative phase [$F(1, 68) = 14.20, p < 0.001, \eta_p^2 = .17$]. Simple main effect analysis revealed that children in the clown group felt less arousal than those in the comparison group in both preoperative ($M= 2.17, SD= 1.15$ vs. $M= 4.89; SD= 2.85$) and postoperative ($M= 1.14, SD= 0.55$ vs. $M= 1.83; SD= 1.60$) phases; however, clown intervention's effect on affective arousal was higher during the preoperative phase [$F(1, 66) = 27.35, p < 0.001, \eta_p^2 = .28$] than after the surgery [$F(1, 66) = 5.75, p < 0.05, \eta_p^2 = 0.08$].

Parents' state of anxiety as a function of group condition

To test the impact of clown intervention on parents' state of anxiety, an independent t -test was computed. Results indicated that anxiety was lower for parents in the clown group ($M= 1.80$; $SD= 0.38$) than for those in the comparison group ($M= 2.14$; $SD= 0.46$), $t(70) = -3.37, p < 0.001$.

Predictors of children's worries about surgery and emotional responses

Multiple linear regression (MLR) analysis was performed to find whether a combination of some of the independent variables can predict the child's preoperative responses better than a single variable. A Pearson correlation matrix was generated to examine the linear relationships between the criterion variables and the potential predictors (see Table 1). Variables found to be

statistically correlated ($p < 0.05$) were subsequently tested in MLR analysis (Stepwise method). All the regression analyses included the group condition (comparison group = 0; clown group = 1). Multicollinearity was not considered a problem because the correlations between the predictors were very low and, in most cases, statistically non-significant.

INSERT TABLE 1 ABOUT HERE

To assess the relative contribution of group condition, emotionality and parents' anxiety regarding the child's worries about surgery, an MLR was carried out. We found that group condition was the only variable that helped the prediction when the other factors were also considered, accounting for 57% of the variability in the child's worries ($\beta = -0.76$, $t = 9.59$, $p < 0.001$), suggesting that the clowns' presence was a relevant factor to account for lower levels of worries about surgery.

An MLR analysis was performed using preoperative valence as the criterion variable, and group condition, age, previous number of hospitalizations, and sociability, as predictor variables. The results showed that the presence of clowns [$\beta = 0.52$, $t = 5.46$, $p < 0.001$], younger age [$\beta = -0.26$, $t = -2.73$, $p < 0.01$], and higher sociability [$\beta = 0.20$, $t = 2.10$, $p < 0.05$] were significant predictors of higher positive affect, explaining 39% of the variance.

In the case of arousal, group condition, number of previous hospitalizations, and parental anxiety were selected for use in the MLR analysis. Arousal during the preoperative phase was predicted by the group condition [$\beta = -0.52$, $t = -5.24$, $p < 0.001$] and by the number of previous hospitalizations [$\beta = 0.25$, $t = 2.49$, $p < 0.05$], explaining 33% of the variance.

Opinion of health professionals regarding the presence of clowns in the ambulatory room

The majority of health professionals agreed with the presence of clowns in the ambulatory room (96.43%), considering them useful for the children (96.43%), for the parents (89.29%), and for themselves (64.29%). The majority favored continuing this type of intervention (89.29%) and disagreed with the idea that clowns are disturbing agents (71.43%).

Discussion

This study analyzed the effects of clown intervention on children's preoperative worries about surgery and on emotional states. The findings generally support our predictions: children in the clown group felt less worried about the hospitalization, the medical procedures, and the illness and its negative consequences; and also reported a more positive emotional states (felt happier and calmer) than those in the comparison group in both operative phases. These results support previous research that a clown doctor's presence reduces the distress of the child preoperatively (Golan, et al., 2007; Smerling, et al., 1999; Vagnoli, et al., 2005, 2007) and has also positive effects following surgery. Further, and regardless of group condition, children reported a higher positive affect and lower arousal following surgery.

As hypothesized, we also found that children's parents in the clown group reported less state anxiety than parents in the comparison group. These findings are very similar to those found by Vagnoli and colleagues (2005), showing that clown intervention had an effect not only on children's reactions but also on the preoperative anxiety of their parents.

When considering all variables correlated to the child's preoperative responses, we found that clowns' presence was the strongest predictor of both self-reported worries and emotional states. More specifically, clowns' presence was the only relevant factor to account for the lower levels of child worries about surgery. This result also means that the child's emotionality and parental state anxiety associations are not strong enough to predict child worries when considering the relevance of clown intervention. Though we did not find these variables to be significant predictors, the positive correlation between them should not be neglected. For instance, parental anxiety was positively correlated to greater worries about the surgery and to higher arousal, which is in agreement with previous studies that found parental anxiety to be positively related to the child's anxiety and distress (Bevan, et al., 1990; Kain, et al., 1996).

The presence of clowns was the strongest predictor of perceived positive affect, but younger age and higher sociability were also significant predictors. It is quite possible that the younger the child, the lower her/his own consciousness about the risks of the medical

procedures. Higher sociability might contribute to greater receptiveness regarding clowns' presence and the healthcare workers' interventions, and to the use of these social interactions as ways of coping with the preoperative situation. However, further research is necessary to test our interpretations. This result is also in agreement with the findings of Kain and colleagues (2000) that sociability is a significant predictor of lower levels of preoperative anxiety. Lower preoperative arousal was best predicted by clown intervention and fewer hospitalizations. As argued in other studies (Vaughn, Wichowski, & Bosworth, 2007), previous hospitalizations may affect the children's emotional states, contributing to higher anxiety; although we have not measured the child's anxiety, the measure used to evaluate arousal is usually correlated with other self-reported measures of anxiety (e.g., Zvolensky, Feldner, Eifert, & Stewart, 2001).

An important limitation that should also be considered is the large age span of children recruited. In fact, self-report scales require the ability to understand what is being asked and to report one's thoughts and emotions. Although we took some precaution to avoid these problems (e.g., providing visual aids such as thermometers to facilitate children's comprehension of the response options; screening their skills to understand and to provide self-ratings; reading each item slowly to the child), we cannot be entirely sure that all the children understood the scales in the same way. This might be an alternative explanation for the results regarding the negative relationship between age and higher positive affect. Another limitation is the susceptibility of self-report measures to social desirability effects. Future research should supplement the study's findings with physiological measures of the child's level of arousal and level of positive and negative affect.

Also relevant are the limitations regarding the use of a post test comparison-group design. There were, however, several reasons for choosing this design. We chose to not randomly allocate children to groups to prevent participants in one condition from realising that they were being treated differently from participants in the other group, because this awareness could affect participants' expectation about being in the presence of the clowns and subsequent affective

responses. An alternative approach would be the use of a pre test – post test comparison-group design, in which the main outcome variables could be administered before and after the intervention. This procedure has some advantage, allowing us to evaluate if a change in the outcomes have occurred. It might also reduce the selection threat due to potential baseline differences between groups. It is, however, important to stress that the present study was developed in the same hospital unit and the groups were comparable in many respects (e.g., similar demographic characteristics, clinical antecedents, and temperamental dispositions). Repeating the outcome assessments for such a brief intervention (15 minutes) could also be inappropriate, as it would increase the potential impact of testing confounds possibly affecting participants' affective responses.

It is also important to point out that the clowns' presence and the other predictors only explained some variance in the children's responses, which means that these responses might be explained by other factors not taken into account in this study. Other predictors should be evaluated in future research (e.g., presence of internalizing or externalizing behavior problems; child's mental health; child's coping style).

Finally, this study addressed the opinions of healthcare professionals regarding the utility of clown intervention. We found that the health professionals favored the collaboration of clowns. Most health professionals agreed to the presence of clowns in the ambulatory room. They consider it a useful intervention for children, parents, and themselves, and favored the continuation of this type of intervention. These results contrast with those obtained by Vagnoli and colleagues (2005). The reason for this difference may be related to the fact that the staff was briefed beforehand about the clown visitors.

Several studies have shown that children's psychological stress during the preoperative phase can interfere with the work of clinical staff and is associated with several negative outcomes that should not be ignored, including the increase in analgesic use postoperatively (Kain, et al., 1996; Kain, et al., 2000). There is also some consensus on the need to reduce the

child's psychological stress before surgery (McCann & Kain, 2001). Therefore, it is possible that interventions with professional clown doctors may lower healthcare costs. Cost savings with the use of clown doctors' intervention for the healthcare institutions was not the focus of our study and should be further analyzed. The clown doctors' intervention was voluntary for the present study, with no costs involved for the healthcare stakeholders. However, we must take into account the many demands on this new profession, which could make the development of programs with volunteers difficult. Nevertheless, this study showed the effectiveness of the clowns' intervention on children's affective states and worries about surgery, and a similar benefit on concomitant parental anxiety reduction. Additional research should explore the efficacy of their interventions on other types of clinical conditions and medical procedures.

Other types of interventions should also be considered for future studies (e.g., development of coping skills, modeling, play therapy, printed material) (O'Byrne, Peterson, Saldana, 1997). In Portuguese institutions, new psychological preparation programs should be developed by multidisciplinary teams and evaluated by specialized professionals, in terms of their potential contribution to patients' health education (e.g., better understanding of medical treatment issues to prepare children and parents for surgery), management, and compliance through the entire process of the intervention. As emphasized by McCann and Kain (2001), these programs should also consider the individual characteristics and needs of the child, and may require additional intervention designed for parents. It would also be interesting to compare the clown's intervention with different types of interventions in future research.

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Footnotes

1. The clowns of “Operation Red Nose” operate every week in eight hospitals throughout the country, visiting each hospital once or twice a week. They usually begin with an impromptu session in the outpatients’ department and then move on to the wards, where they are briefed by the nurses on the condition of those children who would benefit the most from a visit. They then wait to be invited by the child before proceeding. The clown doctors use their improvisation and entertainment skills to involve each patient as much as possible, ensuring that the child can participate in the activities. They also try to involve the families and the medical staff in these sessions. In their work, the clowns must be able to 1) develop their clown character; 2) establish a relationship based on trust and respect; 3) improvise; 4) have some artistic abilities (e.g., juggling, magic, clown classics); 5) show appropriate emotions; 6) understand child development and create shows that are age-appropriate; 7) have creative and imagination skills; 8) have a full understanding of the hospital environment; 9) understand the role of the support organizations; 10) be sensitive and understanding regarding the relationships between parents and the sick child; 11) understand the children’s reactions in relation to illness, pain, being in hospital, treatment and death. The work of this organization was recognized by the Portuguese Medical Association; and received the “Hospital do Futuro” Award in 2005/2006. Although their work was volunteered for the present study, these professionals are regularly paid by their own association.

TABLE 1

Zero-order correlations between the predictor variables and the child's dependent variables

| | Worries about surgery | Preoperative Valence | Preoperative arousal |
|-------------------------------|--------------------------|-------------------------|-------------------------|
| Shyness | .11 | -.19 | .18 |
| Emotionality | .25* | -.16 | -.06 |
| Activity | -.14 | .23 | -.22 |
| Sociability | -.11 | .29* | -.17 |
| Parents' state anxiety | .42*** | -.21 | .27* |
| Number of hospitalizations | .17 | -.29* | .28* |
| Child's age | -.08 | -.29** | .14 |

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; Higher values indicate higher worries about surgery; greater affective valence, arousal, shyness, emotionality, activity, sociability, parental state anxiety, and number of hospitalizations and older age.