

**Parent-child interactions during painful medical procedures: recommendations by Blount and colleagues (1991) have not fallen on deaf ears!**

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**NO CONFLICTS OF INTEREST**

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Since the inception of the Journal of Pediatric Psychology 50 years ago, the important role of the social context in understanding children's pain experiences has featured to a large extent within the journal, thereby contributing to our growing understanding of the complexities within pediatric pain experiences. The work by Prof. Blount and colleagues, aimed at understanding the various social influences (i.e., from staff as well as parents) on the pain and distress experience of children undergoing medical procedures, produced a series of high-quality papers which played a prominent role in laying the foundations for this area of research (see e.g., Blount, Corbin, Sturges, Wolfe, Prater, & James 1989; Blount, Davis, Powers, & Roberts, 1991; Blount, Landolf-Fritsche, Powers, & Sturges, 1991; Blount, Sturges, & Powers, 1990; Frank, Blount, Smith, Manimala, & Martin, 1995). The focus of this commentary will be on the article by Blount and colleagues, originally published in the Journal of Pediatric Psychology in 1991, which demonstrated that adult's responses to child pain differ depending on children's level of coping behavior, with no differences observed for children's responsiveness to parents versus staff behaviors. These findings as well as their rigorous methodological approach, substantially influenced research and clinical practice on the social context of pediatric pain experiences during medical procedures. The two main recommendations the authors made, i.e. systematic replication of their findings and the need for evidence-based training programs, did not fall on deaf ears and have received substantial research attention in the past 30 years. This commentary will focus on providing a summary of how the evidence base on parent-child interactions during painful procedures has evolved since this publication, and how this growing evidence base influenced the design and evaluation of pain management interventions for acute pediatric pain.

Numerous subsequent studies aiming to further our understanding of the mutual influences between parents and children during painful medical procedures have adopted the observational

approach demonstrated by Blount and colleagues (1999). This is illustrated by a widespread usage of the Child-Adult Medical Procedure Interaction Scale-R (CAMPIS-R; Blount et al., 1997). Furthermore, the CAMPIS-R has been modified to accommodate exploration of parent-child interaction towards various pain experiences, thereby opening up an expansive line of inquiry that has and continues to advance research and clinical care of children undergoing painful procedures. These adjustments range from small changes, addition or deletions to make the CAMPIS-R applicable to the specific research setting and question (see e.g., Caes et al., 2014; Felber et al., 2011; Moon, Chambers, & McGrath, 2011; Schinkel, Chambers, Caes, & Moon, 2016), to using the CAMPIS-R as a basis for the development of a new coding scale, such as the R-PCAMPIS for the peri-operative setting (Chorney et al., 2009) and B-CAMPIS for burns (Brown, De Young, Kimble, & Kenardy, 2019). Furthermore, several other coding schemes have since been developed to assess specific aspects of parent-child interactions during painful experiences (see Bai, Swanson, & Santacroce (2018) for a full overview and assessment of their psychometric quality).

While Blount and colleagues (1991) relied on audio recordings, technological advancement facilitated the usage of video to capture parent-child interactions to become more standard. Importantly, the introduction of video recordings allowed research to move beyond verbalizations and explore non-verbal expressions. Although the inclusion of non-verbal behaviors within existing coding schemes is still underrepresented (Bai et al., 2018), the inclusion of non-verbal behaviors has further unraveled the complex social influences on pediatric pain experiences. For instance, Caes and colleagues (2014) revealed that non-verbal parental pre-procedural pain-attending behaviors were related to children's non-verbal pain behavior after the procedure as well as child distress and pain experiences during the procedure. An additional technological advantage has been the development of coding software, such as

Noldus The Observer® XT and Mangold INTERACT®. Such coding software does not only allow for quicker and easier coding, but also allows for more precise coding of the behaviors rather than relying on the traditional paper-and-pencil interval coding process.

The majority of the body of research on parent-child interactions, which has included larger samples, longitudinal evaluations and more focus on routine, brief medical procedures such as immunizations and venipunctures, has further strengthened the original findings, but also provided a more nuanced understanding of how parents and children mutually influence each other's emotional and behavioral responses. Indeed, there is now a strong body of evidence (see Brown, De Young, Kimble, & Kenardy, 2018 for an overview) indicating that parental coping-promoting behaviors, such as distraction, are related to better child coping (i.e. less distress and pain intensity, more engagement coping behaviors,) while parental distress-promoting behaviors, such as reassurance, are related to worse child outcomes (i.e. more distress and pain intensity, less engagement in coping behaviors). However, advances in the application of sequential analyses, revealed that the impact of parental reassurance depends on the state of the child, with parental reassurance found to only maintain children's distress, but not induce or promote child distress (Martin, Chorney, Cohen, & Kain, 2013). Further adding to the complexity, parental psychological distress is commonly observed during medical procedures and strongly influences their behavioral responses. Parental distress when faced with their child in pain has been found to be influenced by a myriad of factors, including children's distress behavior throughout the procedure (Brown et al., 2018), and is strongly related to parental engagement in distress-promoting behaviors (Caes et al., 2014; Martin et al., 2013).

This growing understanding stimulated the development of innovative interventions to support parents and children to engage in effective pain management strategies. These interventions vary from local hospital interventions (e.g. Blount et al., 1992; Cohen, Bernard,

Greco, & McClellan, 2002; Cohen, Blount, & Panopoulos, 1997; Cohen et al., 2015; Newell et al., 2018; Pillai Riddell et al., 2018) to wide-spread social media initiatives (e.g. <https://itdoesnthavetohurt.ca>). Most interventions have focused on providing and evaluating the effectiveness of child-, staff- or parent-led distraction. While the specific underlying mechanisms of distraction are not yet fully understood, most evidence points to the beneficial role of distraction to reduce child pain and distress during painful medical procedures (Birnie, Noel, Chambers, Uman, & Parker, 2018). However, training children to engage in effective coping skills might be more successful if parents are also involved in such training initiatives (Cohen et al., 2002). Indeed, evidence is accumulating on the beneficial effects of providing parental training in increasing parent's understanding of and engagement in effective pain management techniques, thereby reducing their child's pain experiences (Cohen et al., 2015; Newell et al., 2019; Pillai Riddell et al., 2018).

While we have come a long way, we have not yet reached the finish line in this area. Continued efforts and research will be needed to further increase the awareness of the important role parents can play in implementing evidence-based pediatric pain management strategies. In this context, it will be crucial to gain more insight on the impact of widespread educational initiatives through popular/social media and how such initiatives can complement local hospital-specific pain management programs. However, awareness raising might not be enough to implement powerful and simple pain management strategies, such as distraction, more routinely within practices. To further overcome this implementation barrier, it will be important to ensure that knowledge on and practical training of these pain management strategies is a key component within the standard curriculum of all relevant healthcare professions. Related to this, the majority of the current intervention studies have focused on providing either child, parent or staff pain management training and support. Given the strong evidence for mutual influences, future

research on the feasibility and benefits of training and supporting all involved parties is needed as such all-encompassing initiatives could have a more robust effect. Lastly, most available evidence is relevant for pre-school and school-aged children, with little known on the period of adolescence. While more independence in pain management is increasingly expected from adolescents, they still rely on and might benefit from parental support. More research is needed to understand how parent-child influences during painful medical procedures change throughout development and how this can inform pain management initiatives for adolescents and their parents.

Taken together, our understanding of the social influences on children's pain experiences during medical procedures has advanced tremendously since the article by Blount and colleagues in 1991. It is imperative that this enhanced understanding finds its way to routine practice. To this end, establishing and evaluating the effectiveness and sustainability of co-produced approaches (i.e., which actively involve researchers, clinicians, program directors, parents, and children) aimed at supporting staff and parents to play an active and collaborative role in children's pain management during medical procedures will be critical.

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