

Ereigniskorrelierte Potentiale (EKPs)



- Kontaktelektroden an der Kopfhaut
- Kontinuierliche Erfassung neuronaler Aktivität während der Reizverarbeitung
- eingeschränkte räumliche Auflösung
- extrem hohe zeitliche Auflösung

Past: Cognitive Neuroscience Lab
Department of Psychology
University of Glasgow

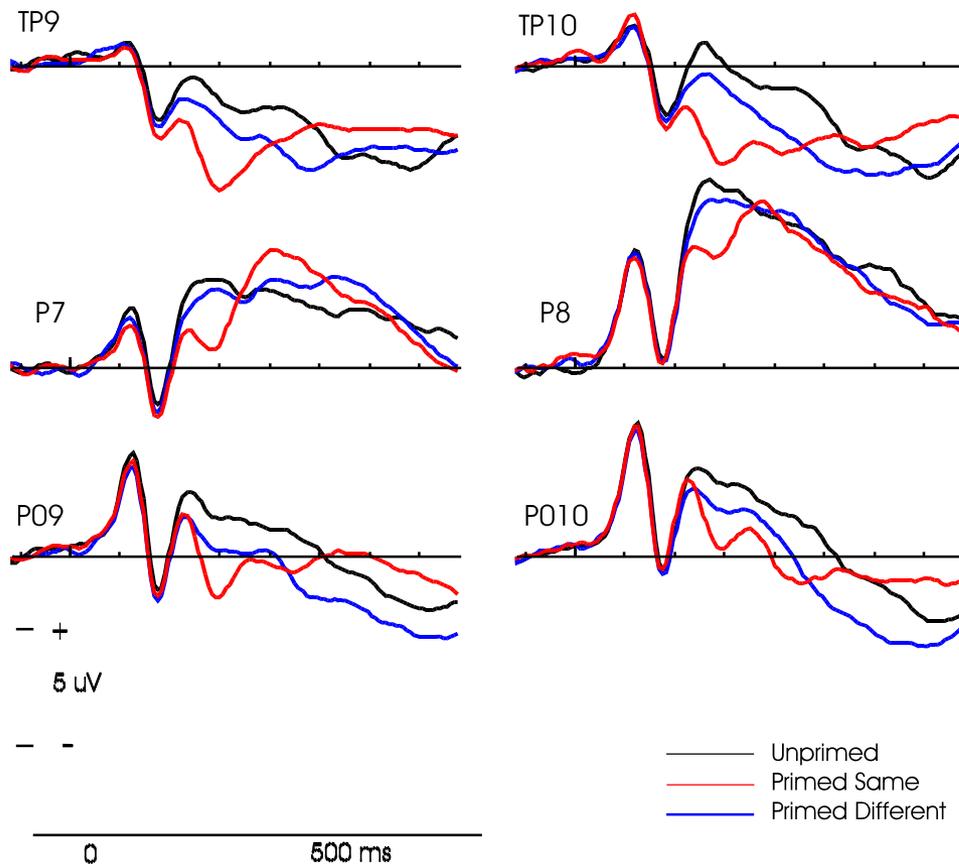
Present: General Psychology /
Cognitive Neuroscience Lab

University of Jena

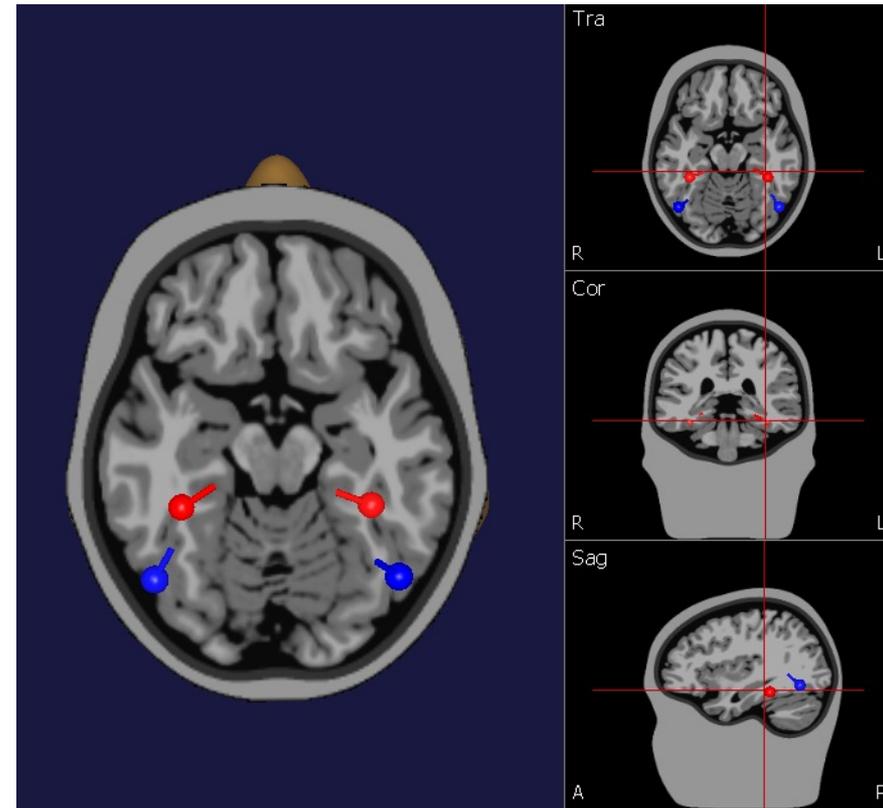
<http://www.allgpsy.uni-jena.de/labs/>



EKPs: Hohe zeitliche Auflösung, limitierte räumliche Lokalisation



Dipolquellenlokalisierung



Quelle: S.R. Schweinberger et al. (2002). Event-related brain potential evidence for a response of inferior temporal cortex to familiar face repetitions. **Cognitive Brain Research**, 14, 398-409.

Broadbent's early selection reassessed: Frühe Aufmerksamkeitseffekte im EKP

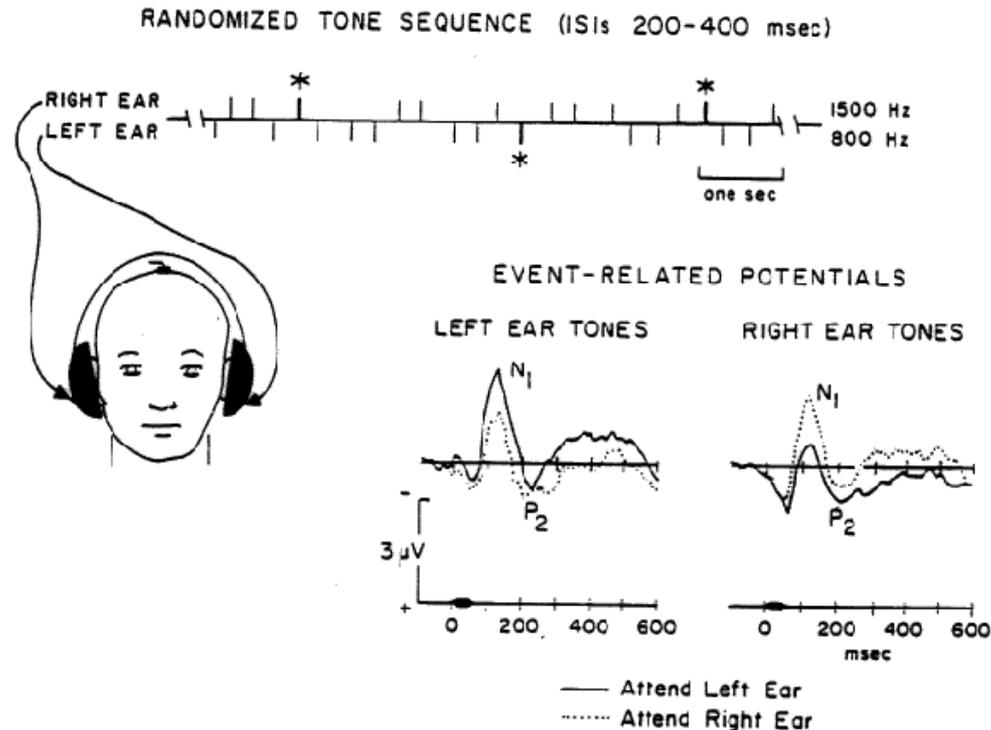


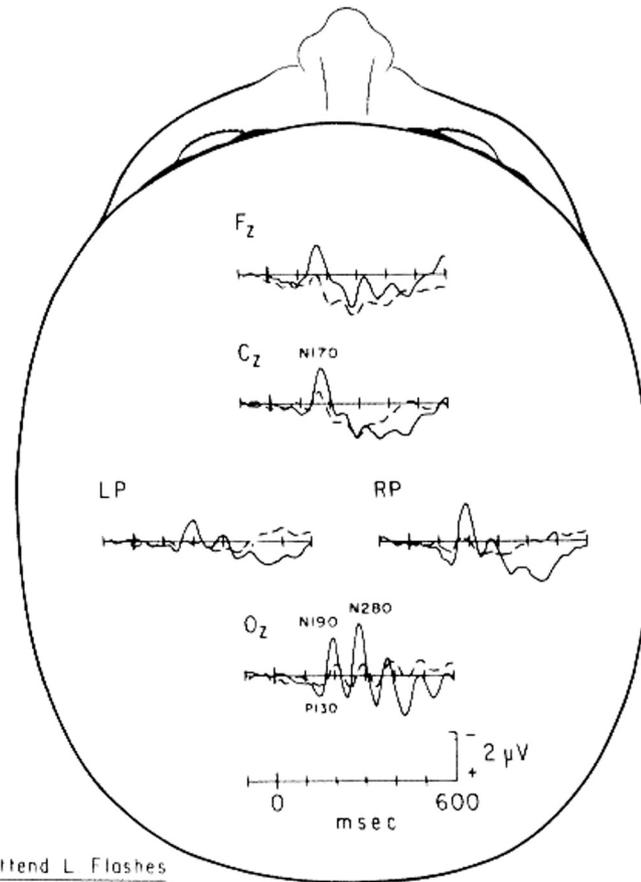
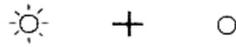
Figure 2.38

Negative Difference Wave Associated With Selective Attention

Randomized sequences of tones were delivered to the left (800-Hz) and right (1,500-Hz) ears at intervals shown on the uppermost axis. Asterisks indicate "target" tones that were slightly longer than other tones. The subject's task was to detect target tones in one ear at a time. Grand average EPs to tones in each ear are shown as a function of "attend left ear" (i.e., task was for left ear tones—shown by the continuous line—and of "attend right ear" (i.e., task was for right ear tones)—shown by the dotted line. The negative difference (Nd) wave is the difference between the dotted and continuous lines. (From Hillyard SA, Simson GV, Woods DL, van Voorhis S, Munte T: In Reinoso-Suarez F, Ajmone-Marsan C (eds): *Cortical Integration*. New York, Raven Press, 1984, pp 395-414.)

(Quelle: Hillyard & Picton, 1987)

ERPs to Left Flashes



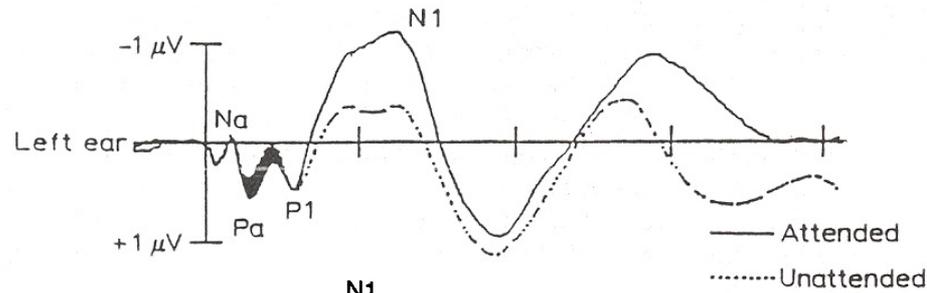
Attend L Flashes

Attend R Flashes

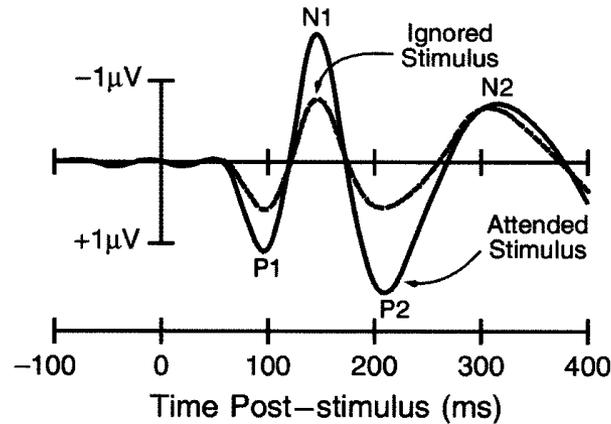
FIG. 21. Grand-average event-related potentials (ERPs) from 12 normal subjects in response to standard (nontarget) flashes located at the left position. *Solid tracings*, ERPs during attend-left condition; *dashed tracings*, ERPs during attend-right conditions. ERPs are shown for midline frontal (Fz), central (Cz), and occipital (Oz) scalp sites and for lateral parietal sites on left (LP) and right (RP). Mirror-image attention effects were elicited by right-field stimuli (not shown). [Adapted from Hillyard et al. (182).]

Aufmerksamkeitseffekte:

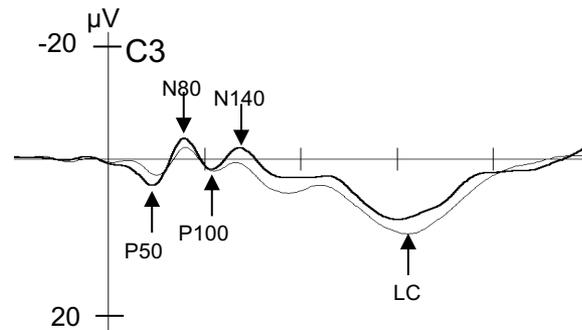
auditorisch, visuell, somatosensorisch



AEP



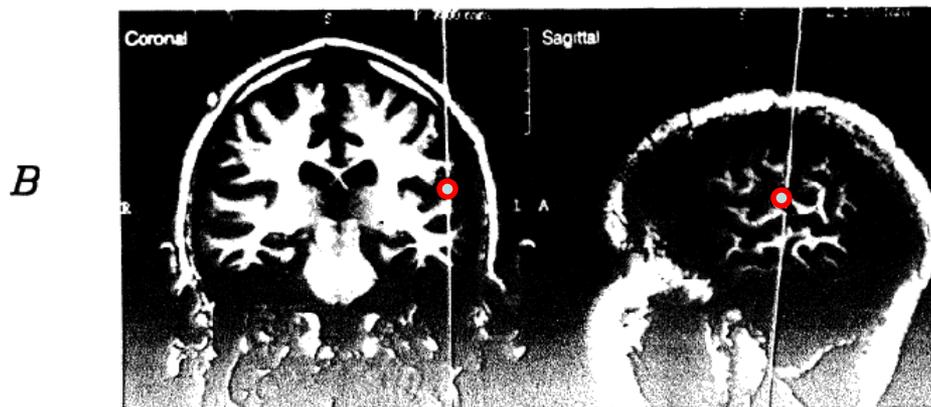
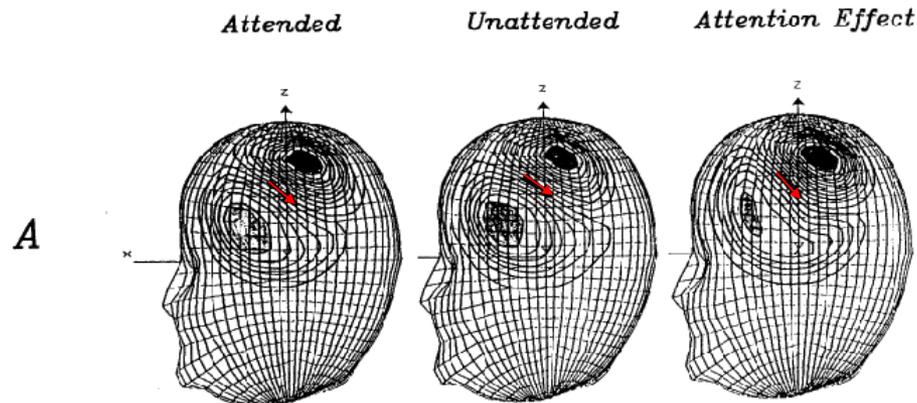
VEP



SEP

Selektive Aufmerksamkeit beeinflusst die frühe auditorische Verarbeitung

(auditorische M100 im MEG, N1 EKP (nach Woldorff et al., 1993))



M100 Lokalisation im auditorischen Cortex auf Töne im rechten Ohr (MRI: R = L)

Nd-Effekt bei Aufmerksamkeitsstörungen

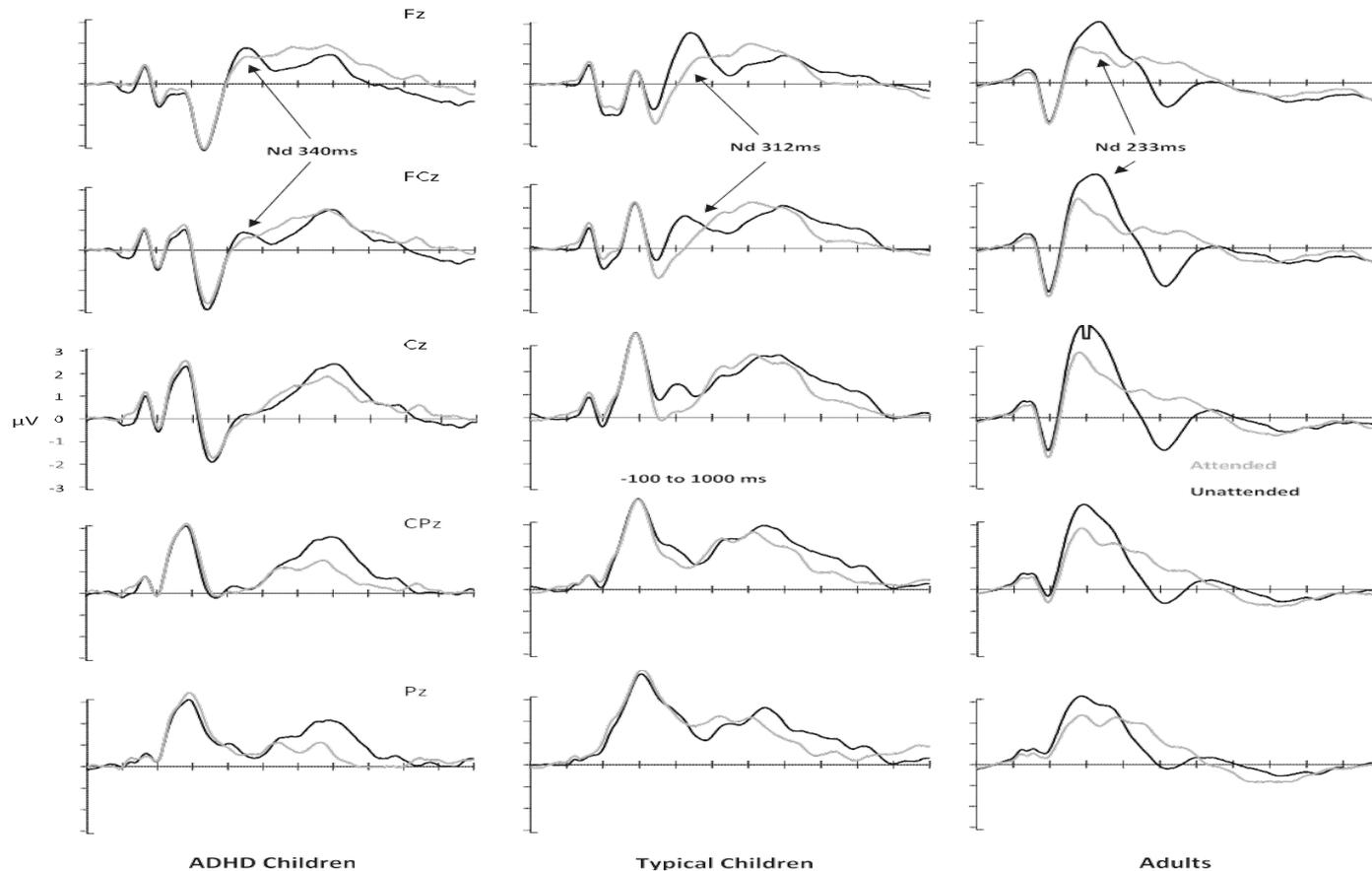
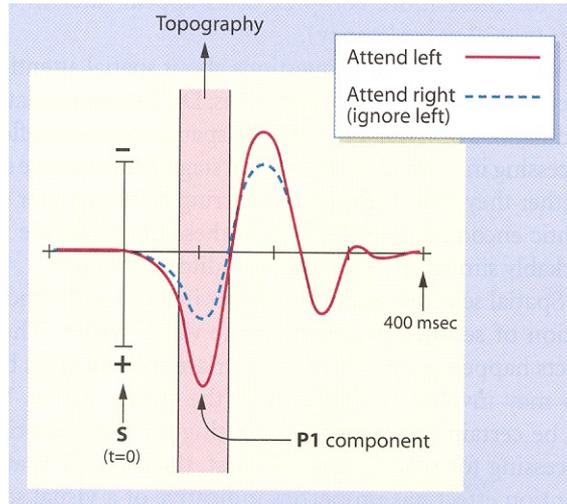


Fig. 1. Grand mean ERPs elicited from participants in the three groups at Fz, FCz, Cz, CPz, and Pz. The gray lines are the ERPs elicited by the standard tones when they were in the attended channel and the black lines are the ERPs elicited by the standard tones when they were in the unattended channel. In this and all subsequent figures, stimuli were presented at time zero, positive is up, and waveform were smoothed for display.

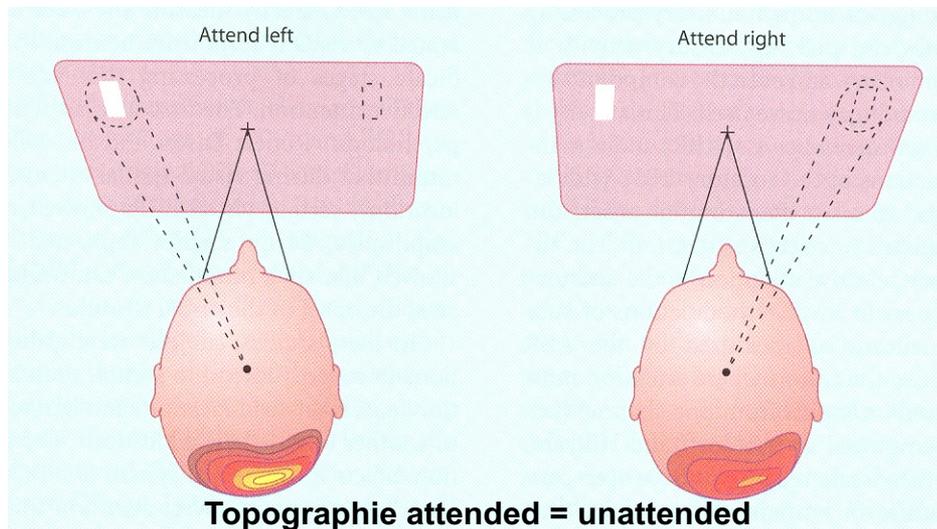
Sensory gain (Amplification)

VEP

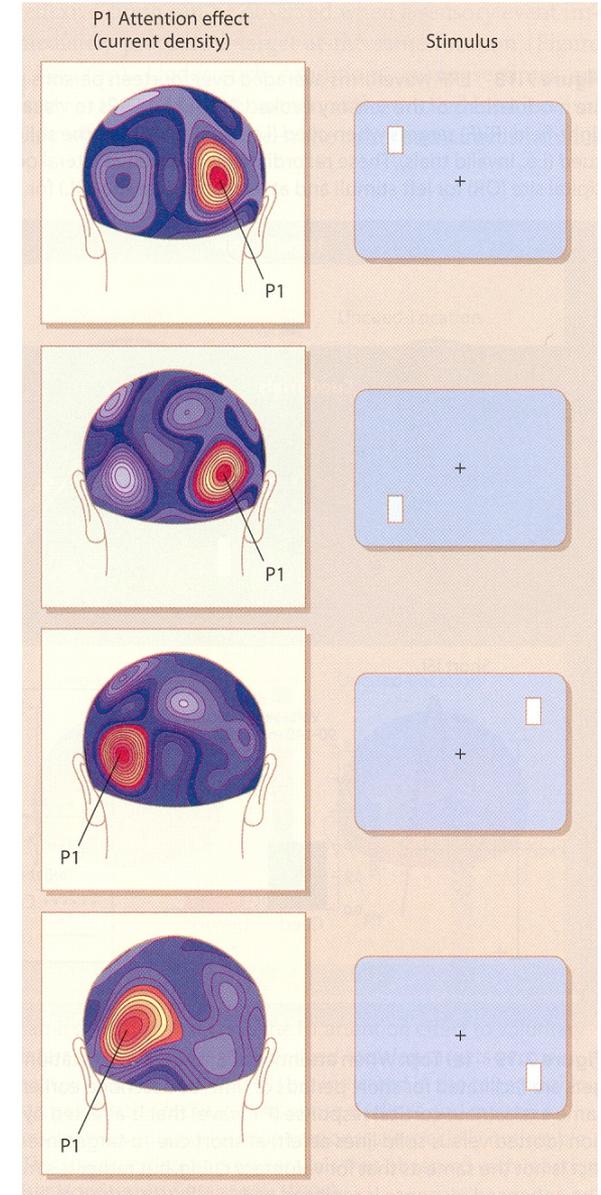
Morphologie
attended und
unattended
identisch



Topographie



Topographie Attention-Effekt



Kontrollfragen

1. Weshalb sind ereigniskorrelierte Potentiale (EKPs) besonders gut geeignet, um Theorien der frühen versus späten Selektion zu testen?
2. EKPs wurden für die Untersuchung selektiver Aufmerksamkeitsprozesse in verschiedenen Modalitäten eingesetzt. Welche Gemeinsamkeiten und welche Modalitätsunterschiede ließen sich hier feststellen?
3. Was versteht man unter „sensory gain“?