The objective of this study is to determine the possibility of evaluating stressful events such as facial expressions of mothers in linguistically incommunicable infants using salivary alpha-amylase (sAMY) activity. Eleven healthy Japanese infants between 15 and 21 months old were enrolled. Both a smile and grimace of their own mothers were shown to the subjects for 1 min as a stressor. sAMY activity in the infants was analyzed using a sAMY monitor before and after exposure to the stressors. Both facial expressions and behaviors of the subjects were recorded using a video camera and then the data were analyzed using a behavior coding system. Furthermore, the emotions of the subjects during the test period were subjectively evaluated by their mothers using a visual analogue scale (VAS). A significant correlation was observed between the mothers and the infants in terms of psychological state evaluated using the behavior coding system ($p < 0.01$, correlation coefficient ($R$) was 0.81). The sAMY activity during the grimace exposure was significantly higher than that during the smile exposure ($p < 0.05$). However, a correlation between VAS score and sAMY activity was observed ($p < 0.05$, $R = −0.26$). It was indicated that salivary biomarkers may be used for evaluating noninvasively the stressful events experienced by infants.