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Mother-Toddler Attachment in a Pediatric Setting: Presentation and Validation of the Pediatric Attachment Style Indicator

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Abstract

The pediatric exam with immunization is a stressful event for toddlers. Its characteristics are close to the classic "Strange Situation": a perceived threat, which activates the attachment system, a stranger, and an unfamiliar environment. As such, it can be used as a natural situation to assess the quality of the mother-child attachment, on one hand to manage the stress of the toddler during the pediatric exam, and on the other to screen for relationship disturbances. To this end, we have developed a specific coding instrument, the Pediatric Attachment Style Indicator (PASI), which allows classification of infant and toddler behavior in the pediatric exam as secure, anxious-avoidant, or anxious-ambivalent. This article presents the PASI instrument and its validation. Pediatric exams ($N = 41$ mother and toddler dyads) were videotaped during a booster session of the regular immunization schedule for toddlers in Switzerland. Results of the PASI coding were compared with other methods of direct observation of emotional behavior of the toddler (distress signals) and of the mother (verbal behaviors), with the information given by the mother to the toddler before the exam, and with the assessment of temperament of the toddler by the pediatrician. Results show good face validity and construct validity for the instrument.

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The pediatric office visit that includes immunization is a stressful situation for toddlers. They must face unfamiliar people (the pediatrician and other staff members), an unfamiliar place (the pediatrician's office), and an aversive and painful experience: the immunization itself. These characteristics are close to the underlying characteristics of the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978), which is designed to elicit attachment behaviors in children. The pediatric visit thus provides a unique opportunity to assess toddler's attachment in a naturalistic setting. This assessment may have two related goals: first, to help practitioners evaluate the emotion regulation skills of the toddler in order to manage her distress during the exam; and second, to allow screening for problematic mother-toddler relationships. To date, no systematic tool for the assessment of attachment in a pediatric setting has been available. The goal of this paper is to present an observational coding system designed specifically to this aim: the Pediatric Attachment Style Indicator (Berger, 1992). We first present a model of a toddler's coping with a medical stressor, and then show the role that attachment plays in this process.

Coping with medical stress in young children

Adjustment to medical situations has been extensively studied in children from 6 years of age, with an emphasis on the cognitive processes involved in coping with stress (see, for example, La Greca, Siegel, Wallander, & Walker, 1992). However, younger children have limited cognitive skills for coping. First, they are not able to understand the reasons for and the value of an immunization procedure. Accordingly, they focus mainly on the short-term aversive aspects of the situation (e.g., being restrained, pain where the immunization is administered), which increases, in turn, the potential for the perception of elevated stress and

pain (Young, 2005). Second, they are not yet able to use intentional self-regulatory behavior and thoughts that imply cognitive skills that are beyond their developmental stage, such as regulation of attention by distracting themselves from the threatening stimulus (Christiano & Russ, 1998; Gunnar, 1994; Öhman & Mineka, 2001; Zelikovsky, Rodrigue, & Gidycz, 2001).

Coping in younger children has been shown to depend on three interrelated categories of factors: dispositional, specific relational, and general relational (Aldwin, 2005; Favez & Reicherts, 2008; Kopp, 1989; Lewis & Ramsay, 1999; Ryan-Wenger, 1992).

Dispositional factors have been mainly studied through temperament, considered to be a biologically based tendency to emotional reactivity. Some children are more reactive than others, or are slower to self-regulate after being aroused; as a consequence, they may show more "negative" behaviors, for example, crying, fussiness, or withdrawal, when facing a challenging situation such as a medical situation—these temperamental characteristics are labeled as a "difficult" or "irritable" temperament (Buss & Plomin, 1984; Rothbart & Bates, 2006; Rothbart & Derryberry, 1981). Temperament also has an impact on maternal parenting, which tends to be more negative and disengaged when the child has a difficult temperament; therefore, in addition to being directly linked to the child's behavior, temperament may also have an indirect impact by its influence on maternal attitude, which, in turn, influences the child's stress reactions (Sanson & Rothbart, 1995).

Specific relational factors have been studied through the spontaneous behaviors of the mother during the medical visit on the one hand, and through the impact of her affective state on the child on the other (Calkins & Hill, 2007, Calkins & Johnson, 1998; Horton & Pillai Riddell, 2010). In infancy, maternal soothing behavior is indeed linked to infants' negative reactions (facial expression of pain, crying), "proximal soothing" (touching, holding the baby) being linked to faster relief after injection (Axia & Bonichini, 1998, 2005). The behavior of

mothers has been studied through the verbal comments they address to the child from the time of toddlerhood. Three main categories have been distinguished: (1) distress-promoting behaviors, which include apologies to the child, reassurance, being critical, being negative, or even being empathetic with the pain—all types of behavior resulting in a focalization on the threat, which, in turn, increases pain and anxiety; (2) coping-promoting behaviors, consisting mainly of distraction and humor, which are precursors of the self-initiated distraction strategies that have been shown to be the most effective in medical settings at virtually any age; and (3) neutral behaviors, which include all comments that are not distress or coping oriented. Maternal distress-promoting behaviors are more likely to be shown by anxious mothers, who tend to be more empathetic with their children as their own stress makes them apologize for what the child is going through because of them (Blount, Sturges, & Powers, 1990; Chambers, Craig, & Bennett, 2002; Piira, Champion, Bustos, Donnelly, & Lui, 2007; Sweet & McGrath, 1998). This maternal anxiety may "contaminate" the child so that she becomes anxious in turn (Whaley, Pinto, & Sigman, 1999). The more mothers are distressed in general (for reasons other than the health of the child specifically), the more likely they are to verbally express concerns and fears about and for their child during a pediatric exam (Wildman, Stancin, Golden, & Yerkey, 2004).

Finally, the general relational factors of the mother-child relationship may explain interindividual differences in the way mothers manage their own behavior during the pediatric exam. This factor has been far less studied in medical settings than has the specific behaviors of the mothers. The few reports that have addressed this variable within pediatric settings have described the relationship in terms of attachment (Carlson, Sampson, & Sroufe, 2003). We know, for example, that insecurity of attachment is correlated with a more frequent use of emergency services by parents (Harris, Weston, & Lieberman, 1989) and with less positive

interactive behavior in intensive care situations (Wright & Zucker, 1980). Research has also shown that secure attachment is linked to a child's diminished anxiety in the presence of the mother in stressful situations (Gunnar, Fisher, & The Early Stress Prevention Network, 2006; Hardy, Power, & Jaedicke, 1993). For example, physiological stress (measured by the cortisol level) increases less from immunizations when the parent is present, but only if the child is securely attached. Alternatively, physiological and behavioral stress increases for insecurely attached children when the mother is present (Gunnar, Brodersen, Nachmias, Buss, & Rigatuso, 1996; Ybarra, Passman, & Eisenberg, 2000). According to what has been observed in nonmedical settings, the way that the mother manages communication about emotions is the main attachment-related variable explaining differences in stress reactions in children. Attachment security is indeed linked with a more open and direct communication about emotional events, positive and negative, in parent-child discussions; commenting and talking about emotion has, in turn, been shown to be linked with emotion regulation and competence in coping with challenging and stressful events, as it makes the environment predictable and helps the child to understand the actions and intentions of others (see Alexander, Quas, & Goodman, 2002, for a review; Farrar, Fasig, & Welch-Ross, 1997; Thompson & Meyer, 2007). Hence, our interest will be to assess to what extent attachment patterns are linked with differences in the way the mothers have prepared their toddler for the upcoming exam.

Observing attachment in a pediatric setting: the Pediatric Attachment Style Indicator protocol

The Strange Situation (Ainsworth et al., 1978) has been one of the principal methodological tools for assessing the quality of an infant's attachment to a parent. At 1 year old, an infant's Strange Situation attachment classification of secure, insecure-avoidant, or insecure-resistant is thought to be the product of the prior interactive patterns between parent

and child in the home environment. The hypothesis that Strange Situation attachment patterns represent an inner working model of relationships from which the developing child assumes stability and coherence in the organization of such relationships over time and across contexts (Bowlby, 1969). Theory would predict, therefore, that attachment behavior should be evoked whenever the toddler is faced with a situation in which he is required to cope with and rebound from stressful experiences. A pediatric visit that includes immunizations clearly meets these criteria.

Although this theoretical framework fits well with the pediatric situation, empirical data on attachment in pediatric settings is scarce, mainly because a specific instrument of evaluation for attachment in a pediatric setting is lacking. Studies that have linked attachment and coping in medical settings have not used direct observation of attachment behaviors in the medical setting itself.

The Pediatric Attachment Style Indicator (PASI; Berger, 1992) that we present in this paper has been designed to fill this gap. This is a research protocol for observing patterns of interaction between parents and children during pediatric health supervision visits modeled on expected behaviors of secure and insecure infants in the Strange Situation. PASI scoring allows for classification of attachment behavior as secure, avoidant, or ambivalent. It uses the behavior of the child toward the pediatrician and the mother, as well as the mother's behavior toward her child during and following procedures, as the main indicators of the relationship. Among the behaviors evaluated are emotional signals from the child and responsiveness of the mother. Other relevant observations include distance between parent and child at various times during the exam, mutual gazes, tonality of affects, body contacts, and the child's social referencing. Reactions of the child to the different phases of the exam are also assessed on the basis of modification of attention level, hypervigilance, reaction to the arrival of the

pediatrician in the room, and soothability of the child by the mother when distressed (see below for a detailed description of the three attachment categories). Convergent validity of the PASI with the Strange Situation has been demonstrated (Berger, 1992): Attachment of 65 mother-infant dyads was assessed with the PASI by independent raters during a pediatric visit and in a classic Strange Situation 1 month later. Results showed a significant interdependence between the two situations (78.5% of the sample was classified in the same category); asymmetrical lambda demonstrated a .73 increase in predictability of the Strange Situation classification when using attachment styles from the pediatric visit.

In accord with the PASI schemes, a prototypical description of the behavior of children for each type of attachment was done (see Table 1 for a summary of coding criteria). This description follows the segmentation of the medical exam in three parts, articulated around the main event of this visit—the inoculation—which is also the main threat that the toddler has to cope with: first, preimpact (before the immunization), and then impact (the very moment of the inoculation), and finally postimpact (recovery and end of the exam).

Secure behavior

Preimpact: The child is relaxed and explores the environment. She talks to the mother and shows her what she sees in the room. She may be actively soliciting her and is responsive to the mother's solicitations. Affects may be positive, or the child may show some wariness. During the pediatric status (measurement of height, weight, and head circumference by a nurse), the mother steps back, but stays in the visual field of the child.

Impact: The child may cry or not. When distressed, the child searches for her mother and is quickly comforted when in contact with her. Mother gives a warm response to the child.

Postimpact: The child returns quickly to the emotional state she had prior to the immunization. She might talk about the pain, showing the injection spot and saying: “Ouch.” The mother acknowledges her pain, but quickly switches to another topic—usually what they will do once the exam is over.

Avoidant behavior

Preimpact: The child is calm and rather passive. Her affects are neutral, but not relaxed. There are only a few visual contacts with the mother. The child shows no resistance to the examination, but may seem to be on “ standby.” She may sometimes whine a little, without any particular reaction by the mother. There might be exploratory behavior, but in a rather stereotypical manner (asking questions such as “What’s this?” about the objects in the room). Mother is talking more to the medical staff than to the child.

Impact: The child may cry or not. When distressed, she stops crying very quickly by her own control without turning toward the mother.

Postimpact: The emotional tone is “hidden sadness.” The child is calm, but rather vigilant. Positive affects may surface as the child is being dressed, which is a signal for the end of the exam.

Ambivalent behavior

Preimpact: The child is immediately resistant to the exam. She refuses the pediatric status and may cry, scream, and show distress that seems out of proportion to what is really happening. Mother does not succeed in soothing her, although she can try hard. Her behavior may alternate between pleas to the child and harsh statements. She stays physically very close to the child, reassures her frequently, and, at the same time, banalizes what is happening.

Impact: Mother tries to restrain the child with the help of the nurse to allow the immunization to take place. The child is shouting and crying; her distress, which had at first a forced tone to it, turns then to what seems like genuine despair.

Postimpact: The child does not recover, although her distress is less intense. She keeps on showing resistance even when she is being dressed.

Aim of the paper and hypotheses

The aim of this paper is to present the validation of the PASI in a naturalistic setting of routine immunization (Berger, 1992). Construct validity will be tested against an alternate measure of coding the expression of distress in toddlers and compared with the preparatory information spontaneously given by mothers to their toddlers prior to the exam. In accord with the theoretical framework presented earlier, the PASI codes will also be tested against variables related to temperamental features of the toddlers and variables related to the specific behavior of the mothers during the exam. The following hypotheses are postulated:

First, we expect preparation for the exam to be related to attachment categories; specifically, we expect mothers of secure toddlers to be more likely than mothers of avoidant and ambivalent toddlers to have talked about the upcoming immunization with their toddler prior to the visit.

Second, we expect the security of attachment to be related to the expression and reduction of distressed behaviors related to the procedures of a medical visit. Toddlers with secure attachment will be less distressed before the immunization phase of the visit and will recover from their immunizations more rapidly (i.e., show less distress postimpact) than avoidant toddlers. Ambivalent children will show more distress before and after the immunization than the secure and anxious-avoidant children.

Third, we expect the PASI codes to be related to the verbal behavior of the mother, with more coping-promoting behavior of the mothers of secure toddlers and more distress-promoting behaviors of the mothers of ambivalent toddlers throughout the entire exam. Mothers of avoidant toddlers will have more neutral comments than other mothers.

Finally, we expect the PASI codes to be related to the temperament of the toddler, as assessed by the pediatrician; ambivalent toddlers will be rated higher on emotional dimensions than will secure and avoidant toddlers. Avoidant toddlers will be rated lower on these dimensions than will secure and ambivalent toddlers.

Method

Context of the research and sample

Forty-nine families were contacted at the time of the third booster injection for the diphteria-tetanus-pertussis immunization, which is between 15 and 24 months of age, in Geneva, Switzerland, where the research was conducted. Forty-one families agreed to participate. Among reasons for refusal were reluctance to being filmed, uncertainty about the use of the information collected during the exam, and privacy. Of the 41 children, 23 were girls and 18 were boys. The mean age was 22.7 months (SD = 4.7).

Preliminary assessment

The level of development of the children was controlled in order to rule out potential effects of developmental delay on the research variables. The pediatrician completed the Harvey scales for child development (Harvey, 1984); results show that the developmental quotient of our sample is in the norm for its age (mean = 100, SD = 11, range = 85 to 123). No child was excluded.

There is no link between gender of the child and any of the variables of the research; gender was therefore not included in subsequent analyses.

Mothers completed a questionnaire about their husband's and their own educational level and current occupation. The Hollingshead Index of Social Position (two factors) showed the following distribution for the families of our sample: lower class (3%, one family), lower-middle class (24%), middle class (33%), and upper-middle class (39%). The Index of Social Position is not linked to the other variables of the study.

Procedure

The study was approved by the Pediatric Society of Geneva and by the Ethical Commission of the Medical Association of Geneva, Switzerland. In order to guarantee data confidentiality, we designed the procedure as follows: at the time a family asked for an appointment for the immunization visit, the medical staff asked the family for a preagreement to be part of the research project. In the case of a positive answer, the staff would ask the family to come to the visit 15 min early to meet the experimenter. At the time of the meeting, the experimenter would explain the purpose of the research to the parent(s) and give them a consent form and several questionnaires to be returned once completed (with a self-addressed envelope).

Four pediatricians were involved in the study (three women, one man). The exam itself has a standardized procedure: first, the pediatric status is done by a nurse. The pediatrician then enters the room and does an anamnesis interview before examining the child. Then the immunization is performed by the nurse, the child being seated on her mother's knees and held by the mother and the pediatrician. After the exam, the pediatrician fills in questionnaires to assess the child's behavior and her level of development. For the purpose of this study, the

appointment was divided into three key segments: the preimpact phase (the nurse does the pediatric status, the pediatrician gathers anamnesis data), the impact phase (the immunization itself), and the postimpact phase (the child is comforted and dressed, the pediatrician answers questions from the mother and gives prescriptions).

The entire consultation is videotaped by a researcher, with a mini-digital video camera installed on a tripod.

The mean duration of a consultation was 24 min (*SD* = 5 min, range = 12 to 42).

Face validity of the situation

All parents and pediatricians describe this situation as emotionally challenging. Mothers report the difficulty of doing "harm for good" and often feel guilty for exposing their children to such a challenging experience. Observation of behaviors show that the immunization is the high point of the exam, as it is mentioned several times during the preimpact phase by parents or pediatricians, or by both, and the toddler's relational behavior is clearly different before, during, and after the injection. This observation is consistent with the idea that this medical exam activates the attachment system of the toddler.

Coding strategy

In order to avoid interdependence of coded data, different pairs of coders did the coding for each observational variable; six coders were thus involved in the coding. The coders were undergraduate students who were doing research for their master's thesis. Each of them was trained by their thesis supervisor (N.F.). The coding was done individually by the coders, each of them being blind to the coding of other variables. Interrater agreement was then computed for each pair of coders, and disagreements were afterward discussed with the supervisor and a

decision made about which code had to be kept for subsequent analyses. The PASI has been coded from the videotapes of the visits (kappa = .73).

Instruments

A short questionnaire about the preparation for the exam was completed by the mother in the waiting room; this questionnaire contained two yes or no questions ("Did you tell your child that you were going to the doctor today?", "Did you tell your child that there would be an immunization?") and two open questions about what the mother had precisely said, how her child had reacted, whether the mother thought that, in general, an event like this has to be explained to a child beforehand, and whether she thinks that her child would prefer to be warned or not.

Distress behavior of the toddler was coded with the Alarm Distress Baby Scale (ADBB; Guedeney & Fermanian, 2001). This scale is designed to assess distress and withdrawal in infants and toddlers (2 to 24 months old) according to eight variables rated by observation on a Likert scale ranging from 0 (*no unusual behavior*) to 4 (*severe unusual behavior*). The variables are (1) facial expression, (2) eye contact, (3) general level of activity, (4) self-stimulating gestures, (5) vocalizations, (6) briskness of response to stimulation, (7) relationship, and (8) attraction. Interrater reliability was computed for 40% of the situations; intraclass correlations were on average 0.74 ($p < .001$), which was judged as satisfactory. In order to have a measure of the evolution of the distress signals throughout the exam, we coded the signals every 60 s and then computed a mean for each of the three parts of the exam. With this method, we could also control for the variability in the length of time of each exam and the number of signals a child could express (i.e., the longest exam was almost four times longer than the shortest one). Given the small size of our study sample, we aggregated the data into one "distress" score for each time period of the consultation, given the

acceptable reliability coefficient for the scale (relative to the small number of items): preimpact ($\alpha = .70$), impact ($\alpha = .75$), and postimpact ($\alpha = .70$).

Verbal behavior of the mother during the exam was coded through direct observation according to the second version of the Child-Adult Medical Procedure Interaction Scale (CAMPIS; Blount et al., 1989), the CAMPIS-R (Blount et al., 1990), which is a well-validated instrument in pediatric psychology. Three categories of coding were used in this research: coping-promoting behaviors, stress-promoting behaviors, and neutral behaviors of the mother. Coping-promoting behaviors refer to verbal comments or interactions that have been shown to lower the child's stress in medical settings (e.g., humor, distracting comments), whereas stress-promoting behaviors have been shown to be related to an increase in the child's stress behaviors (e.g., reassurance of the child, apologies, criticism) and neutral behaviors refer to verbal comments that do not belong to the two previous categories. Each occurrence of maternal verbal behavior is coded according to one of those three categories; a total score is computed for each part of the medical exam (preimpact, impact, postimpact) and for the entire exam. According to the procedure described by Blount et al. (1997), we used a proportion-based metric, which means that the number of occurrences of a given behavior was divided by the total number of coded behaviors for each mother. This procedure was followed in order to account for variation in the number of verbal comments across situations with different mothers. Interrater reliability was computed for 25% of the situations; intraclass correlations were on average 0.80 ($p < .001$), which was judged as satisfactory.

Toddler temperament was assessed by pediatricians through the Emotionality, Activity, and Sociability Temperament Survey (EAS; Buss & Plomin, 1984). This questionnaire assesses four temperament dimensions on five scales each, ranging from 1 (*not characteristic*)

to 5 (*very characteristic*): shyness ($\alpha = .95$), emotionality ($\alpha = .85$), activity ($\alpha = .86$), and sociability ($\alpha = .98$).

Results

Preliminary comparisons

We observed interindividual differences in the behaviors of the children, which we were able to catch with the PASI as the behavioral expression of the three different attachment categories. Attachment distribution was close to that found by Berger (1992; see Table 2) in the study done in Chicago with 1-year-old infants to design the PASI instrument; although there were fewer avoidant but more ambivalent children in our sample, the difference was not significant (chi-square). We noted a lower proportion of secure children in both the Berger sample and in the present study compared with the classic distribution of attachment categories in Strange Situations (Ainsworth et al., 1978). This difference is significant (chi-square (2) = 8.4, $p < .05$), residual analyses showing that it is mainly due to the higher proportion of ambivalent children and the lower proportion of secure children.

Construct validity

To test the construct validity of the PASI, we then checked the coding of the attachment category against different variables related to attachment according to the model presented earlier. As the sample size was small, we opted for nonparametric analyses, comparing first the three styles of attachment with the Kruskal-Wallis H index, and then in the case of the H being significant, comparing the styles by pairs with the Mann-Whitney U index, using 0.016 as the critical value for each comparison.[1] Descriptive data for the study variables are given in Table 3.

We first compared the information received by the toddler prior to the visit according to their attachment style (see Figure 1). There was a strong tendency for a secure toddler, compared with an avoidant toddler, to be informed beforehand (Fisher's exact test = .059); there was no difference in information given beforehand between ambivalent toddlers and either secure or avoidant toddlers.

Regarding the expression of distress coded through the ADBB scale, the results showed a significant difference according to attachment styles for the distress that was expressed preimpact ($H(2) = 6.9$, $p < .05$), during impact ($H(2) = 9.8$, $p < .01$), and postimpact ($H(2) = 8.8$, $p < .05$; see Table 4). Post hoc comparison showed no difference between ambivalent and avoidant children in the expression of distress, regardless of the part of the exam. On the other hand, secure children expressed significantly less distress than ambivalent children in every part of the exam (all comparisons significant at < .016), with medium effect sizes for each comparison.

As for the verbal behavior of mother, there was no difference according to attachment style in the coping-promoting and neutral behaviors of mothers; the only significant difference was in the distress-promoting behaviors ($H(2) = 6.7$, $p < .05$) at preimpact. Mothers of ambivalent children tended to make more distress-promoting comments than did mothers of avoidant children ($U = 9.5$, $p < .05$) and mothers of secure children ($U = 51.5$, $p < .02$). Both effect sizes were medium. No difference was found between secure and avoidant mothers.

Regarding temperament assessed by a pediatrician, a significant difference appeared for shyness ($H(2) = 6.5$, $p < .05$) and for emotivity ($H(2) = 7.8$, $p < .05$). Post hoc comparison showed that ambivalent children were rated as significantly more shy than secure children ($U = 58.0$, $p < .016$) and that there was a tendency for ambivalent children to be rated as more

emotive (U = 75.5, $p = .09$). Avoidant toddlers were significantly rated as more emotive than secure children (U = 17.5, $p < .016$). All effect sizes were medium. There was no difference between avoidant and ambivalent children.

Discussion

In this study, we aimed to present and validate the PASI system, an instrument designed to assess attachment in a pediatric setting, in a naturalistic setting of routine immunization in toddlers. Although fewer significant results were found than postulated, they were all in the expected direction, which speaks to the validity of the PASI.

First, we were able to observe the three main categories of attachment behavior described in other settings, as in the well-known Strange Situation: secure, avoidant, and ambivalent attachment. These individual differences show that the pediatric exam is indeed a stress-eliciting situation, which activates the attachment system and the search for protection by the child. On the other hand, we found a slightly different distribution of attachment categories than usually described in the classic Strange Situation procedure. Indeed, in this medical setting, we found fewer secure and more ambivalent attached children. Although the two situations are similar, the immunization or medical setting poses a different kind of "danger" from that of the Strange Situation, as not only is there a (relative) stranger that the child has to face, but there is also an objective unpleasant event associated with pain. Our sample size, however, is too small to evaluate whether this difference is incidental and might disappear with an increase in the number of subjects, or if it is actually due to the difference between a laboratory situation and this naturalistic situation. Nonetheless, these differences are not beyond the frequently noticed inter- and intracultural variations in attachment classifications (van Ijzendoorn & Kroonenberg, 1988).

Second, we tested the PASI codes against several variables that were theoretically related to attachment, according to the theory of coping with medical stressors in young children. Our hypotheses concerning the links between the PASI and these variables were all confirmed, but only partially. Regarding the information prior to the exam, we found indeed that mothers of secure children are more likely to forewarn their toddler of the upcoming immunization than are mothers of avoidant toddlers. However, mothers of ambivalent toddlers did not differ either from mothers of secure toddlers or from mothers of avoidant toddlers on this measure, indicating that these mothers can either inform the child or not.

As expected according to our second hypothesis, expressed distress is linked to attachment at each phase of the exam. Before, during, and after the immunization, ambivalent children express more distress than secure children. The acceptable internal reliability of the scales points to a composite picture of distress manifestation: a high score on the ADBB refers to toddlers who may increase some behaviors (self-stimulation), but who also withdraw from the interaction by reducing signals of readiness to interact (eye contact, affective facial expression)—all behaviors consistent with an ambivalent attachment. On the other hand, we did not find an "intermediate" position of secure toddlers because, contrary to the behavior we expected, they did not express more distress than avoidant toddlers.

Our third hypothesis was also partially confirmed; mothers of ambivalent children tend to produce more distress-promoting behaviors than do mothers of secure and avoidant toddlers, but during the preimpact phase only. However, we did not find a difference in these behaviors between mothers of secure toddlers and mothers of avoidant toddlers. Coping-promoting and neutral behaviors did not discriminate between mothers.

Our fourth hypothesis was confirmed by asking the pediatricians to rate toddlers' temperamental dimensions from their general knowledge of the child (each toddler had the

same pediatrician from birth on and had visited him or her at least five times before this immunization session). Comparison of these ratings with the attachment classifications showed that ambivalent toddlers are shyer and more emotive than secure children and that avoidant children are more emotive than secure children.

These results tend to validate the PASI system, but with different variables for each distinction between attachment categories:

- Secure and avoidant toddlers are differentiated on the one hand by the tendency of the mothers of secure toddlers to talk about the upcoming immunization prior to the visit, and on the other by the tendency of avoidant children to be rather emotive according to the ratings done by the pediatricians (whereas the coding of attachment as avoidant refers to children who tend to restrict their emotional expressions; this composite picture is nevertheless consistent with other observations of avoidant infants and children, which have shown that these children may have a high level of physiological arousal in a stressful situation while being behaviorally rather calm).
- Secure and ambivalent toddlers are differentiated mainly by a more intense emotional expression in ambivalent toddlers and a tendency of their mothers to make more distress-promoting comments; here also, this finding is consistent with the description of the ambivalent type of attachment as being related to a high level of emotional arousal and expression associated with difficulty in calming down. Accordingly, ambivalent children are rated as more shy and emotive than secure children by the pediatrician.
- Finally, avoidant and ambivalent toddlers are differentiated by only one variable, the tendency of mothers of ambivalent children to express more distress-promoting comments.

Being able to discriminate attachment types in toddlers during the pediatric exam has implications for the pediatric practice. Indeed, avoidance, security, and ambivalence are three different styles in emotion regulation and attentional processes. We know from research with older children in medical settings that children benefit from different psychological interventions (or preparatory procedures) in accordance with their coping style. For example, two coping intentions have been described, depending on their attentional foci: monitoring and blunting (Miller & Green, 1985; Miller, Sherman, Combs, & Kruus, 1992), the first one being characterized by vigilance and problem-solving tendencies, the second by avoidance (not in attachment terms) and self-centered regulation. For "monitors," information about the medical procedure is beneficial, as it makes the situation more predictable to them; in contrast, information increases the stress for "blunters," as it foils their avoidance effort—these children will benefit more from distraction procedures, for example (see Christiano & Russ, 1998).

This matching between procedure and coping intention has been referred to as the "congruency hypothesis," according to which the most efficient interventions in medical settings to release stress in children are those corresponding with the child's attentional preferences. Whatever a child's particular strategy, its concordance with the behavior of adults in the immediate social context seems to be the main predictor of distress (Auerbach, Kendall, Cuttler, & Levitt, 1976; Lumley, Abeles, Melamed, Pistone, & Johnson, 1990). In this line of thought, understanding toddlers' reactions in an attachment framework may help practitioners to adapt their interventions to the style of the child. As ambivalent children are likely to be very distressed in such a stressful situation—their behavior can be understood as an attempt to increase the predictability of the events—giving them information and making the situation more predictable should help them to cope with the stress. Conversely, avoidant

children may benefit from receiving less information, as this may help them to divert their attentional focus away from the exam and reduce the effort required to minimize the danger, according to the well-described avoidant strategy.

Finally, some authors have long advocated that the pediatric exam be used as a screening situation for relationship disturbances (Drotar, Stancin, Dworkin, Sices, & Wood, 2008; King & Glascoe, 2003; Parens, 1972). Being able to assess the relationship, in terms of attachment, with a reliable instrument would allow the pediatrician to have a more comprehensive understanding of the development of the child. As "anticipatory guidance"—age-specific counseling—is an important part of a pediatric exam (Dworkin, 2000), better knowledge of the relational context in which a given behavior of the child may occur, or a specific concern of the mother may be formulated, can help pediatric practitioners to choose more accurate advice and to appropriately orient the mother toward clinical services if needed.

Although there are several limitations to this study, the first step of the validation of the PASI instrument is promising. Further studies are needed to replicate these results with a larger sample and to study the differences between the attachment types in more depth, in particular to further specify the differences between avoidance and ambivalence.

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Footnotes

[1]According to the Bonferroni correction, when the Mann-Whitney test is used as a post hoc measure for Kruskal-Wallis, the critical value of .05 is divided by the number of comparisons done, in our case three.

Table 1

Summary Sheet for PASI Coding—Pediatrician in the Room

Attachment categories	Child before the exam	Child during the exam	Child after the exam	Mother
Secure	Takes note of the physician's entrance into the room Responds positively if greeted Social referencing to mother Orients toward mother or seeks proximity to her First cautious, then "warms up" May explore the room Affects are neutral and/or positive	May be distressed or not; tries to get closer to mother and looks at her Cooperative Easily comforted by mother Does not resist contact with mother	Shifts quickly to play activities Searches for closer contact with mother Again shows alternate patterns of play and contact seeking with mother Does not resist release if on mother's lap	May focus on the physician and answers questions while attending to her child's activities Nonintrusive when the child plays Responsive when the child initiates interaction
Avoidant	Takes note of the physician's entrance into the room Friendly toward pediatrician No social referencing to mother Plays without paying attention to what the adults are doing Affects are more positive toward pediatrician than toward mother	May be distressed or not; tries to "escape" from the adults Distress quickly disappears, but without contact or help from the mother Tries to distract the pediatrician from the exam through play May show positive affect when facing stressful procedure	Does not try to make contact with the mother Attention is focused toward elements in the exam room Does not resist release Can get closer to mother when she talks to the pediatrician, but does not look at her or interact with her	Keeps herself at a distance Does not try to comfort the child Insufficient or no effort to pick up or to reconnect with the child once the exam is over
Ambivalent	Takes note of the physician's entrance into the room Shows high level of distress Seeks immediate contact with mother, with an apparent level of "emergency" Rejects contact with the pediatrician No exploration activities Anger or distress prevail	Protests heavily and shows anger or passivity and helplessness Seeks mother's contact Shows more distress when examined on the table rather than on mother's lap	Seeks contact and gets close to mother, but is not comforted Fails to calm down, may even get more upset once the pediatrician has left the room Gets distressed when released, but at the same time resists contact with mother	Shows difficulties in managing the "double agenda" of talking with the pediatrician and paying attention to the child Seems happy that the child stays close to her or seated on her lap Tries unsuccessfully to soothe the child; persists in using the same strategy (offering food, toy) even when it fails to soothe the child

Table 2

Numbers and Percentages of Children in Attachment Categories in Medical Settings and in the Classic Strange Situation

	Attachment categories		
Studies	Secure	Avoidant	Ambivalent
This study	24 (58%)	6 (15%)	11 (27%)
Berger (1992)	37 (57%)	16 (25%)	12 (18%)
Ainsworth et al. (1978)	70 (66%)	23 (22%)	13 (12%)

Table 3

Descriptive Data of Study Variables (Mean and Standard Deviation)

	Secure ($N = 24$)	Avoidant ($N = 6$)	Ambivalent ($N = 11$)	All
ADBB overall distress				
Preimpact	0.7 (0.1)	0.9 (0.1)	1.2 (0.1)	0.9 (0.1)
Impact	0.4 (0.1)	0.7 (0.1)	1.3 (0.1)	0.8 (0.1)
Postimpact	0.6 (0.0)	0.9 (0.1)	0.9 (0.1)	0.8 (0.1)
CAMPIS stress-promoting behaviors				
Preimpact	02 (00)	01 (00)	05 (02)	03 (01)
Impact	07 (01)	12 (03)	11 (03)	10 (02)
Postimpact	01 (00)	06 (06)	04 (02)	04 (03)
CAMPIS coping-promoting behaviors				
Preimpact	19 (02)	24 (05)	10 (02)	18 (03)
Impact	15 (02)	26 (09)	09 (02)	17 (04)
Postimpact	26 (03)	29 (08)	17 (05)	24 (05)
CAMPIS neutral behaviors				
Preimpact	39 (03)	41 (02)	35 (05)	38 (03)
Impact	21 (08)	34 (03)	26 (08)	27 (06)
Postimpact	37 (08)	48 (04)	41 (07)	42 (06)
EAS temperament dimensions				
Emotionality	2.4 (0.2)	3.0 (0.4)	3.6 (0.1)	3.0 (0.2)
Shyness	2.4 (0.2)	2.9 (0.3)	3.1 (0.3)	2.8 (0.3)
Activity	3.1 (0.1)	2.9 (0.2)	2.7 (0.2)	2.9 (0.2)
Sociability	3.4 (0.1)	2.9 (0.1)	2.9 (0.3)	3.1 (0.2)

Note. ADBB = Alarm Distress Baby Scale; CAMPIS = Child-Adult Medical Procedure Interaction Scale; EAS = Emotionality, Activity, and Sociability Temperament Survey.

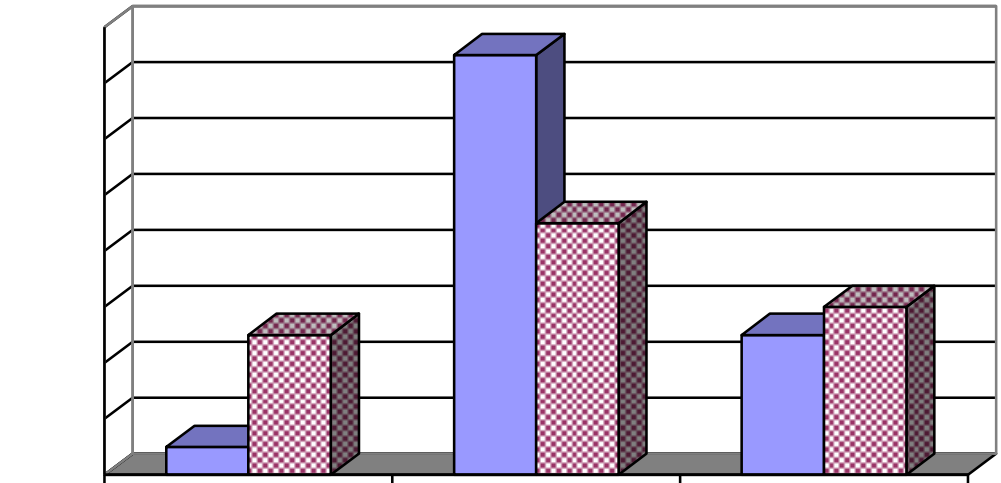
Table 4

Comparison of Study Variables According to Attachment Categories (Significant Variables Only)

		Specific contrasts (Mann-Whitney U and effect sizes)		
	Kruskal-Wallis	Secure/Avoidant	Secure/Ambivalent	Avoidant/Ambivalent
ADBB overall distress				
Preimpact	6.9*	-	38.5°, $r = .43$	-
Impact	9.8**	-	31.5°, $r = .48$	-
Postimpact	8.8*	-	34.0°, $r = .46$	-
CAMPIS stress-promoting behaviors				
Preimpact	6.7*	-	51.5*, $r = .39$	9.5*, $r = .47$
EAS temperament dimensions				
Shyness	6.5*	-	58.0°, $r = .40$	-
Emotionality	7.8*	17.5°, $r = .45$	75.5^{+}, $r = .30$	-

Note. ADBB = Alarm Distress Baby Scale; CAMPIS = Child-Adult Medical Procedure Interaction Scale; EAS = Emotionality, Activity, and Sociability Temperament Survey.

*$p < .05$. **$p < .01$. °$p < .016$. $^{+}p = .09$.



	Avoidant	Secure	Ambivalent
Yes	1	15	5
No	5	9	6

Figure 1. Information given to the toddler by the mother according to attachment style.