

Infantile Spasms: Facial Expression of Affect before and after Epilepsy Surgery

Rochelle Caplan,^{*†} Donald Guthrie,^{*†} Scott Komo,^{*}
W. Donald Shields,[‡] and Marian Sigman^{*†}

**Department of Psychiatry, †Mental Retardation Research Center, ‡Neurology and Pediatrics, UCLA*

This is a longitudinal study of facial expression of affect in 28 children with intractable infantile spasms who underwent epilepsy surgery. After a mean follow-up period of 1.8 years, there was a significant increase in positive affect, a significant decrease in neutral affect, and no change in negative affect during a nonverbal communication paradigm. These findings were unrelated to surgical (i.e., side of surgery, type of surgery) or seizure-related variables (i.e., seizure control, age at onset of illness, duration of illness, change in antiepileptic drugs). Comparison of affect in a subgroup of 16 patients with those of 32 normal subjects suggest a normal age-related increase in the use of positive affect. Both before and after surgery, the patients used the most positive affect while not communicating. They also used significantly more positive affect during while requesting objects or assistance rather than during social referencing. Intractable infantile spasms might be associated with reduction in the facial expression of positive affect and with impaired use during social communication. © 1999 Academic Press

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There are two theories on the role of the cortex in the regulation of affect. According to the first theory, the lateralization theory, the right hemisphere processes and regulates the perception and expression of emotional processes (Borod et al., 1993, 1997; Gainotti, 1983; George et al. 1993; Silberman & Weingartner, 1986; Roschmann & Wittling, 1992; Schmitt et al., 1997). According to the second theory, the valence theory, both hemispheres are involved in this process, the left hemisphere is specialized for the expression

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of positive and the right is specialized for the expression of negative affect (Davidson, 1984; Fox & Davidson, 1984; Wheeler et al., 1993).

There are several studies in children with brain damage that support the first theory. Using Ekman and Friesen's Facial Action Coding System (FACS) (1978) in 6- to 24-month-old children with unilateral brain damage due to prenatal or perinatal events, Reilly et al. (1995) demonstrated reduced frequency of the expression of positive affect if brain damage involved the posterior right cerebral cortex. The infants with brain damage in the posterior left cortex used the same amount of positive affect as the normal infants. During both free play and a wrist restraint paradigm, the infants with right posterior damage used negative affect more frequently than those with left posterior damage, who, in turn, responded like the normal infants.

On measures of temperament, right hemiplegic toddlers were less adaptable than toddlers with left hemiplegia or normal toddlers (Koeda, 1994). Nass and Koch (1987) also found more negative temperament based on parental reports for the difficult/easy, but not the approach/withdrawal category of the Toddler's Temperament Scale (Fullard et al., 1979) in 1- to 3-year-old toddlers with right compared to left focal brain damage. Children with right hemisphere damage had more difficulty with the comprehension of prosody, the affective modulation of voice, compared to those with left hemisphere damage (Trauner et al., 1996). There were no differences in the expression of prosody, however, between these two groups of children.

Studies on the relationship between affect and EEG in normal children support the valence theory (Dawson et al., 1992; Davidson, 1992; Fox, 1994). EEG evidence for activation of the left frontal lobe is associated with positive affect and approaching behavior whereas activation of the right frontal lobe is associated with negative affect and withdrawal behavior (Fox, 1994). During the first year of life, normal infants had more left frontal activation for conditions that stimulate positive rather than negative affect (Davidson, 1992). In contrast, right frontal activation was associated with negative affect, such as disgust in response to bad tasting foods (Davidson, 1992). Similarly, 10-month-old infants who cried when separated from their mothers had increased right compared to left frontal activation than noncrying infants (Davidson & Fox, 1989). Prior to the maternal separation, however, there were no discernible differences in the facial expression of the infants who responded with crying compared to the noncryers. In older children EEG findings of decreased left frontal activation were associated with an inhibited temperament whereas decreased right frontal activation correlated with an uninhibited temperament (Kagan et al., 1988).

Dawson et al. (1992) replicated Davidson and Fox' (1988) EEG findings on 21-month-old normal children and concluded that asymmetry of frontal lobe activation reflects differences in regulation and coping strategies rather than differences in emotional valence. More specifically, Dawson (1994) hypothesizes that the left frontal region is specialized to regulate affect through

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