Two components or one? An examination of the relationship between the P300 and emotion-related late positive potential (LPP)

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In ERP studies of the effects of emotion, the most consistently modulated waveform is a parietally-distributed late positive potential (LPP). The cognitive function represented by this component is not clear, but many authors have noted its similarity the well-studied P300 component. Both are later parietal positivities that are highly sensitive to probability and task-relevance within the broad experimental context. Some authors have suggested that the P300 and LPC are the same component, but this hypothesis has not been directly tested. In the present work we orthogonally manipulated the factors that classically influence each component: stimulus Valence (LPP) and stimulus Probability (P300) via a classic oddball task with neutral and negative words as the stimulus categories. As expected, ERPs showed large main effects of Valence and Probability. These effects appeared on very similar parietally distributed positivities. However, the effect of Probability began and peaked somewhat later than the effect of Valence. The key finding was the absence of an interaction between Valence and Probability. This suggests that these effects were independent. While it remains possible that Probability and Valence independently modulate the same cognitive process, or that the P300 and LPP reflect similar underlying computational principles, these results fail to provide strong evidence that the P300 and LPP are the same component with the same underlying neural sources.