New Approaches on the Horizon: Comments on Jaaniste, Hayes, and von Baeyer's "Providing Children With Information About Forthcoming Medical Procedures: A Review and Synthesis"

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Jaaniste, Hayes, and von Baeyer contribute to the growing body of work on preparing children for medical events by describing an Information Provision Model to aid clinicians in developing effective preparatory tools. This commentary considers the contributions of this model, and extends several of the principal ideas in new directions. In doing so, particular attention is paid to investigating the meaning of the phrase "timely and appropriate" when used to describe optimal information provision. In addition, discussion of how the model relates to emerging understandings of coping processes on both neurological and behavioral levels is offered. Throughout, emphasis is placed on using information from a diversity of research programs to help inform the development of better strategies for helping children achieve the best possible outcomes in medical settings.

Each day thousands of children undergo dental and medical procedures. The influence of such procedures on children's behavior and development is beginning to receive significant research attention. Forrest, Shipman, Dougherty, and Miller (2003) report that the number of published articles on this topic doubled between 1994 and 1999. Kain (2000), for example, reports that half of all children undergoing routine outpatient surgery develop transient symptoms such as bedwetting, sleeping and eating disturbances, increased anxiety, nighttime crying, and separation anxiety in the weeks and months following the procedure. Data like these suggest a clear need to understand what leads some children

to experience adverse outcomes, whereas others experience positive effects. Although a variety of factors are likely to be associated with how children respond to medical procedures, recent investigations have focused on preparatory information provision as a way to minimize potential disruption (for a review, see Rudolph, Dennig, & Weisz, 1995). Jaaniste, Hayes, and von Baeyer (2007) contribute to this growing body of work by proposing an Information Provision Model intended to aid clinicians in developing practical preparation strategies.

The model of Jaaniste et al. is impressive for several reasons. First, it is informed by existing theory and data from multiple research agendas, including both those that emphasize pediatric medical contexts and those that are concerned with more general cognitive, social, and emotional developmental trajectories. Second, it integrates information on the processes by which children make sense of and cope with medical procedures with information on the mechanics of how best to provide preparatory information to children. Finally, the authors distill their ideas into a clinically relevant tool for helping children deal with medical events. The result is a model that is broad in scope, yet with clear and accessible practical applications. Articulation of this model sets the stage for thought-provoking discussion about how developmental findings can inform clinicians in selecting timely and appropriate preparatory strategies that are likely to be effective with individual children.

This commentary focuses on two main issues: (a) the critical efforts of Jaaniste et al. to unpack the meaning of the catchphrase “timely and appropriate” when used to describe optimal information provision; and (b) the contributions and limitations of the Information Provision Model of Jaaniste et al. in offering new ways of understanding how children process medical experiences. Our attention to these topics focuses on elaborating upon

several of the issues raised by the authors, extending their analysis to take into consideration additional relevant developmental data, and raising questions to guide continued research.

WHAT DOES "TIMELY AND APPROPRIATE" MEAN?

One of the key contributions of this article was the discussion of the *what* (content), *how* (format), and *when* (timing) of effective information provision. In addition, the authors briefly consider how *who* the preparatory information comes from may influence child outcomes. Below we comment on and extend the authors' discussion of these factors in information provision.

What Do We Tell Children About Upcoming Medical Interventions?

In considering how best to prepare children for medical experiences, there is a clear need to consider the content of information to be shared with children. Jaaniste et al. (2007) suggest that children be given specific (versus general) information about both the procedures they are to go through and the sensations they are likely to experience. The authors' suggestion that preparatory information focus on helping children to develop accurate expectations for what will happen is valuable. The "content" question might be usefully complicated, however, by consideration of potential benefits of providing children with information about the *reasons* for a procedure. Although Jaaniste et al. argue that explanations are in-appropriate for preadolescent children, we suggest that even young children may benefit from opportunities to consider the causal motives for their forthcoming procedures. Young children's curiosity about aspects of themselves and of the world around them has been documented by numerous researchers (e.g., Callanan & Oakes, 1992; Chukovsky, 1973; Piaget, 1974; Tizard & Hughes, 1984). Research on the content and frequency of children's

causal questions in the context of medical events is needed to demonstrate the nature and extent of children's curiosity in situations that are emotionally charged and personally meaningful. Should such research find, as we suspect it will, that children are curious about the reasons behind certain medical procedures, responsiveness on the part of medical personnel and parents is critical.

Koopman, Baars, Chaplin, and Zwinderman (2004) make some specific recommendations about how to construct developmentally appropriate explanations. For instance, they recommend using short explanatory statements with young children (e.g., "insulin gives the body energy") and analogies with children over 7 years of age (e.g., "the heart is like a pump"). Only children over 11 years old should receive detailed explanations about internal bodily processes. Interestingly, in studies of parents' conversations with preschool- and elementary-aged children about a wide range of topics, parents seem to be providing just such explanatory "fragments" rather than offering full-fledged scientific explanations (Callanan & Jipson, 2001). Keil (1998) argues that these explanatory fragments could be more helpful to children than more complete causal explanations, because children who hear detailed explanations may experience "explanatory satiation" and become unreceptive to the information provided. It remains to be seen what level of detail is most appropriate in explanatory conversations with children in medical settings. To achieve this, future research might manipulate the detail of explanations offered (or none at all) and observe the result in terms of child outcomes.

We suggest that knowledge about children's conceptions of illness will lead clinicians to develop more effective explanations. Many researchers have investigated children's understanding of illness, with findings converging on the conclusion that children do not always appeal to biological explanations when reasoning about the causes of illnesses (Au &

Romo, 1999; Bibace & Walsh, 1981; Raman & Winer, 2002). Some of the nonbiological causal explanations for illnesses endorsed by children en route to (or coexisting with) sophisticated understandings include immanent justice explanations (e.g., being punished by God), psychological explanations (e.g., feeling nervous causes a stomachache), behavioral explanations (e.g., going outside without a hat causes a cold). Koopman et al. (2004) advise healthcare workers to initiate conversations with children in order to assess their current conceptualizations about their illness prior to offering information of their own. Turning to parents to guide medical personnel's understanding is also an option that is likely to yield more parental satisfaction and useful information about how their particular child constructs illness attributions and understands medical events.

***How* Do We Introduce Preparatory Information to Children?** The authors highlight multiple ways of sharing health-related information with children. Although older children (over 7 years old) are better able to understand written and verbal descriptions, younger children are in need of more concrete avenues of information provision. Among the strategies discussed by Jaaniste et al. are dolls, toys, modeling, and video, with particular promise given to modeling. We take this opportunity to comment specifically on the use of video and other electronic media asinformational tools in pediatric health contexts. Despite the potential for video as an informational tool, a 1997 survey of pediatric hospitals' preparation programs found that less than 50% of surveyed hospitals actually employ filmed preparation for surgeries, with an even lower rate of use for other procedures (O'Byrne, Peterson, & Saldana, 1997). The low rate of use may be due to the current medical–economic climate (Kain, 2000) and/or the ineffective dissemination of research findings about the potential benefits of preparatory strategies (O'Byrne et al., 1997).

Even when available, however, video should not be viewed as a magic bullet in information provision. Attention must be paid to the content, timing, and format of video presentations. It is clear from the work of Klingman, Melamed, Cuthbert, and Hermecz (1984) that the most effective existing video preparations for children who are naïve about an upcoming medical procedure portray a peer model who, in addition to going through the procedure, narrates his or her feelings about how it felt and what can be done to minimize the impact of the event. Such techniques essentially have the child "rehearse" along with the "participant" model and have been found to reduce anxiety and improve cooperation. However, work by Melamed, Yurcheson, Fleece, Hutcherson, and Hawes (1978) indicates that timing is a critical factor in the success of video information presentation. In their study, children who had a previous negative medical experience did not always benefit from videotaped depictions of upcoming procedures. From a schema point of view, this sensitization is sensible as the information presented in the video may not have matched that of the template that had been stored in the child's memory. Thus, it may be that video presentations are less likely to be effective with children with significant prior histories of medical events.

One way around this problem may be to capitalize on the emerging technologies highlighted by Jaaniste et al. (2007). For instance, many pediatric hospitals have computer kiosks with touch screen video capability in the waiting areas. We can envision something like a "Choose Your Own Adventure" intervention in which children, in collaboration with parents, can customize the preparatory information they receive. For instance, those children who are resistant to technical information might benefit from more typical distraction videos. Or perhaps displays prompting aggression might be of value for some youngsters who

have less regulatory control by allowing them to ventilate rather than bring their anger into the pediatric operatory.

A second reason to consider revamping current video preparation techniques is that videos, like dolls, are representational in nature. As argued by Callanan, Jipson, and Soennichsen (2002), because children see video mostly in the context of entertainment and make-believe, it may be difficult for them to consider it as something that can represent reality. Consequently, practitioners are cautioned not to assume that passive video viewing is equated with learning and urged to consider how to help children make effective use of the medium. An exciting new line of research in developmental psychology offers some intriguing possibilities for the promise of interactive video as a tool to convey preparatory information to children. Troseth, Saylor, and Archer (2006) found that 2-year-old children were aided in their understanding of video if they responded to the characters on the screen as interactive partners. Thus, it may be that videos produced by medical practitioners to convey preparatory information should emulate television programs such as *Blue's Clues* in which the speaker appears to be having conversations with the viewer. Studies investigating how child readiness is influenced by a variety of video formats would make a clear contribution both to this issue and to the more general literature on children's television viewing.

Following from this line of work, we suggest that emerging electronic formats offer the possibility of taking the idea of interactive video to yet another level. Specifically, in multiuser role-playing video games, it is now possible to customize one's gaming experience by uploading photographs of real people. It would not be unreasonable, then, for a child's likeness to be shown within the media as a participant successful in cooperating with the medical procedure. Providing children with opportunities to beneficially use the

preprocedure waiting period, which is often a period of heightened suspense and concern, to virtually experience success with upcoming procedures could one day become a standard of care. This strategy raises additional considerations. For example, in video games characters are rewarded for certain actions in various ways (e.g., points, money, and health). In a pediatric medical context, reinforcement of adequate behavioral rehearsal (e.g., the video shows the child receive some prize for high scoring with cooperation) would, of course, have to be explored in terms of its effect on motivation. The objective would be to make cooperation intrinsically motivating.

Developing these technologies would require health practitioners and child life specialists to create dynamic preparatory packages tailored to individual children's needs and experiences. It would also have the added benefit of providing researchers with an opportunity to explore feelings of self-efficacy. Jaaniste et al. (2007) acknowledge the importance of self-efficacy in their model; however, this concept could be further studied. One's own appraisal of one's ability to cope with the demands may influence actions taken. Bandura (1986) and Kanfer and Stevenson (1985) have written on the development in children of self-efficacy appraisal. By having the child rate him- or herself as to confidence in dealing with the procedure, the feedback could then be used postprocedure to create preparatory packages that maximize the child's self-esteem for the next set of exposure to medical events. Thus, we would suggest that adding a feedback loop from coping response back to schema reconstruction would benefit the model of Jaaniste et al. (2007). This addition to the model would encourage researchers to investigate repeated performance over time and the reported schema which says, "I can do this. I have handled other situations just like this." Whether or not Jaaniste et al. would designate such thoughts as self-regulatory is unclear.

Who Should Deliver Preparatory Information to Children?

We argue that there are two primary candidates for roles as information provider: parent and health practitioner. Children in this country begin to interact with pediatricians and have exposure to medical experiences in infancy (i.e., receiving inoculations), and they typically continue to have regular contact with health practitioners throughout childhood. The National Center for Health Statistics (1986) reports that children under 18 years of age visit a doctor or hospital outpatient center an average of 6.7 times a year, and children between 5 and 17 years of age make 3.3 visits. These everyday experiences in pediatric health settings set the stage for all subsequent medical experiences and involve a complex interplay between parent-child-doctor.

Although medical personnel have been primarily responsible for helping prepare children for procedures, there is a need to consider parents as collaborators. Research in other domains suggests that children's receptiveness to information from each source will be influenced by multiple factors, including (a) their conception of that individual's knowledge state, (b) their previous experiences with that individual, and (c) synchrony between the child's coping strategies and those offered by others. With regard to authority, Herbst, Steward, Myers, and Hansen (1999) suggest that preschool-aged children put their trust in parents over all others, but that by middle childhood children have come to appreciate social position (e.g., teachers, doctors) as an indicator of legitimate authority. This suggests that, at least in the early years, much can be accomplished if the mother or caregiver is included in the preparatory process. However, trust in authority is not the only consideration. Research in the domain of language development finds that preschool children will disregard information about object labels provided by authority figures when that person has been wrong in the past, or when that person indicates

uncertainty in their provision of information (Koenig, Clement, & Harris, 2004; Sabbagh & Baldwin, 2001). Thus, in deciding on how to proceed with information provision, parents and clinicians need to think about their history with the child, and information should come primarily from whomever has provided the most reliable information in the past. Finally, research on children's coping strategies indicates that positive outcomes are more likely when children interact with others who share similar coping styles. For example, Lumley, Abeles, Melamed, Pistone, and Johnson (1990) demonstrated that, in preparing children for anesthesia, asynchrony of coping behaviors in the parent-child dyad (e.g., approach or avoidance coping) was related to distress. Dennis (2006) also studied approach and avoidance characteristics of parenting and examined how their fit with child temperamental approach reactivity is associated with child emotional self-regulation. Her findings suggest that when low-approach children interacted during a waiting task with mothers demonstrating high-approach behaviors, these children exhibited high levels of frustration. The waiting room of the physician's office would be an extremely relevant context in which to further examine these relationships.

In summary, the thought-provoking discussion of the *what*, *how*, *when*, and *by whom* of information provision offered by the authors reveals that no one approach is likely to work for every child. Instead, the selection of effective preparatory strategies will depend on individual child factors seen within a complex picture of how that child is able to regulate emotional experiences at the current time given his or her developing competencies.

SHORTCOMINGS AND ENHANCEMENTS OF THE MODEL OF JAANISTE ET AL.

The model articulated by Jaaniste et al. (2007) covers a great deal of territory. At times, this is done extremely well, and at times important points are underdeveloped. Given the already broad scope of the existing model, it is understandable that certain pertinent areas of research and theory were not addressed. We take this opportunity to briefly point to additional bodies of literature that might inform those attempting to extend the Jaaniste et al. (2007) approach in new directions.

First, recent work in the area of neuroscience is relevant in explaining how the self-regulating process operates on a neurobiological level. Jensen, Knapp, and Mrazek (2006) review studies which suggest that neural circuits play a distinct role in mediating an organism's responses to various forms of danger. These circuits based in the cortex, hippocampus, or other limbic structures are activated by visualization of the context ("formation of a schema"), allowing higher order processes to impact the amygdala. With maturation of these brain regions, psychological components of anticipation and dread are expected to play increasingly prominent roles in mediating an organism's response to danger cues. The construct of "readiness to receive information" could involve the ability of the provided information to trigger an action network, based on memory, by which the child in the past has reduced anxiety, thus enhancing the positive employment of the same coping responses.

Second, an underinvestigated topic in the Information Provision Model is that of coping behavior. There are many studies that describe the developmental changes in children's use of coping strategies (e.g., Rudolph, Dennig, & Weisz, 1995; Ryan-Wenger, 1992; Spirito, Stark, & Williams, 1988). In general, studies find that, with age, children replace behavioral strategies with more cognitive approaches, such as information seeking (Gedaly-Duff, 1991). Less information is available regarding children's use of emotion-

focused coping strategies. This is likely to be because emotion-focused coping mechanisms are not observable in the same way as problem-focused coping, hence it is necessary to get the verbal narrative of the child (Engel & Melamed, 2002). Whether emotion-focused coping is later emerging or just difficult to observe in young children is an important question. Compas, Conner-Smith, Saltzman, Thomsen, and Wadsworth (1991) take the view that there is a delayed emergence of emotion-focused coping skills and postulate several reasons to explain this developmental trajectory. Preschool children are more often less aware of or able to label internal emotional states than older children. In addition, preschool children may also fail to recognize that they have the ability to self-regulate their emotions.

Coping should be seen not only as a result of the regulatory process but also as a driver of it. Thus, feedback loops should be predicted. Coping is also something that one learns from one's exposure to adult models: parents at first and then perhaps the teachers and the care providers as well. We know how important peer group influences then become. It may be examined that revealing children's responses to other intense emotional stimuli, such as the first haircut, preventive inoculations, and undressing for the examination, may elicit the ready use of those coping responses in their repertoire. A quick questionnaire or behavioral checklist may help the provider select from among several strategies to suggest the child use. The coping mechanisms focus on the "constantly changing cognitive and behavioral efforts to manage specific internal and external demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984). Skinner, Edge, Altman, and Sherwood (2003) provide a model in which a more hierarchical system is presented for a fuller multidimensional approach. Seeing this as a process wherein the child may develop new behaviors or more effectively employ dispositional coping styles can

help us see that the model can be thought of as a probe for “resilience” in face of uncertainty.

Third, several research programs offer information that may be helpful in understanding the “fear” schema and anxiety that some children develop in medical contexts. Lang’s (1979, 1984) theory of bioinformational fear processes claims that children construct schemas that consist of emotional images involving description not only of the feared situation but of an action set to respond based on prior experiences. The outcome could be measured by multiple perspectives including parent observation, physician ratings on cooperation and compliance, as well as the child’s levels of discomfort as measured by physiological data, autonomic indices (perhaps even the brain imaging noted by the authors) and self-report or avoidance behaviors. Pine and Shapiro (2006) offer a different perspective with their view of anxiety as a by-product of vulnerabilities in some core alarm system. This evolutionary approach can help us look at the conditioning of fear responses to danger-related stimuli, such as painful medical procedures. Although many of the high rates of anxiety and fear during childhood recede with age, those children showing severe separation anxiety when it is no longer warranted may signal failure in development, in essence a maladaptive regulation of the fear responses. Prospective studies are sorely needed in which initial symptoms are controlled and coping behaviors are examined, as they change over developmental periods and even into adulthood (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Kubzansky, Martin, and Burka (2004) studied observed emotional distress in 7-year-old children during mental and motor tasks and followed them into adulthood. Parents also rated their children on the Child Behavior Checklist (Achenbach, 1991). The investigators found a clear continuity in that differences in distress proneness, attention, and inappropriate interpersonal self-regulation regardless of

child's descriptive diagnosis (learning disabled, attentional problems, or normal controls) were clearly related to their adult (age of 35 years) self-reported emotional distress. This type of investigation could arouse interest in researchers interested in adult psychopathology to look at youngsters' self-regulation in emotionally trying situations such as medical settings.

CONCLUSION

In summary, thanks to the model presented in the original article by Jaaniste et al. (2007), many thought-provoking paths have been opened. Consideration here of just a few of these paths suggests that the process of discovery can be enhanced by interdisciplinary adventures as our comments are informed by work in a variety of fields, such as pediatric psychology, child development, clinical psychology, and neuroscience. It is clear that the convergence of information from a diversity of research programs promises to lead to better strategies for helping children achieve the best possible outcomes in medical settings. And this, after all, is a worthy endeavor. The challenge is how to negotiate these interdisciplinary collaborations in real-world contexts. Bearison (1998) states, "It is unreasonable to expect that scientific findings from pediatric psychology, or any other scientific discipline, will adequately resolve practitioners' questions . . . because practice is not simply applying science" (p. 689). Instead, health practitioners have the responsibility of working with individuals with unique histories and expectations. We hope that both the model of Jaaniste et al., and our extension of some of their ideas, will lead to new research directions, new strategies for preparing children for medical experiences, and new partnerships among those striving to improve children's responses to medical experiences.

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