Kognitive Neuropsychologie

- 03.11. Geschichte der kognitiven Neurowissenschaft
- 10.11. Funktionelle Neuroanatomie
- 17.11. Methoden der kognitiven Neuropsychologie I
- 24.11. Methoden der kognitiven Neuropsychologie II
- 01.12. Visuelle Wahrnehmung
- **08.12. Objekterkennung**
- 15.12. Auditive Wahrnehmung
- 05.01. Sprache
- 12.01. Aufmerksamkeit und Selektion
- 19.01. Kognitive Kontrolle
- 26.01. Gedächtnis & Lernen
- 02.02. Kognitives Altern

Themen & Literatur für Wahlfach-Essays

(1) Kognitive Kontrolle:

Braver, T.S. (2012)

(2) Aufmerksamkeit & Selektion:

Corbetta & Shulman (2002)

(3) Multisensorische Verarbeitung / Synästhesie:

Hubbard (2005)

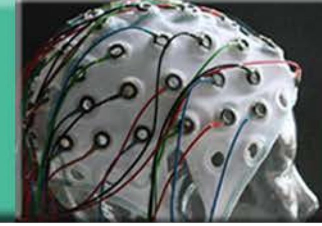
(4) Soziale Kognition /Stereotypie:

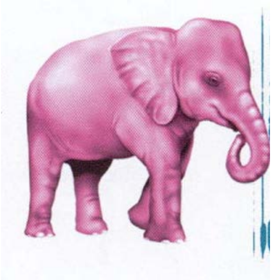
Amodio et al (2014)

(5) Gedächtnis & Lernen:

Mecklinger & Bader (2020), Stark et al (2019), Frankland & Bontempi (2005)

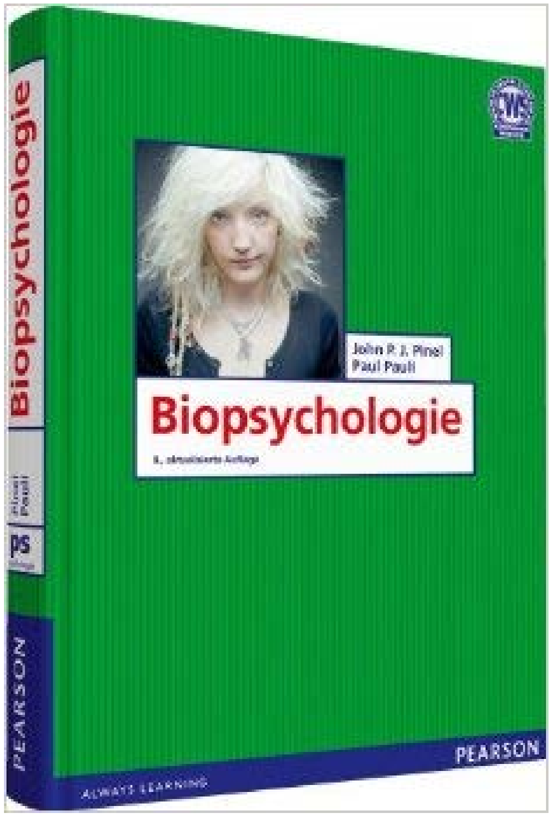
Heutige Themen





- Der visuelle Kortex
- Aufbau und hierarchische Struktur
- Farbe und Bewegung
- Was „was“ und „wo“ System
- Formkodierug
- Objekterkennung /Agnosie
- Sind Gesichter etwas Besonderes?

Literatur



Ward, J. (2010). The student's guide to cognitive neuroscience. (2nd Edition) Psychology Press. New York. (Kap. 6)

Gazzaniga, M.S., Ivry, R.B. & Mangun, G.R. (2009). Cognitive Neuroscience (3rd Edition). W.W. Norton & Company: NewYork (Kap. 6)

Fehlerhafte Objekterkennung: Agnosie

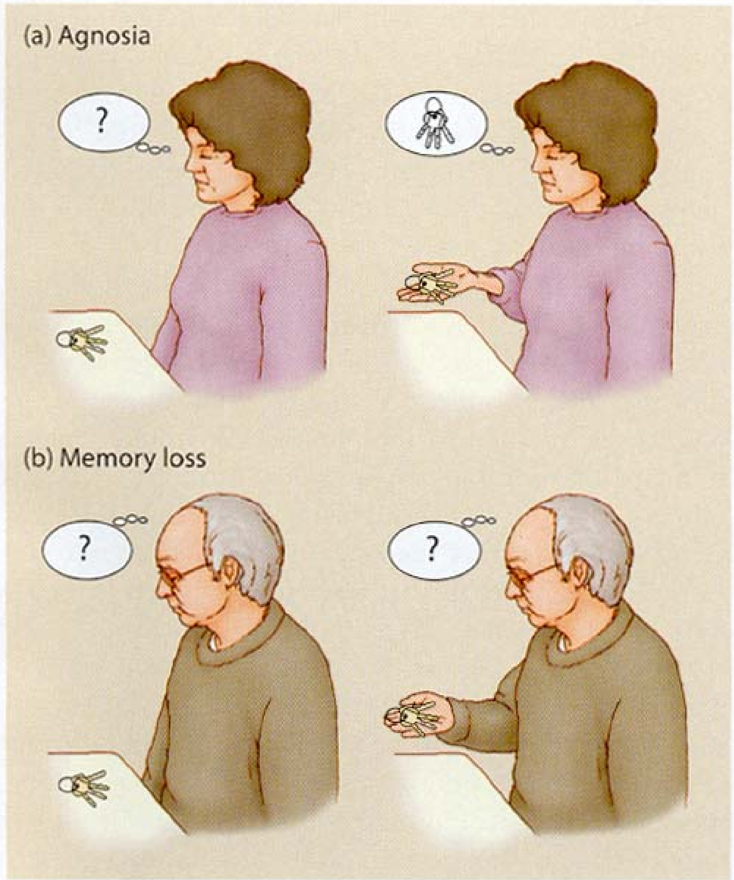


Figure 6.22 To diagnose an agnosic disorder, it is essential to rule out general memory problems. **(a)** The patient with agnosia is unable to recognize the keys by vision alone, but immediately recognizes the keys when she picks them up. **(b)** The patient with a memory disorder is unable to recognize the keys even when he picks them up.

Agnosie: die Rolle der rechten Hemisphäre

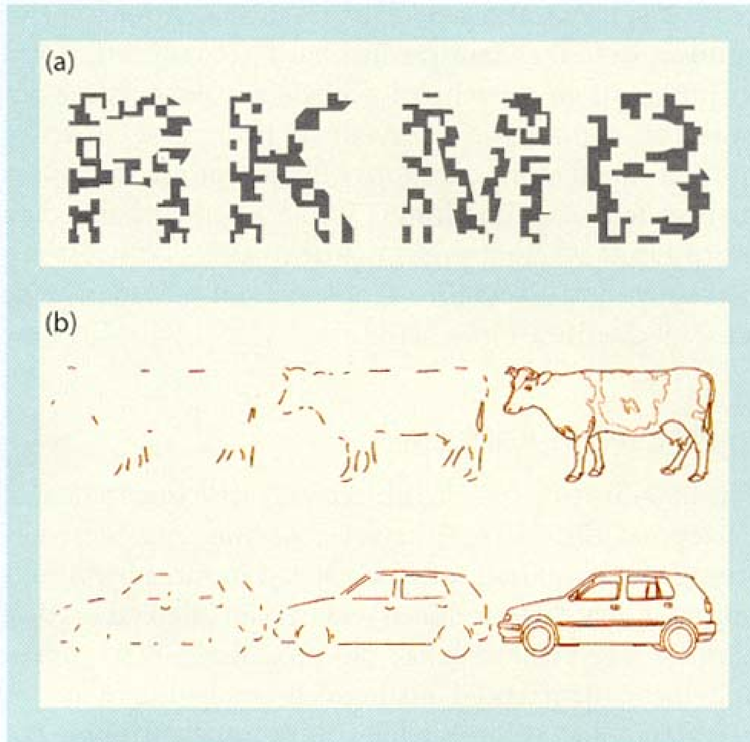
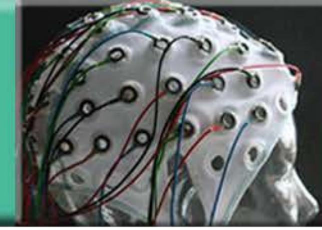


Figure 6.23 **(a)** Patients with agnosia following right-hemisphere lesions have more difficulty than patients with left-hemisphere lesions, despite the more severe language problems for the left-hemisphere group. **(b)** In the Gollin picture test, the subjects are presented with a series of drawings of an object, each successive drawing being more complete than the previous one. Patients with right-hemisphere lesions required more complete drawings in order to correctly identify the objects. Adapted from Warrington (1985).



Apperzeptive Agnosie

Lissauer (1890): Seelenblindheit

Elizabeth Warrington (1985)

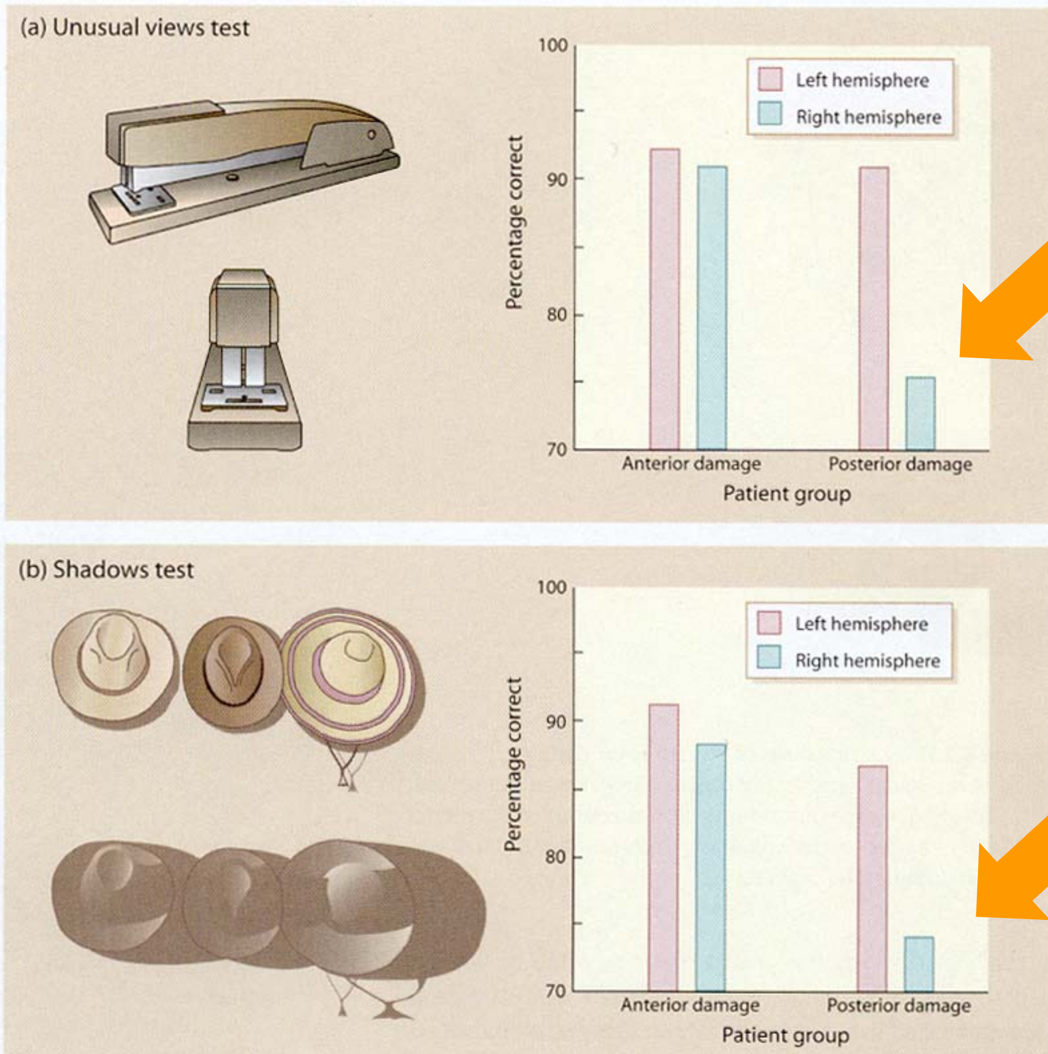


Figure 6.24 Tests used to identify apperceptive agnosia. **(a)** The unusual views test. The subject must judge if the two pictures are of the same object. **(b)** The shadows test. Subjects must identify the object(s) when seen under normal or shadowed illumination. In both tests, patients with right-hemisphere lesions, especially in the posterior area, performed much more poorly than did control subjects (not shown) or patients with left-hemisphere lesions. Adapted from Warrington (1982).

Assoziative Agnosie

Der Patient F.R.A.

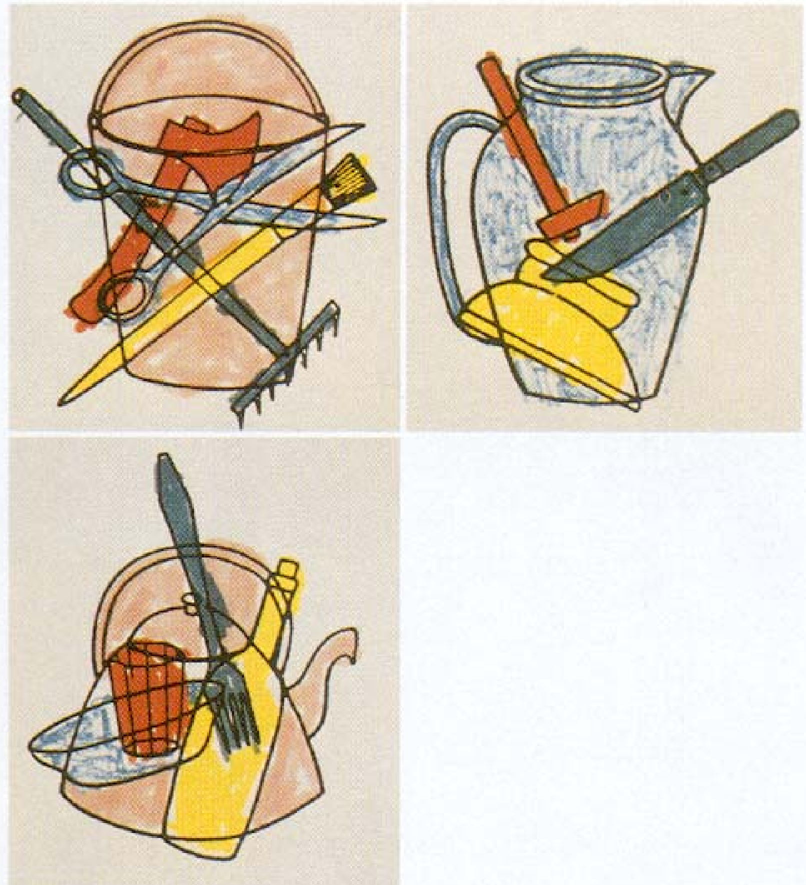
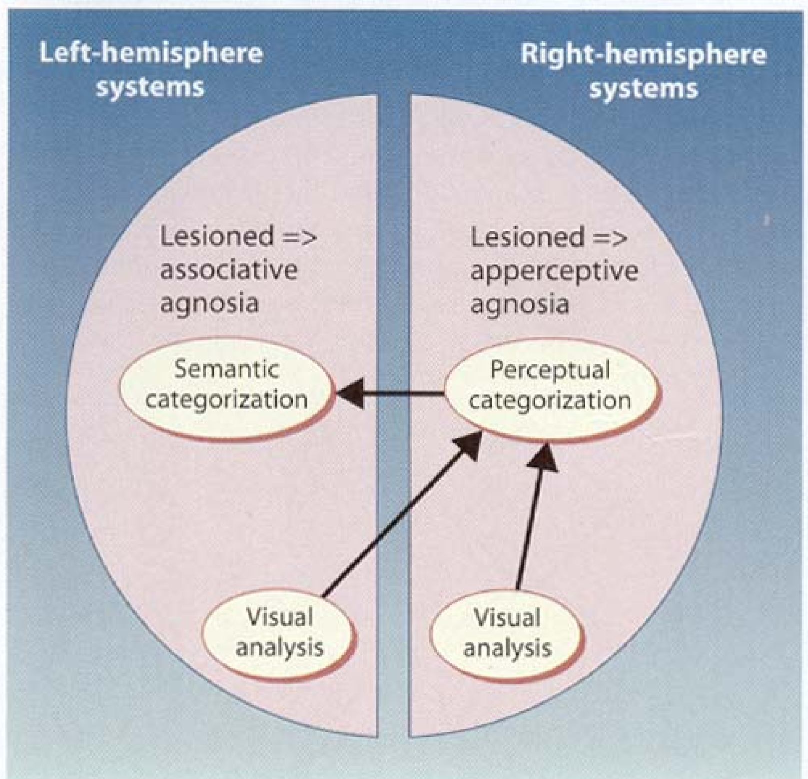


Figure 6.25 The drawings of patient F.R.A. Despite his inability to name visually presented objects, F.R.A. was quite successful in coloring in the components of these complex drawings. He clearly had succeeded in parsing the stimuli but still was unable to identify the objects.

Semantische Eigenschaften von Objekten: Der matching-by-function Test

Das 2-Stufen-Modell der Objekterkennung

Figure 6.27 Warrington's two-stage model of object recognition. Visual analysis occurs in both hemispheres, at least when we look directly at an object. The first stage of object categorization is perceptual, the processes required to overcome the perceptual variability in the stimulus. This stage is dependent on the right hemisphere. The second stage involves semantic categorization in which the perceptual representation is linked to semantic knowledge. This stage is dependent on the left hemisphere.



Integrative Agnosie: Der Patient H.J.A.

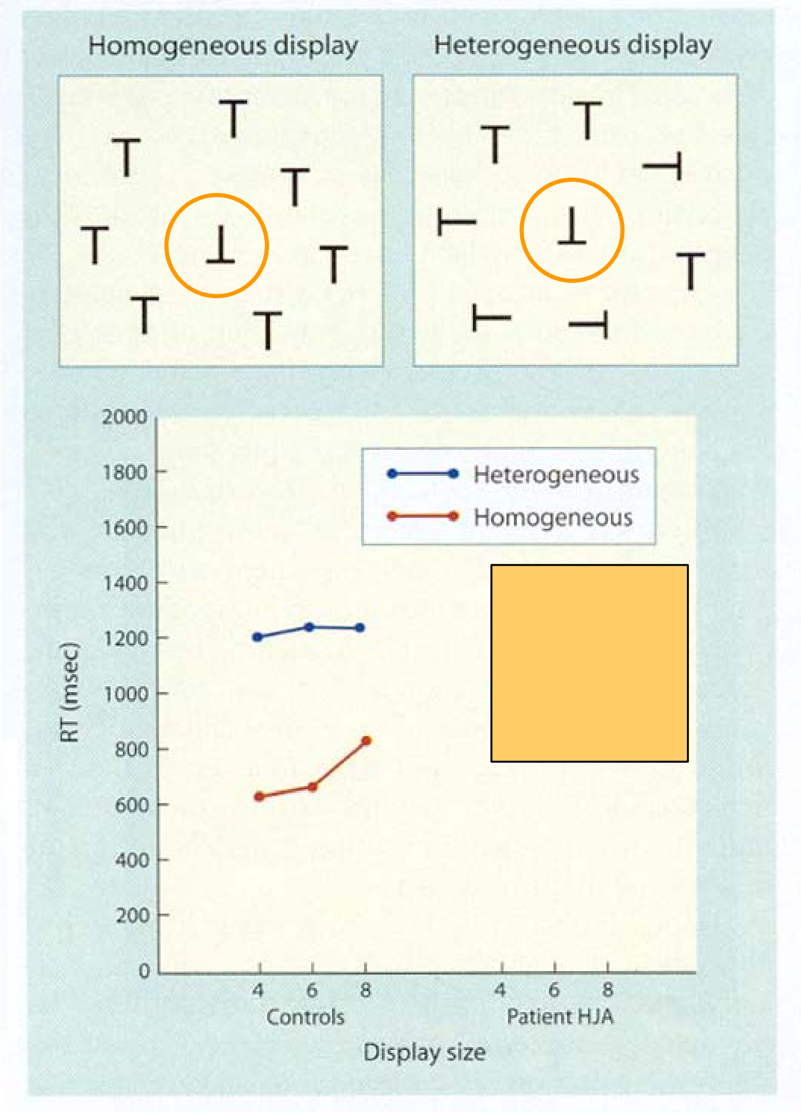
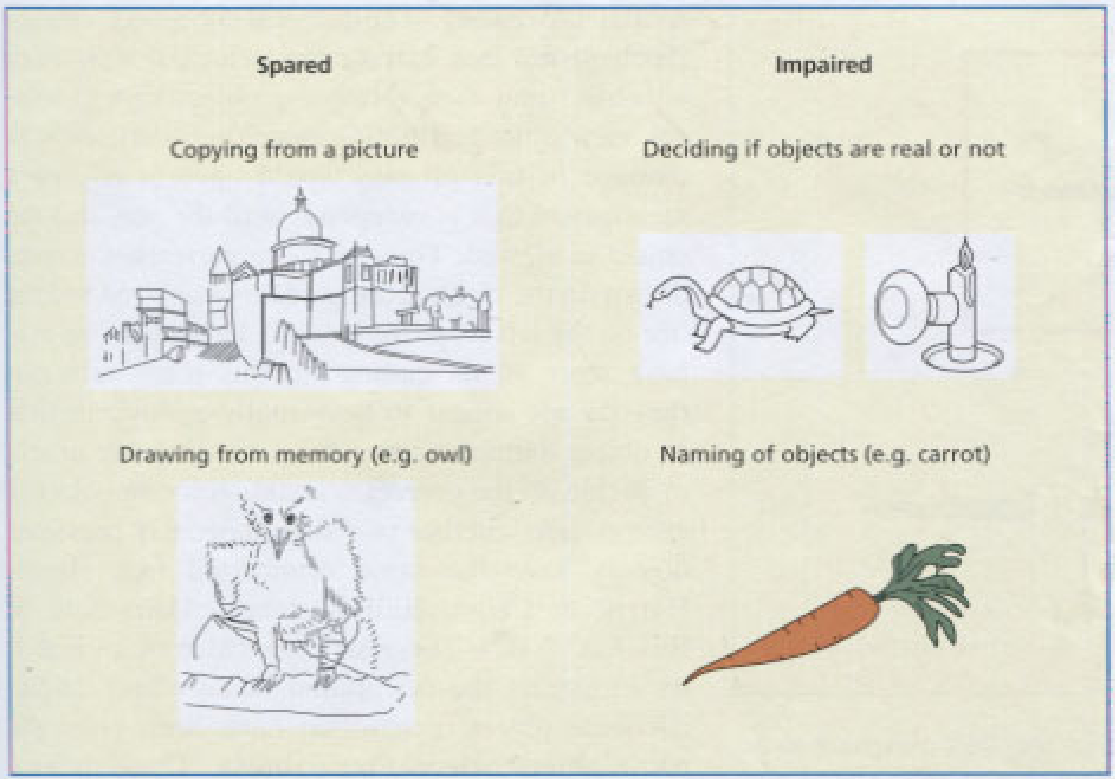
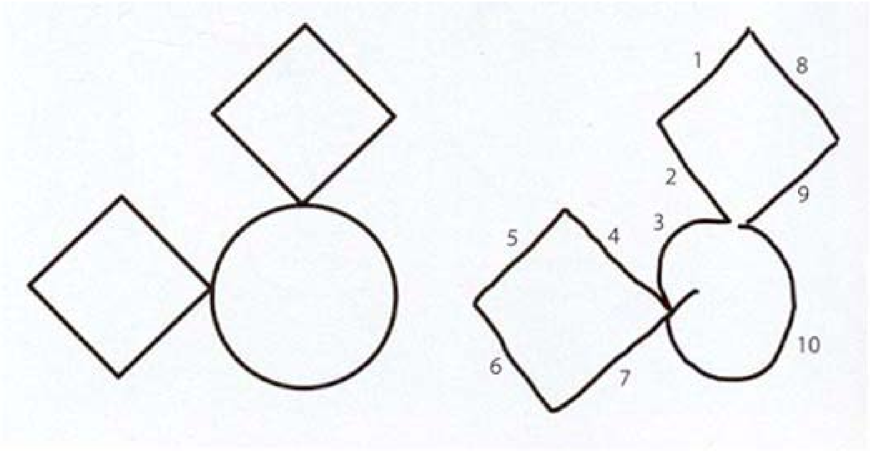


Figure 6.28 Patients with integrative agnosia have difficulty grouping common elements together. Normal subjects find the upside-down T much faster when all of the distracters are upright T's. When the distracters are heterogeneous, their reaction times (RT) are much slower. The benefit is likely due to the fact that the distracter elements group together in the homogeneous condition. Patient H.J.A.'s reaction times are comparable in the two conditions, indicating a failure to group. Adapted from Humphreys et al. (1994).

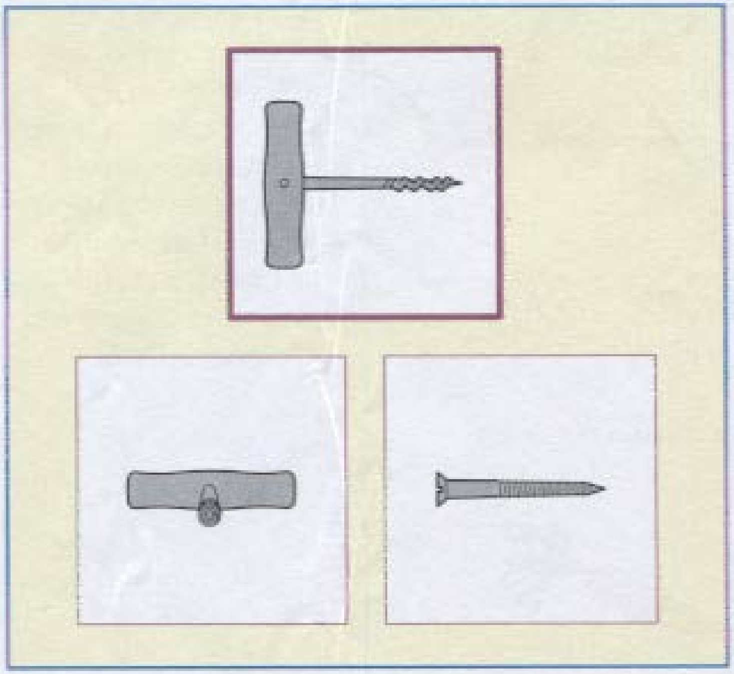
Integrative Agnosie: Der Patient H.J.A.



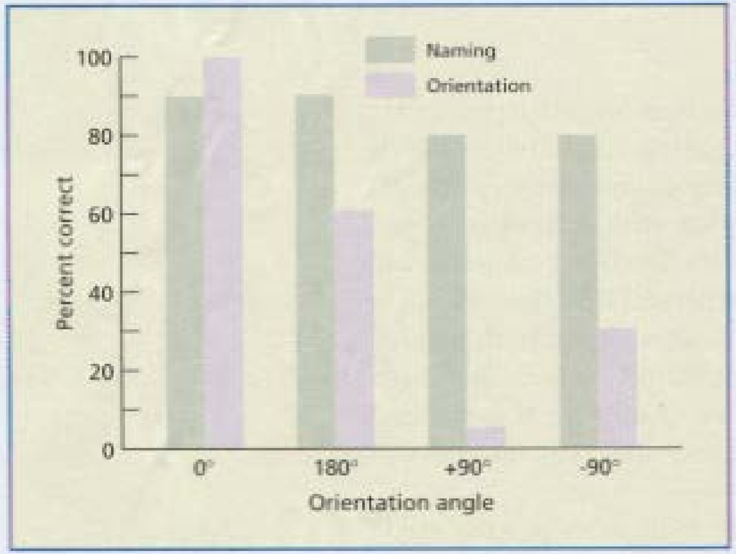
HJA is impaired at deciding if objects are real or made up and naming objects. However, he can copy drawings and draw objects from memory. Adapted from Humphreys and Riddoch, (1987) and Riddoch and Humphreys (1995).


1
8
2
9
3
5
4
6
7
10

Orientierungsagnosie: Patient E.L.

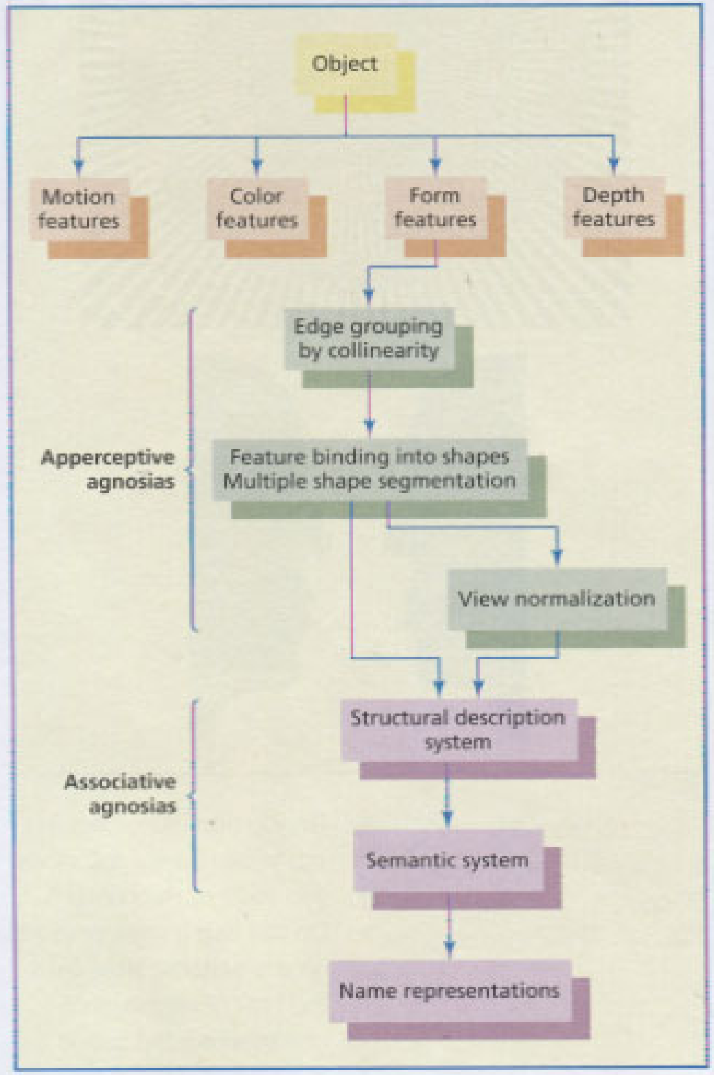


A test of object recognition that requires matching to an unusual view. From Riddoch and Humphreys (1995).



Patient EL could produce the names of items presented in various orientations (green bars), but could not correctly judge whether or not an object was in its correct orientation (purple bars). From Harris et al. (2001). Copyright © The MIT Press. Reproduced with permission.

Ein Model der Objekterkennung



A simple model of visual object recognition. From Riddoch and Humphreys (2001).

Kategoriespezifische Agnosien:

J.B.R zeigt stärkere Beeinträchtigungen für belebte als für unbelebte Objekte

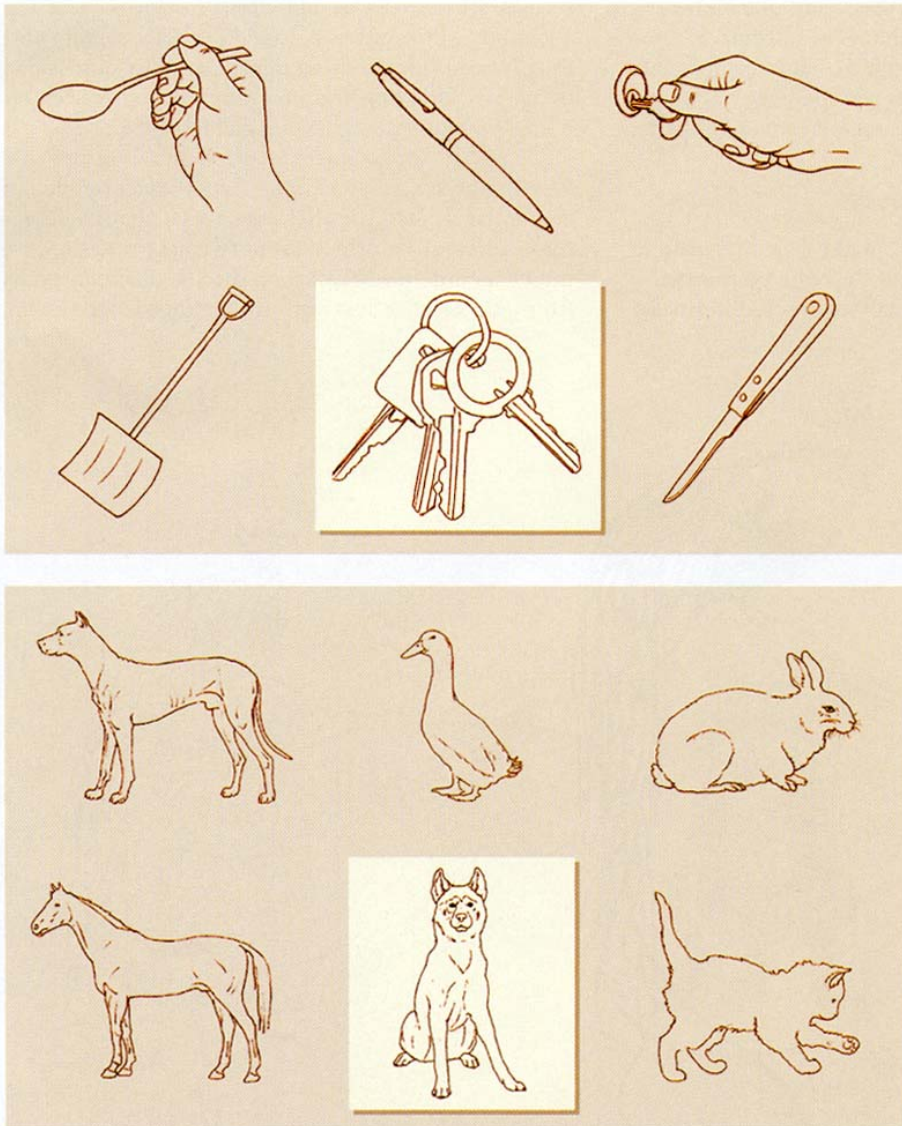
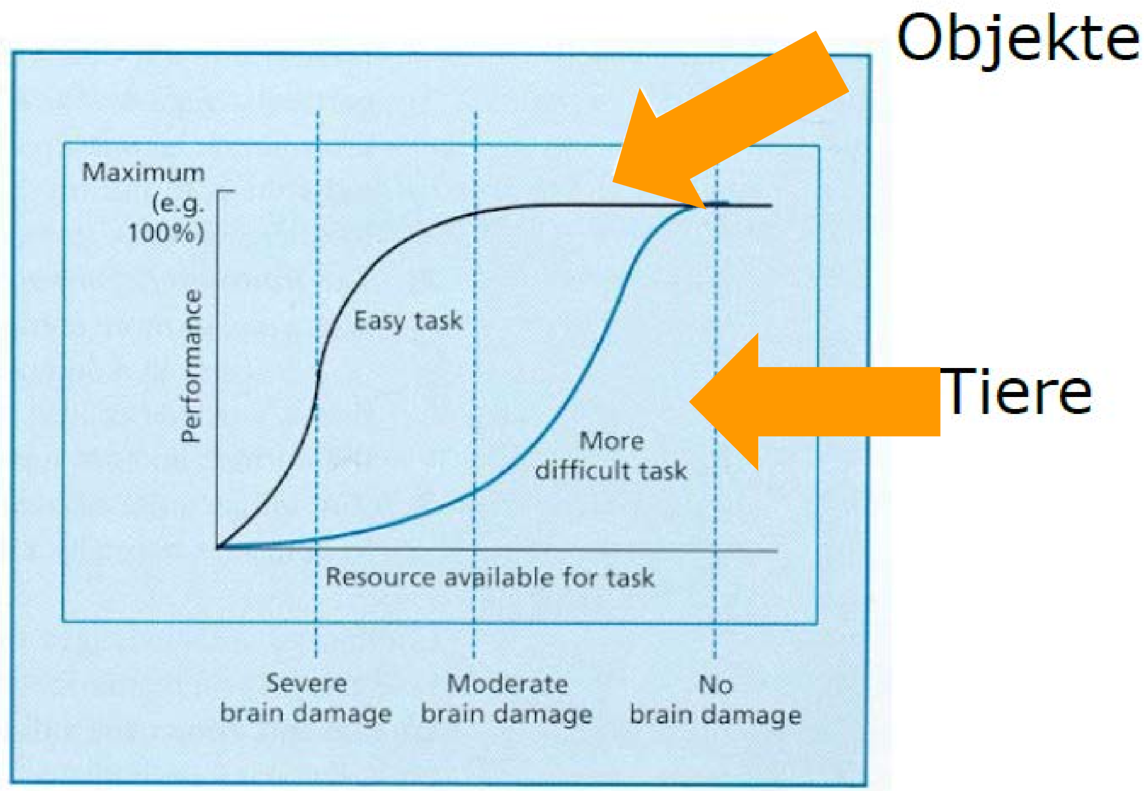


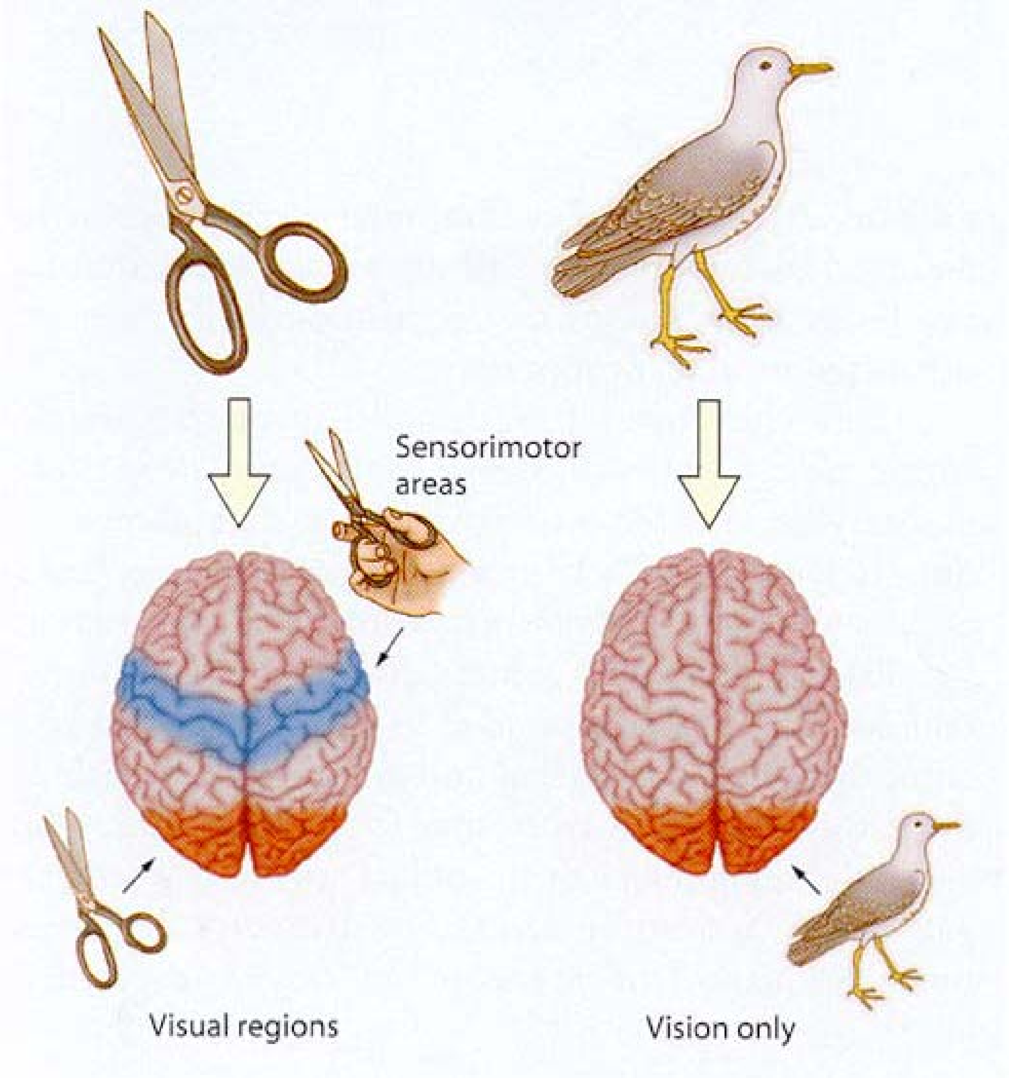
Figure 6.31 Tests used to demonstrate category-specific agnosia. In each condition, the subject is asked to choose from the array of five drawings the one that goes best with the probe item in the box. A patient with a selective deficit for common objects would perform poorly in the top example but perform normally in the bottom example. The reverse would be expected in a patient with a category-specific deficit for living things. Adapted from Warrington and McCarthy (1994).

Ein Aufgaben-Ressourcen Artefakt?



A task-resource artefact can arise because one task uses more of a cognitive/neural resource than the other (i.e. one task is harder). One could construe brain damage as depleting the amount of resource available. In this instance, at moderate brain damage the patient can still perform the easy task normally. A single dissociation need not reflect different cognitive/neural substrates for the tasks. Adapted from Shallice, 1988.

Multiple Repräsentationen für nicht belebte Objekte?
Visuelle und funktionelle semantische Merkmale



Schwierigere Diskrimination belebter Objekte auch bei normalen Probanden

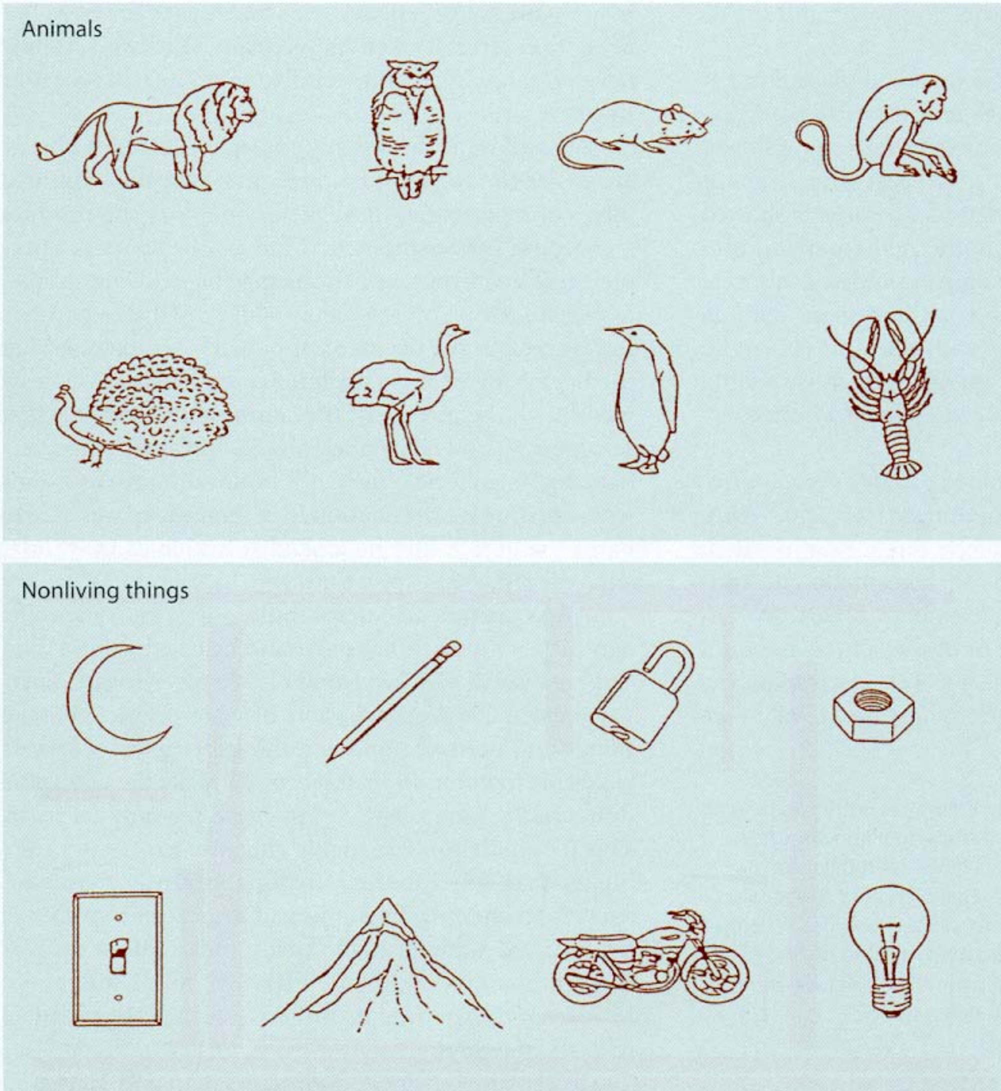
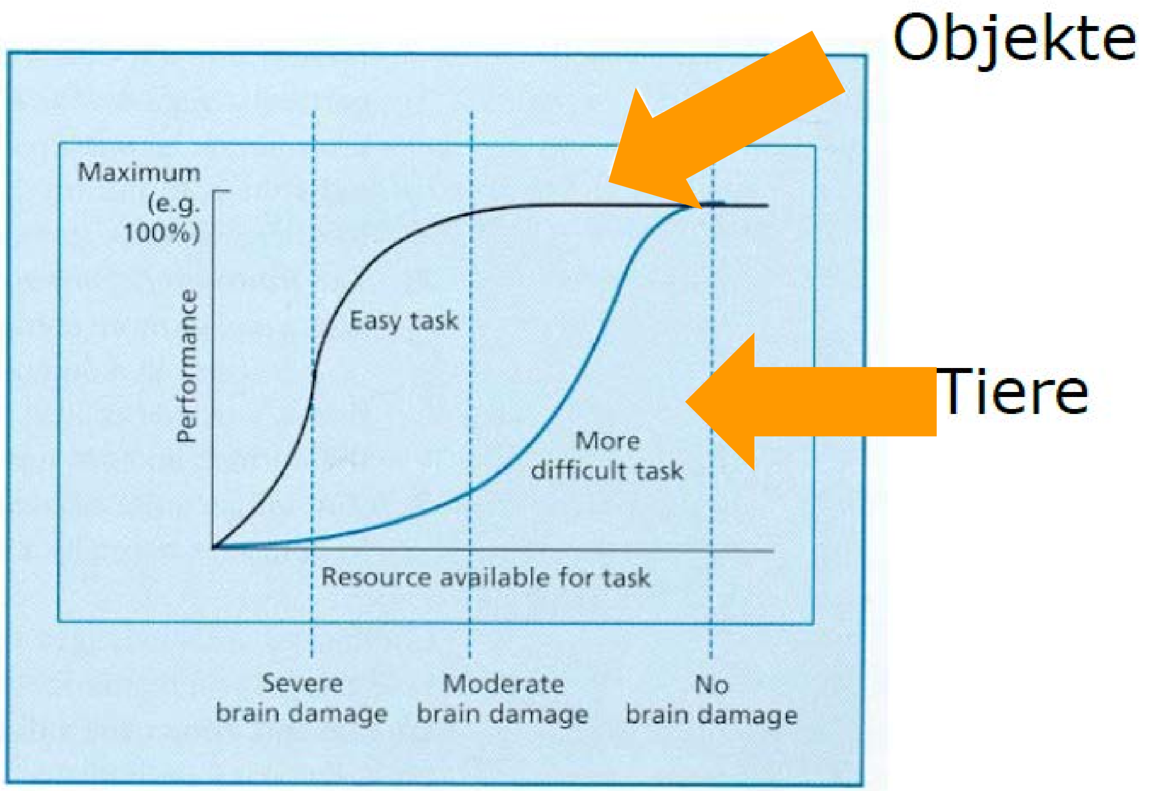


Figure 6.33 Line drawings of objects used to compare recognition of living and nonliving things by normal subjects. Notice the greater similarity (and thus confusability) of the living things: they tend to have rounded bodies and appendages of some sort. There is little similarity among the set of nonliving things. Adapted from Snodgrass and Vanderwart (1980).

Ein Aufgaben-Ressourcen Artefakt !



A task-resource artefact can arise because one task uses more of a cognitive/neural resource than the other (i.e. one task is harder). One could construe brain damage as depleting the amount of resource available. In this instance, at moderate brain damage the patient can still perform the easy task normally. A single dissociation need not reflect different cognitive/neural substrates for the tasks. Adapted from Shallice, 1988.

Kategorien vs Eigenschaften: Farah & McClelland (1991)

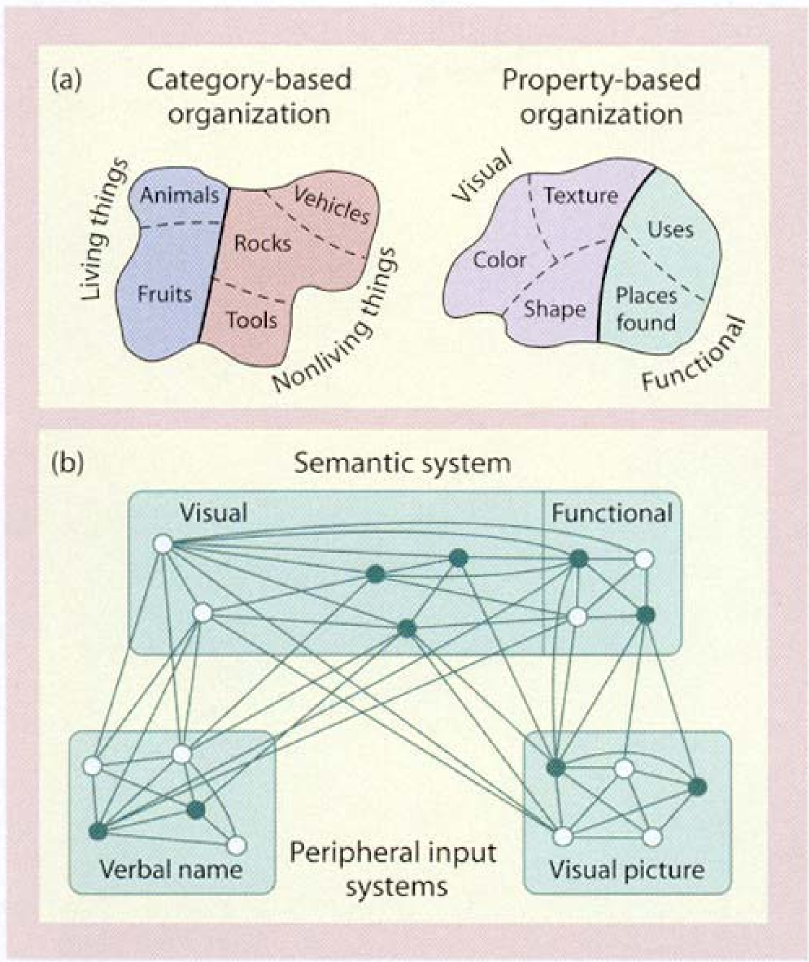
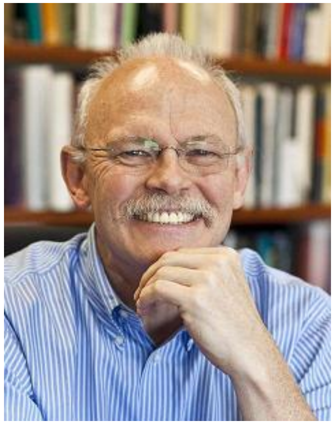
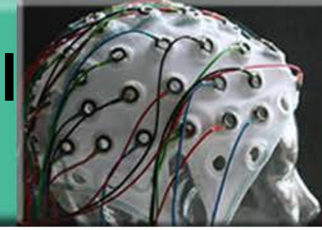
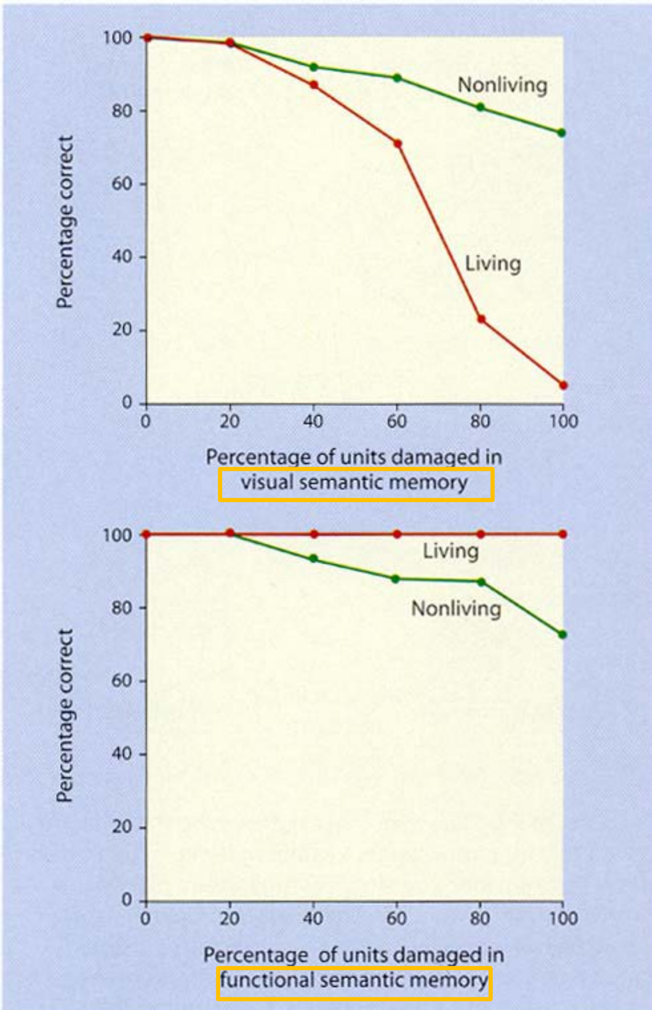


Figure 6.34 **(a)** Two hypotheses concerning the organization of semantic knowledge. A category-based hypothesis proposes that semantic knowledge is organized according to our categories of the world. For example, one prominent split would be between living and nonliving things. A property-based hypothesis is that semantic knowledge is organized according to the properties of objects. These properties may be visual or functional. **(b)** The architecture of Farah and McClelland's (1991) connectionist model of a property-based semantic system. The initial activation for each object is represented by a unique pattern of activation in two input systems and the semantic system. In this example, the darkened units would correspond to the pattern for one object. The final activation would be determined by the initial pattern and the connection weights between the units. There are no connections between the two input systems. The names and pictures are linked through the semantic system.



Läsionen im semantischen Netzwerkmodell
Farah & McClelland (1991)





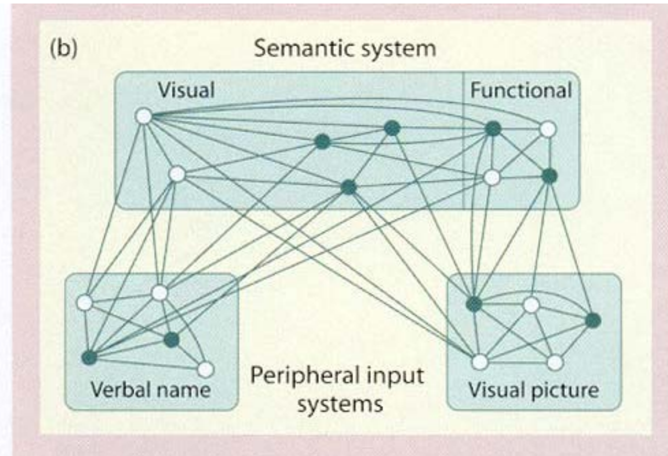
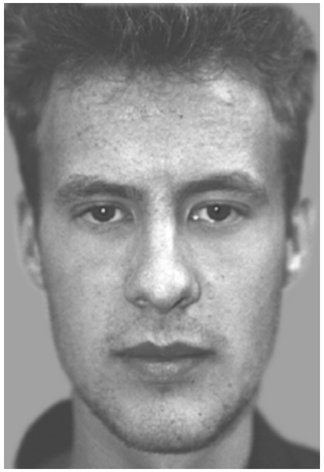
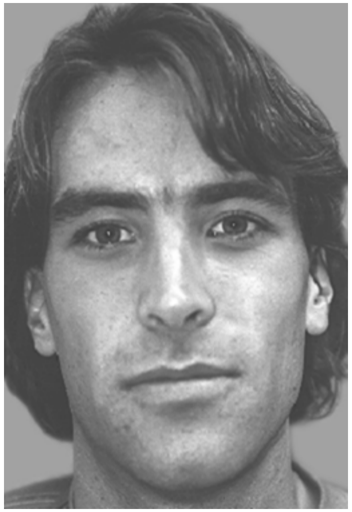


Figure 6.35 Lesions in the semantic units resulted in a double dissociation between the recognition of living and nonliving objects. After a percentage of the semantic units were eliminated, two measurements were made. In the picture-naming task, the visual input pattern for each object was activated and the resultant pattern on the verbal units was evaluated as either correct or incorrect. In the matching-to-sample test, the name pattern was activated and the resulting pattern on the picture units was evaluated. When the lesion was restricted to the visual semantic memory units, the model showed much more impairment in correctly associating the name and picture patterns for the living things. When the lesion was restricted to the functional semantic memory units, the model showed impairment only in associating the input patterns for nonliving things. Adapted from Farah and McClelland (1991).

Prosopagnosie:
Gibt es ein spezifisches Gesichtermodul?

Drei kritische Fragen:

(1) Unterschiedliche Gehirnregionen

(2) Funktionelle Unabhängigkeit

(3) Unterschiede in der Informations-verarbeitung in beiden Systemen?

(1) Läsionen die zu Prosopagnosie führen

Table 6.1 Summary of Lesion Foci in Patients Described as Prosopagnosic*

Bilateral (n = 46)	65%
Temporal	61%
Parietal	9%
Occipital	91%
Left only (n = 4)	6%
Temporal	75%
Parietal	25%
Occipital	50%
Right only (n = 21)	29%
Temporal	67%
Parietal	28%
Occipital	95%

*Within each subcategory, the percentages indicate how the lesions were distributed across the temporal, parietal, and occipital lobes. The sum of these percentages is greater than 100% because many of the lesions spanned more than one lobe. The majority of the patients had bilateral lesions. Adapted from Farah (1990).

Face Cells in the STS

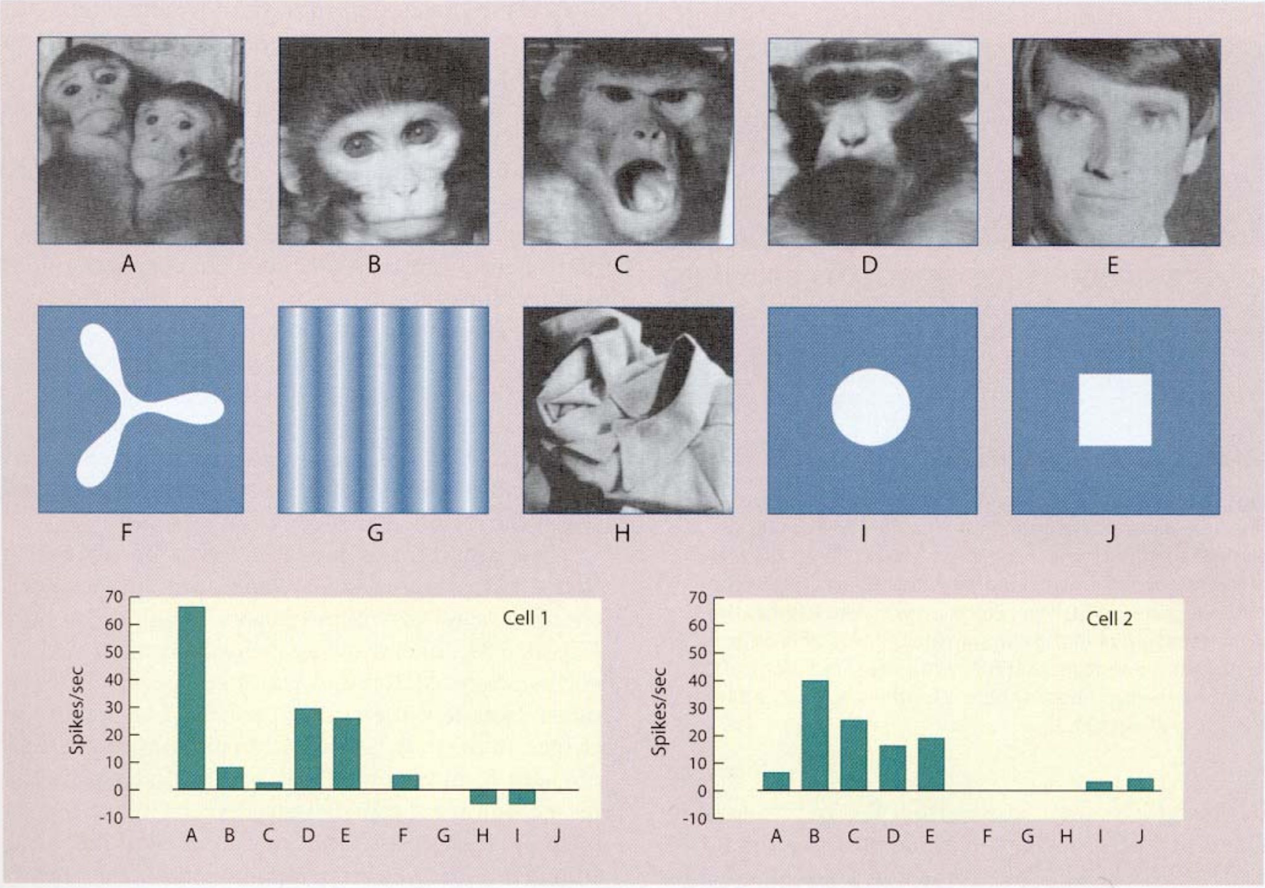


Figure 6.36 Face cells in the superior temporal sulcus of the macaque monkey. The graphs show the response of two cells to the ten stimuli (labeled A–J). Both cells responded vigorously to many of the facial stimuli. Either there was no change in activity when the animal looked at the objects, or in some cases, the cells were actually inhibited relative to baseline. The firing rate data are plotted as a change from baseline activity for that cell when no stimulus was presented. (Bottom) Adapted from Baylis et al. (1985).

Gesichter und Objekte
Die Fusiform Face Area (FFA)

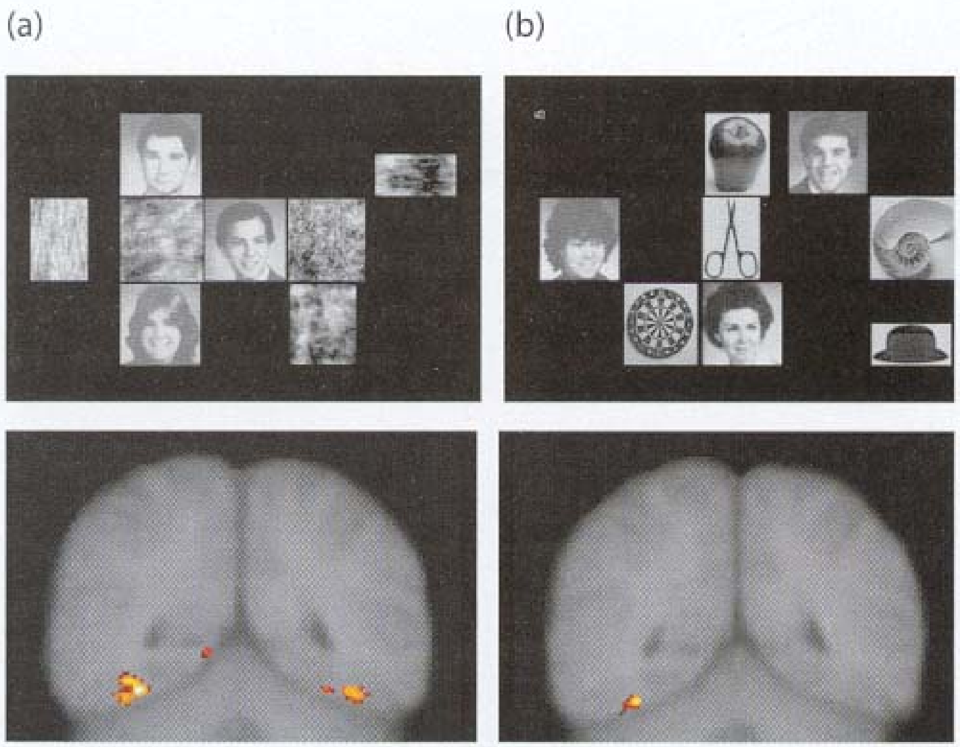
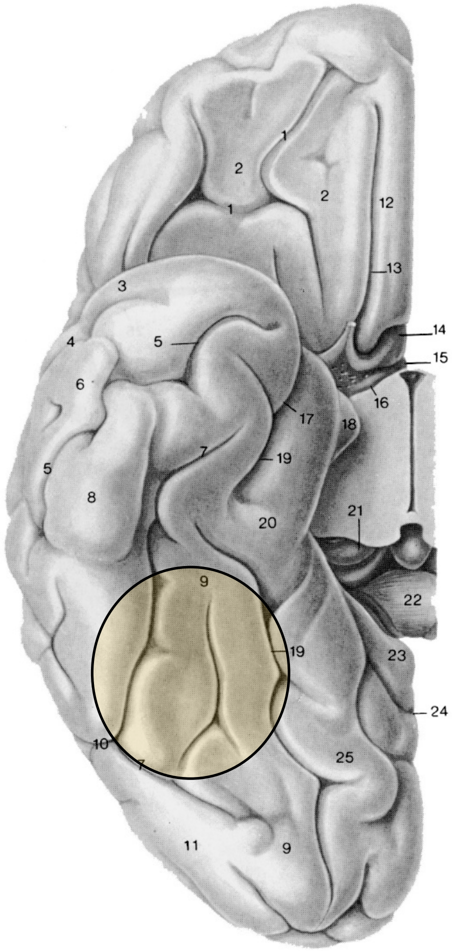


Figure 6.37 Isolating neural regions during face perception. **(a)** Bilateral activation in the fusiform gyrus was observed with fMRI when subjects viewed collages of faces and random patterns compared with collages of just the random patterns. **(b)** The activation was restricted to the right hemisphere in the comparison of faces plus objects to objects alone. Note that following neuroradiological conventions, the right hemisphere is on the left. Adapted from McCarthy et al. (1997).

Die Fusiform Face Area



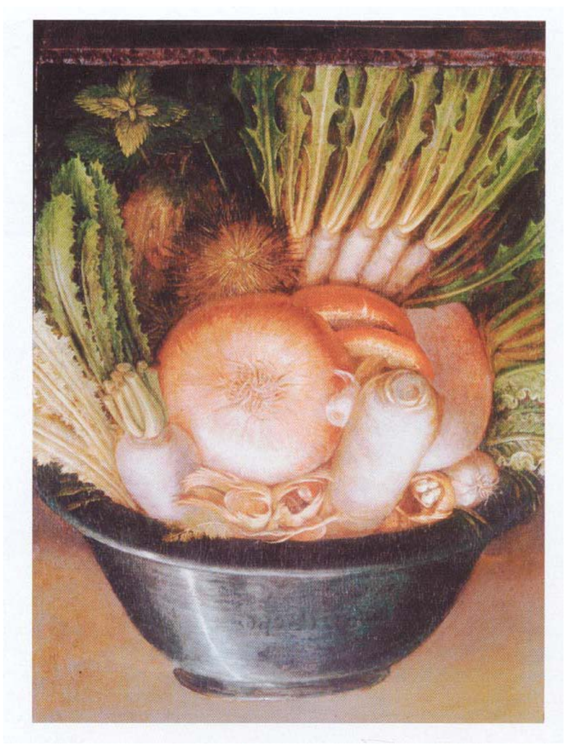
1 Sulci orbitales
2 Gyri orbitales
3 Gyrus temporalis superior
4 Sulcus temporalis superior
5 Sulcus temporalis inferior
6 Gyrus temporalis medius
7 Sulcus occipitotemporalis
8 Gyrus temporalis inferior
9 Gyrus occipitotemporalis lateralis
10 Incisura preoccipitalis
11 Gyri occipitales

12 Gyrus rectus
13 Sulcus olfactorius
14 Area subcallosa
15 Gyrus paraterminalis
16 Gyrus diagonalis
17 Sulcus rhinalis
18 Gyrus ambiens
19 Sulcus collateralis
20 Gyrus parahippocampalis
21 Pulvinar thalami
22 Splenium corporis callosi
23 Isthmus gyri cinguli
24 Sulcus calcarinus
25 Gyrus occipitotemporalis medialis

Abb. 10. Basalansicht der rechten Endhirnhemisphäre. Der Tractus olfactorius wurde entfernt (1/1 ×)

(2) Funktionelle Unabhängigkeit

Patient C.K.
Agnosie ohne Prosopagnosie

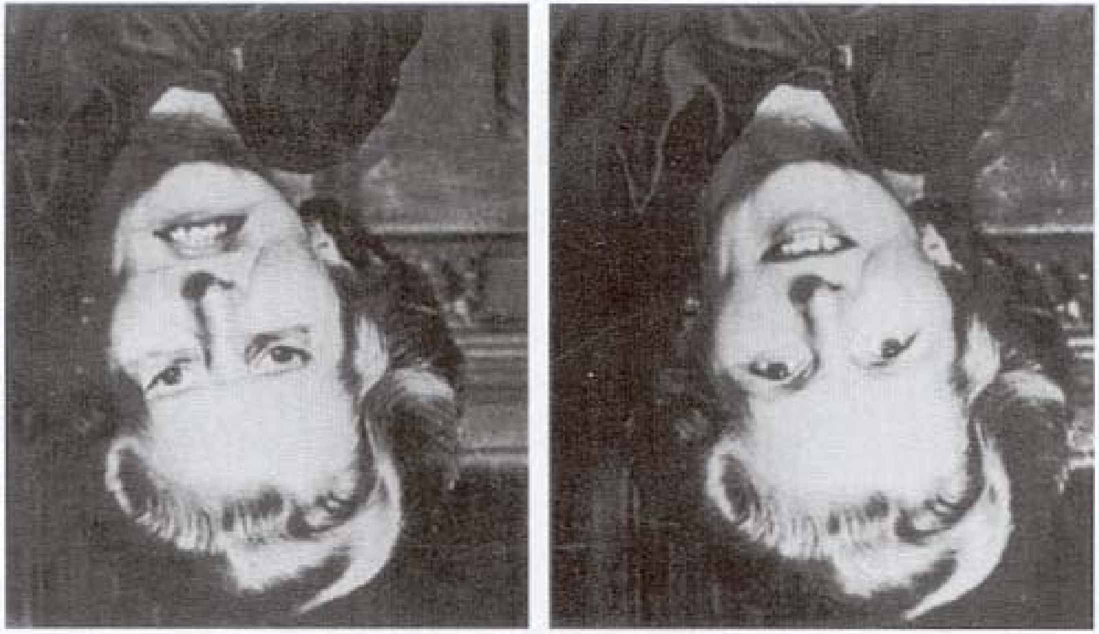


(2) Funktionelle Unabhängigkeit

Aufgaben-Ressourcen Artefakt: Erfordert Gesichterserkennung eine schwierige innerkategorielle Diskrimination?

Figure 6.39 Face-specific recognition deficits cannot be attributed to the fact that faces represent a difficult within-category discrimination. A sheep farmer, W.J., with prosopagnosia demonstrated impairment in recognizing famous faces yet was more accurate in recognizing individual sheep in comparison to control subjects. In one of the face discrimination tasks, the subjects were shown three faces and asked to point to the one familiar face. In this example, the familiar face is Norman Tebbit, a well-known (to the British population) politician of the Thatcher era. The faces on the left and right were unfamiliar to the subjects. The sheep were either familiar or unfamiliar to the subjects. From McNeil and Warrington (1993).

(3) Unterschiede in der Informations-verarbeitung: Face Inversion



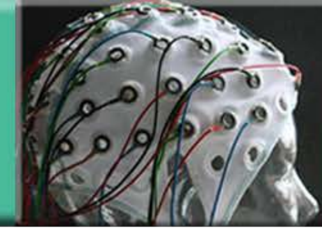
Face inversion Effekt:

Starke Beeinträchtigung der Gesichter-erkennung, wenn sie auf dem Kopf stehen

Face inversion Effekt

Hohe Ähnlichkeit

Geringe Ähnlichkeit



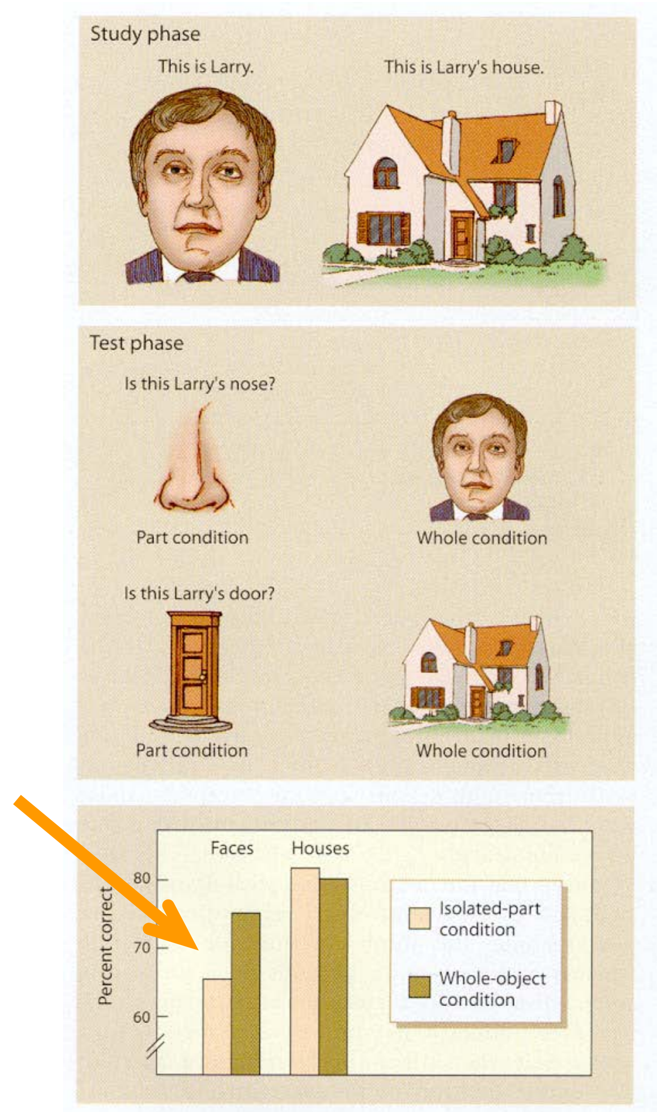
Face inversion

Gesichtererkennung

	Kontrollgruppe	Prosopagnosie	
Upright:	94%	58%	Holistische Analyse
Inverted:	82%		Teile Analyse

Gesichterwahrnehmung basiert nicht auf der W. von Einzelteilen

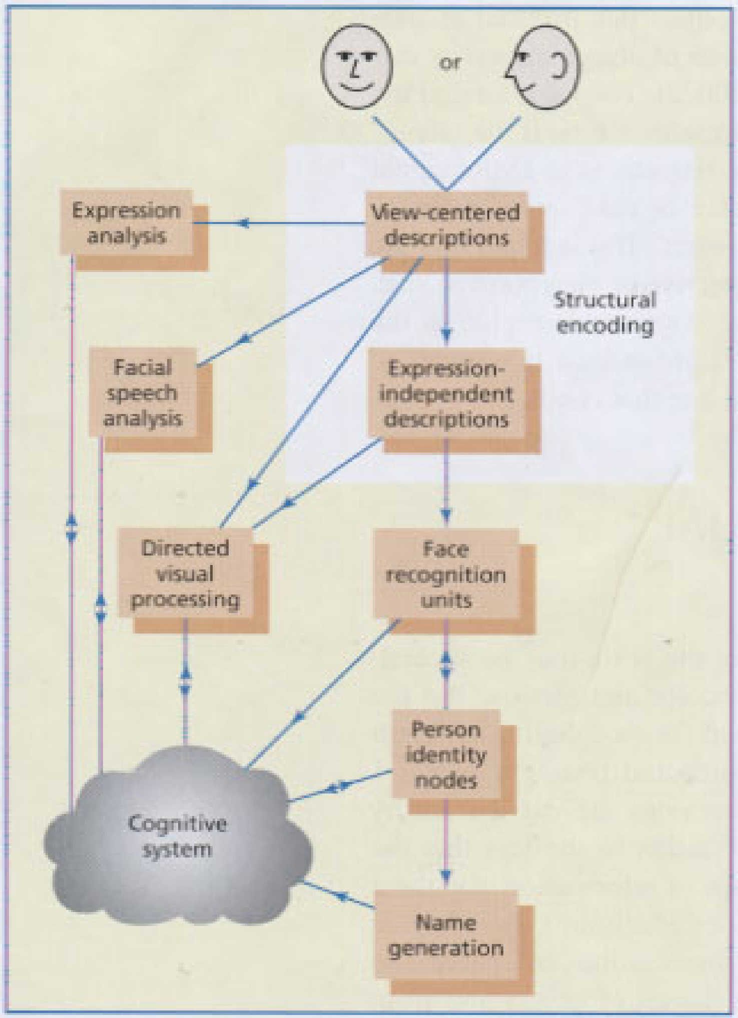
Schlechteres Rekognitions-gedächtnis für Gesichtsteile als für Objektteile



Gesichter sind etwas besonderes

- Spezialisierte Gehirnregionen.
- Gesichter- und Objekt-verarbeitung ist funktionell unabhängig.
- Unterschiedliche Verarbeitungs-mechanismen (Holistisches System / Teile Analyse System).

Gesichtererkennung (Bruce & Young, 1986)



The Bruce and Young (1986) model of face recognition. From Parkin (1996).

2-Prozess Model der Objekterkennung

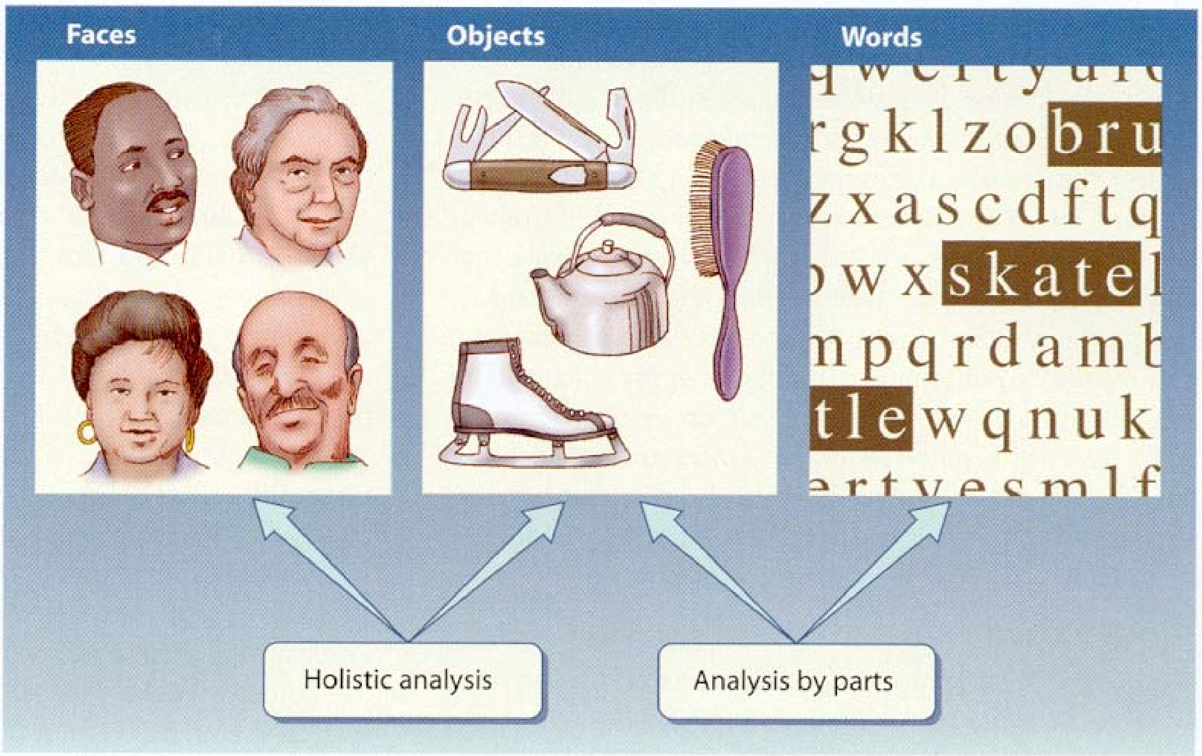
Table 6.2 Patterns of Co-occurrence of Prosopagnosia, Visual Agnosia, and Alexia*

Deficits in all three	21 patients
Selective deficits	
Face and objects	14 patients
Words and objects	15 patients
Faces and words	1 patient (possibly)
Faces alone	35 patients
Words alone	Many patients described in literature
Objects only	1 patient (possibly)

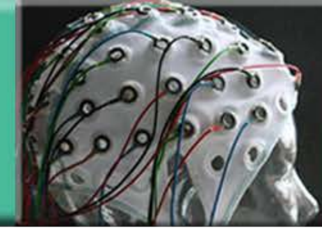
*Note that there was only a single case in the literature reporting a patient who showed impairment in recognizing both faces and words, but not objects. Adapted from Farah (1990).

2-Prozess Model der Objekterkennung

Figure 6.42 Farah's two-process model for object recognition. Recognition can be based on two forms of analysis, holistic and part based. The contribution of these two systems varies for different classes of stimuli. Analysis by parts is essential for reading and is central for recognizing objects. A unique aspect of face recognition is its dependence on holistic analysis. This process also contributes to object recognition.



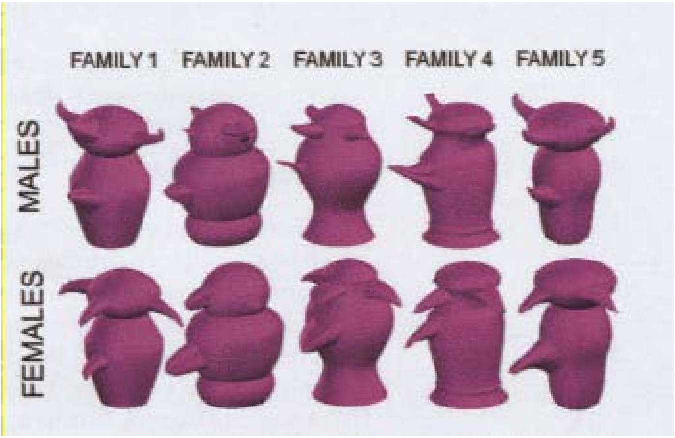
Das 2-Prozessmodell der Objekterkennung

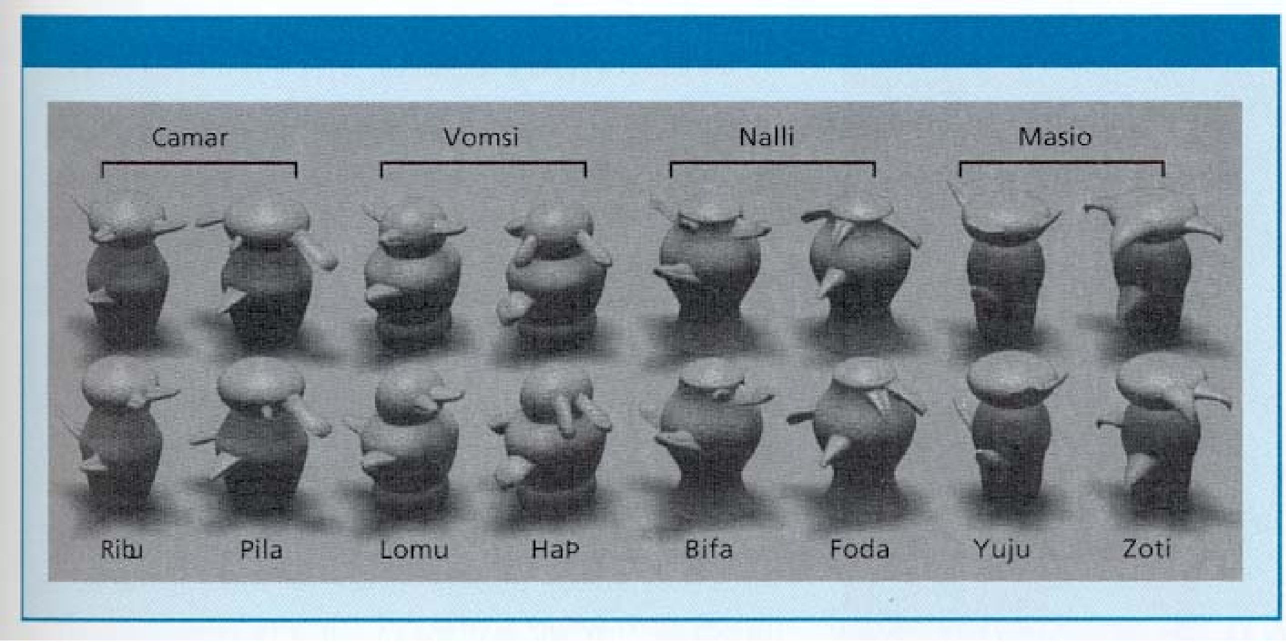


Handschriften:

	Lesen	Identifizieren
Prosopagnosie:	√	-
Alexie:	-	√

Holistische Verarbeitung ist trainierbar:
Greebles: Face Inversion Effekt nach Training





Greebles can be grouped into two genders and come from various families. To what extent does discriminating amongst greebles resemble discriminating amongst faces? Reprinted with permission of Michael Tarr. (Brown University, Providence, RI), see www.tarrlab.org

Expertise for cars and birds recruits brain areas involved in face recognition

Isabel Gauthier[1,2], Pawel Skudlarski[2], John C. Gore[2] and Adam W. Anderson[2]

[1] *Present Address: Department of Psychology, Vanderbilt University, Wilson Hall, Nashville, Tennessee 37240, USA*

[2] *Department of Diagnostic Radiology, Yale University Medical School, Fitkin Basement, 333 Cedar Street, New Haven, Connecticut 06510, USA*

Correspondence should be addressed to I.G. (isabel.gauthier@vanderbilt.edu)

Expertise with unfamiliar objects ('greebles') recruits face-selective areas in the fusiform gyrus (FFA) and occipital lobe (OFA). Here we extend this finding to other homogeneous categories. Bird and car experts were tested with functional magnetic resonance imaging during tasks with faces, familiar objects, cars and birds. Homogeneous categories activated the FFA more than familiar objects. Moreover, the right FFA and OFA showed significant expertise effects. An independent behavioral test of expertise predicted relative activation in the right FFA for birds versus cars within each group. The results suggest that level of categorization and expertise, rather than superficial properties of objects, determine the specialization of the FFA.

Holistische Verarbeitung ist trainierbar

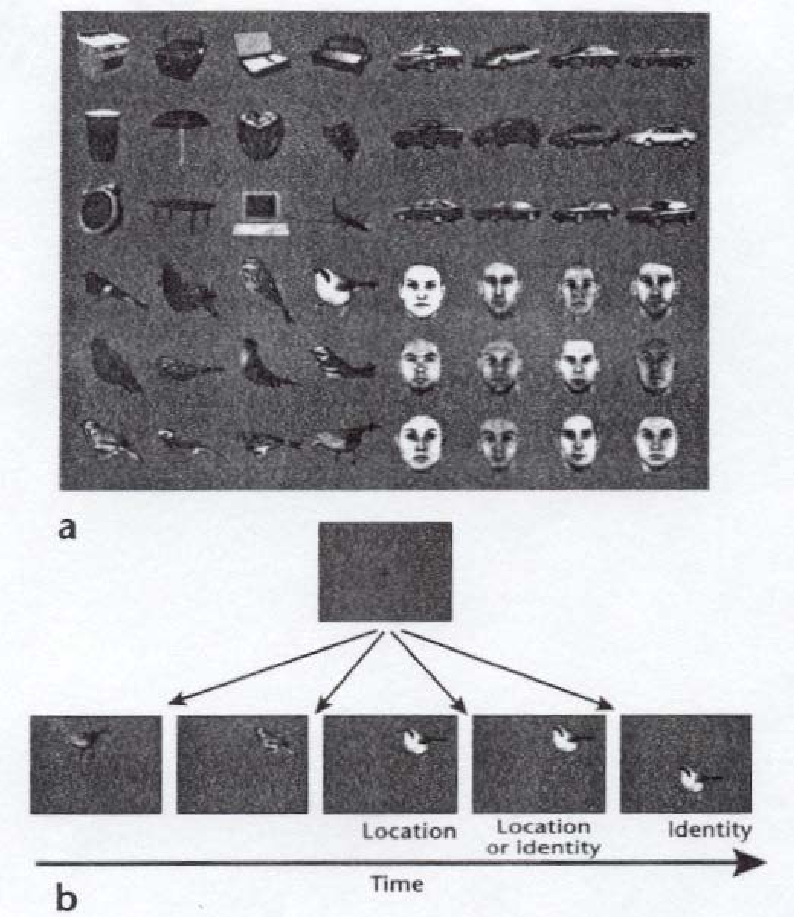


Fig. 1. Examples of stimuli and tasks for the fMRI protocol. (**a**) Images (256 × 256 pixels in size, 256 grays) from each of 4 categories (Caucasian faces without hair, passerine birds from New England, car models for the years 1995 and 1998 and various familiar objects) were used in the fMRI study. (**b**) Example of stimulus presentation during the fMRI runs. Subjects made 1-back repetition judgments regarding either location or identity (an identity repeat would show identical images, although sometimes in different locations—see Methods for details).

Die FFA bei Auto- und Vogelexperten I

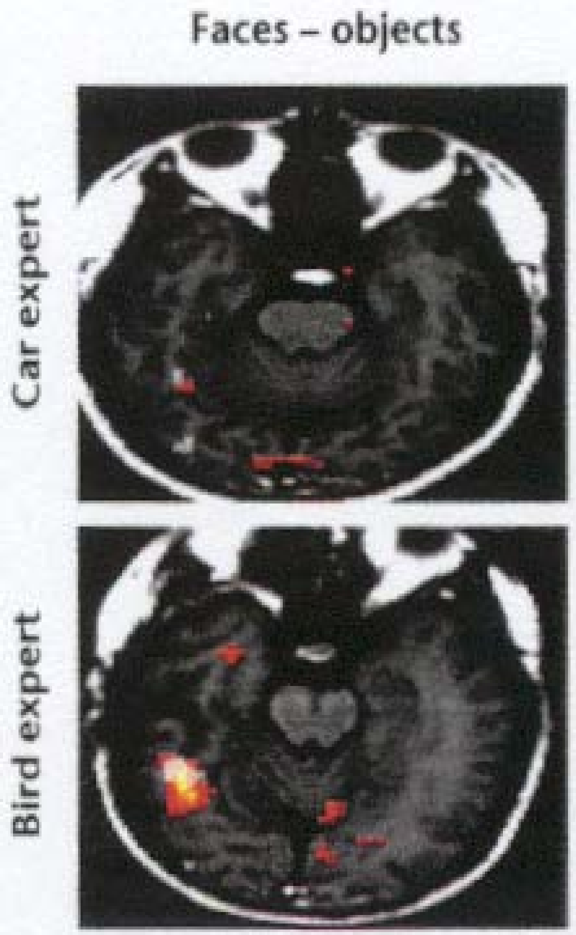
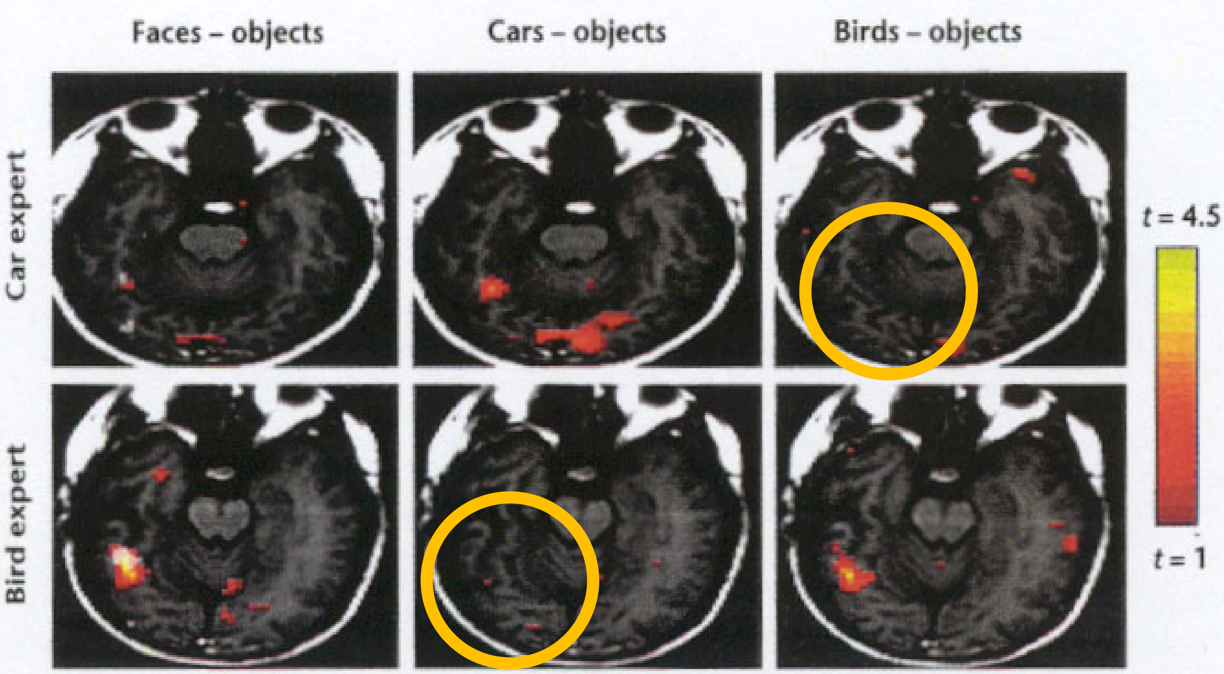


Fig. 3. The right FFA shows an expertise effect for birds and cars. One axial oblique slice through the FFA for one expert for each category shows the t-maps obtained when comparing the activation for faces, cars and birds with the activation elicited by objects during the location 1-back runs. The voxels marked by white crosses indicate the right FFA and OFA as defined in the passive viewing runs for these two subjects. (In this car expert, the OFA was actually in the slice immediately below and is shown on the same slice as the FFA only to illustrate its in-plane location.) Note that the center of the right FFA may be slightly different depending on the task (here passive viewing versus 1-back location) and that its size varies between subjects.

Die FFA bei Auto- und Vogelexperten II

Fig. 3. The right FFA shows an expertise effect for birds and cars. One axial oblique slice through the FFA for one expert for each category shows the *t*-maps obtained when comparing the activation for faces, cars and birds with the activation elicited by objects during the location 1-back runs. The voxels marked by white crosses indicate the right FFA and OFA as defined in the passive viewing runs for these two subjects. (In this car expert, the OFA was actually in the slice immediately below and is shown on the same slice as the FFA only to illustrate its in-plane location.) Note that the center of the right FFA may be slightly different depending on the task (here passive viewing versus 1-back location) and that its size varies between subjects.



Ereigniskorrelierte Potentiale

EEG: Elektrodenpositionen
Das 10-20 System

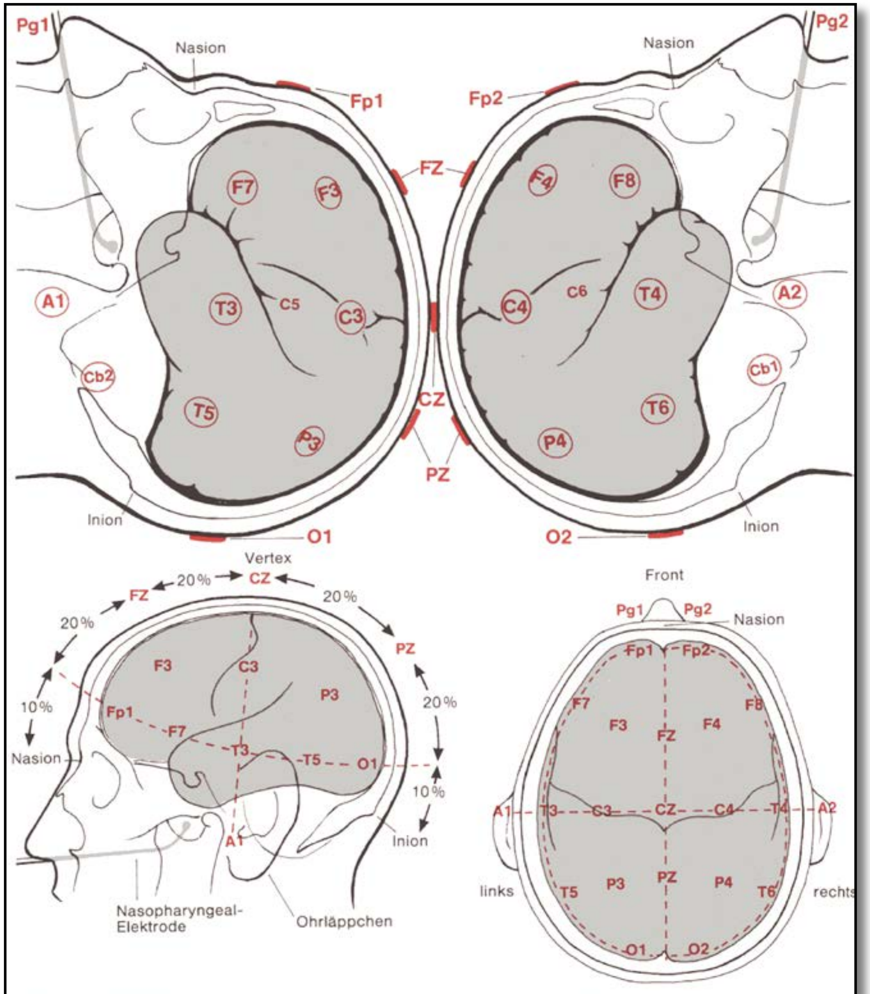
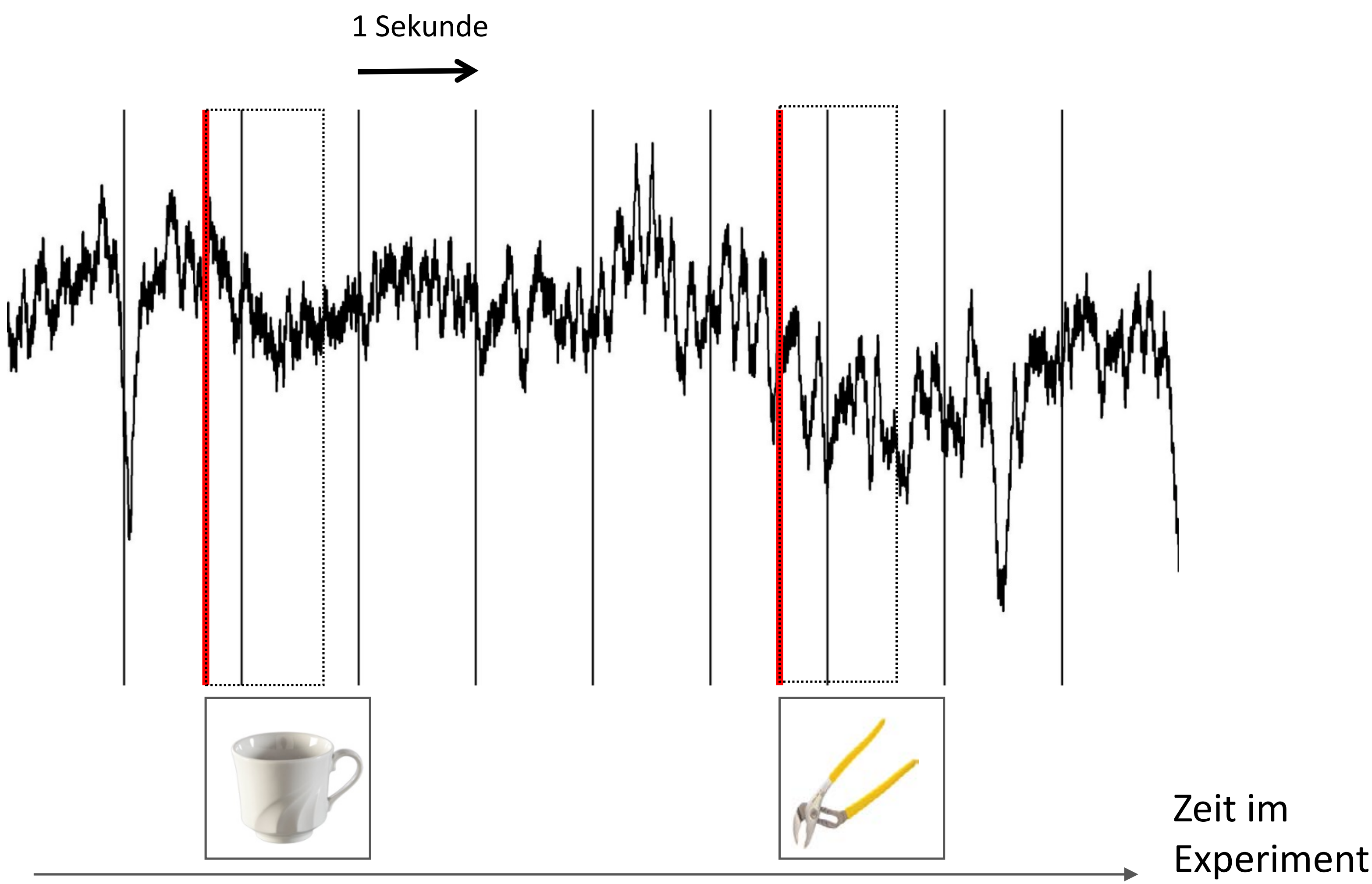


Abb. 21-4. Internationales 10-20-System für die Plazierung der EEG-Elektroden. (Nach Jasper HH (1958) The ten-twenty electrode system of the International Federation. J. Electroenceph. Clin. Neurophysiol. 20, 371-375)

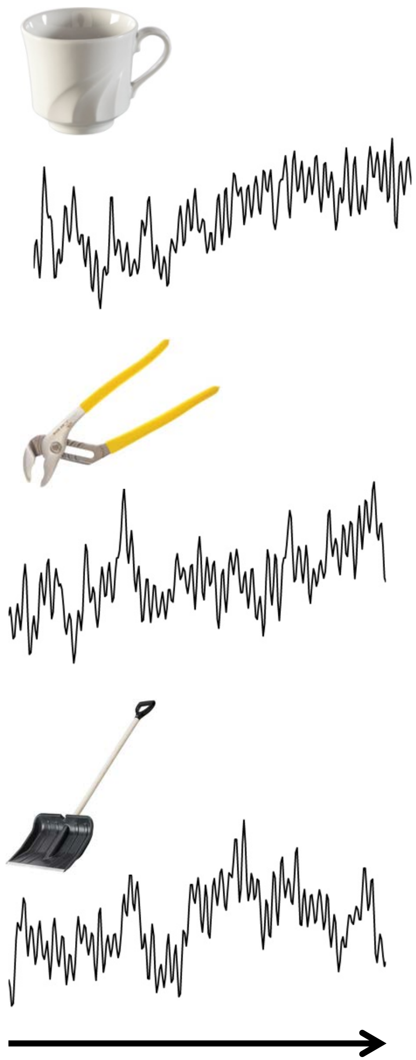
Ein typisches EEG

Vom EEG zum EKP

Beispiel: Ein Experiment, bei dem Objekte präsentiert werden

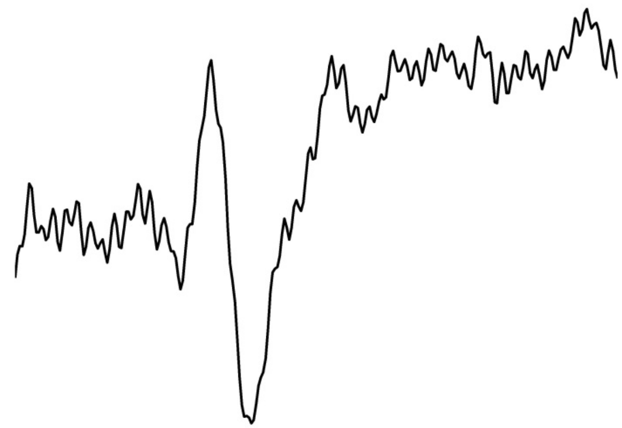


EEG-Signal einzelner Durchgänge:

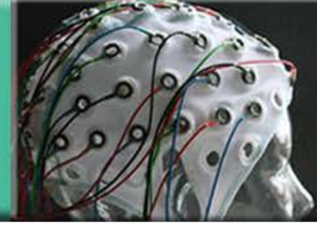


Eine Sekunde

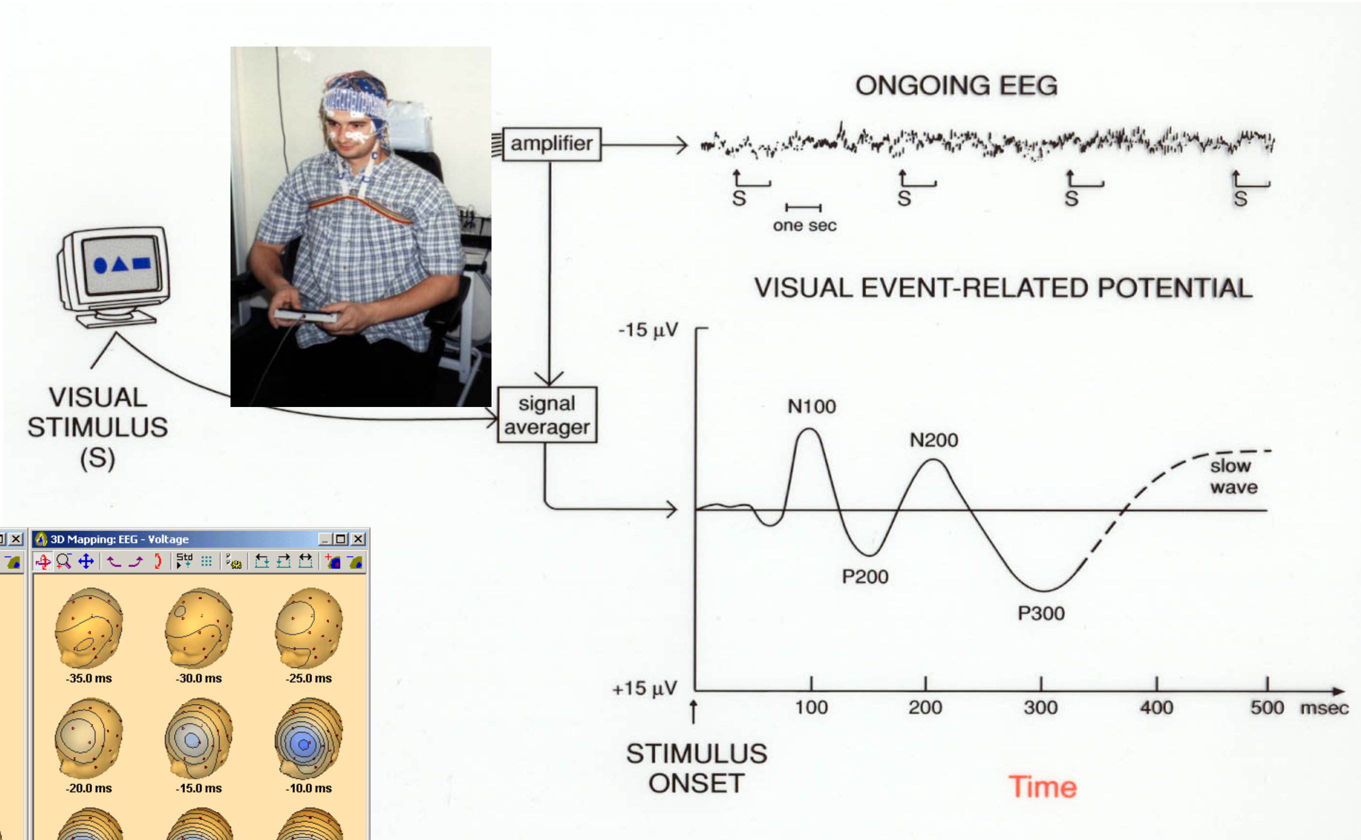
Mittelwert über viele* Durchgänge:

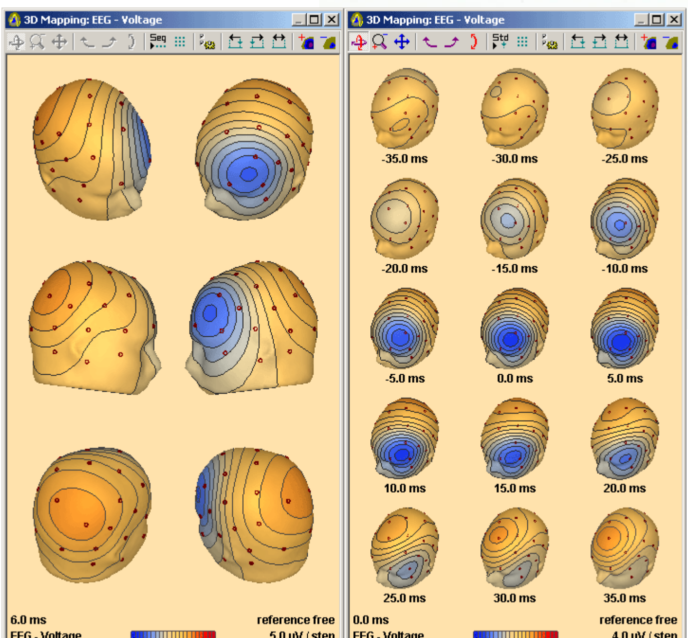


* was „viele“ bedeutet hängt vom Experiment ab



EEG: Ereigniskorrelierte Potentiale



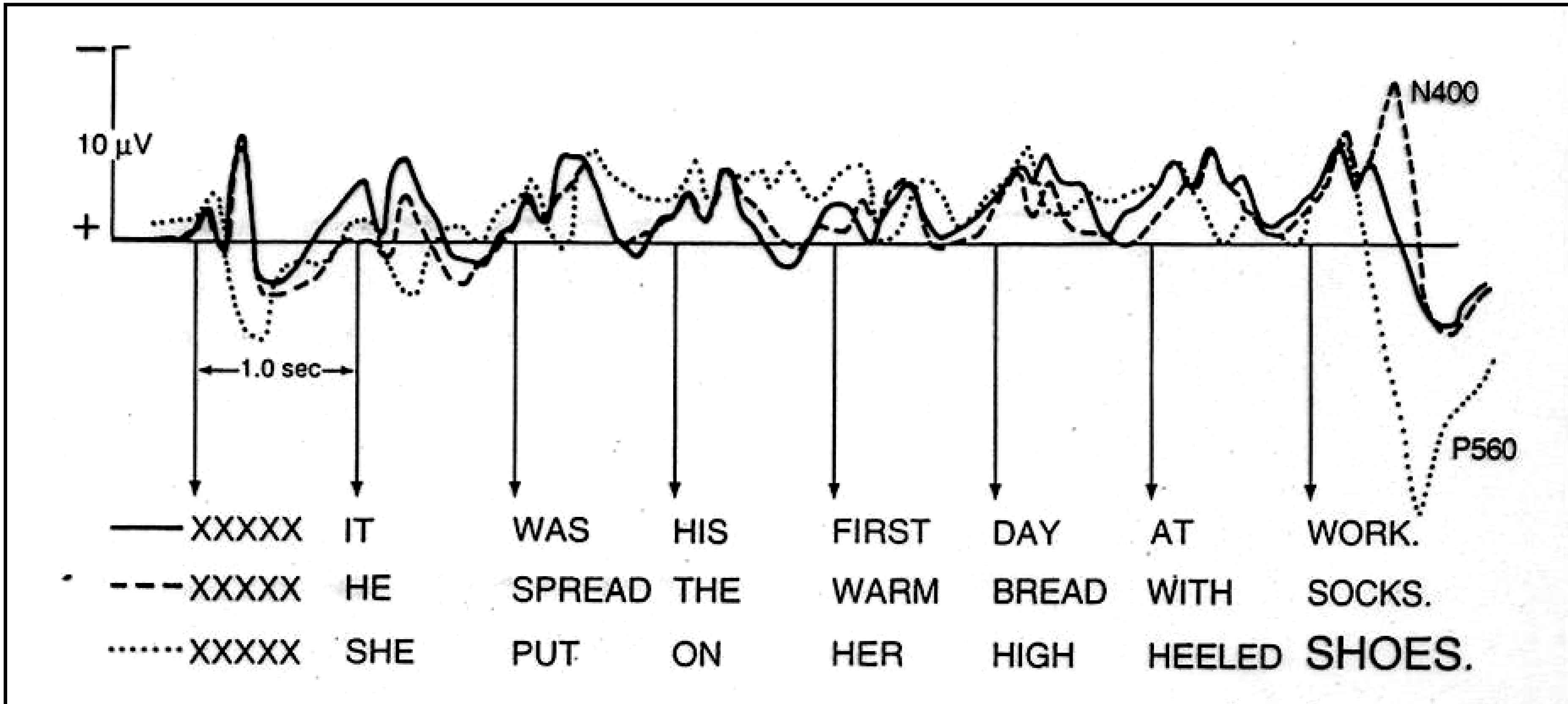


Endogene Komponenten

- Beispiele:
- N100
- N170
- MMN
- Bereitschaftspotential
- CNV
- P300
- N400
- Langsame Potentiale
- Alt/neu Effekte

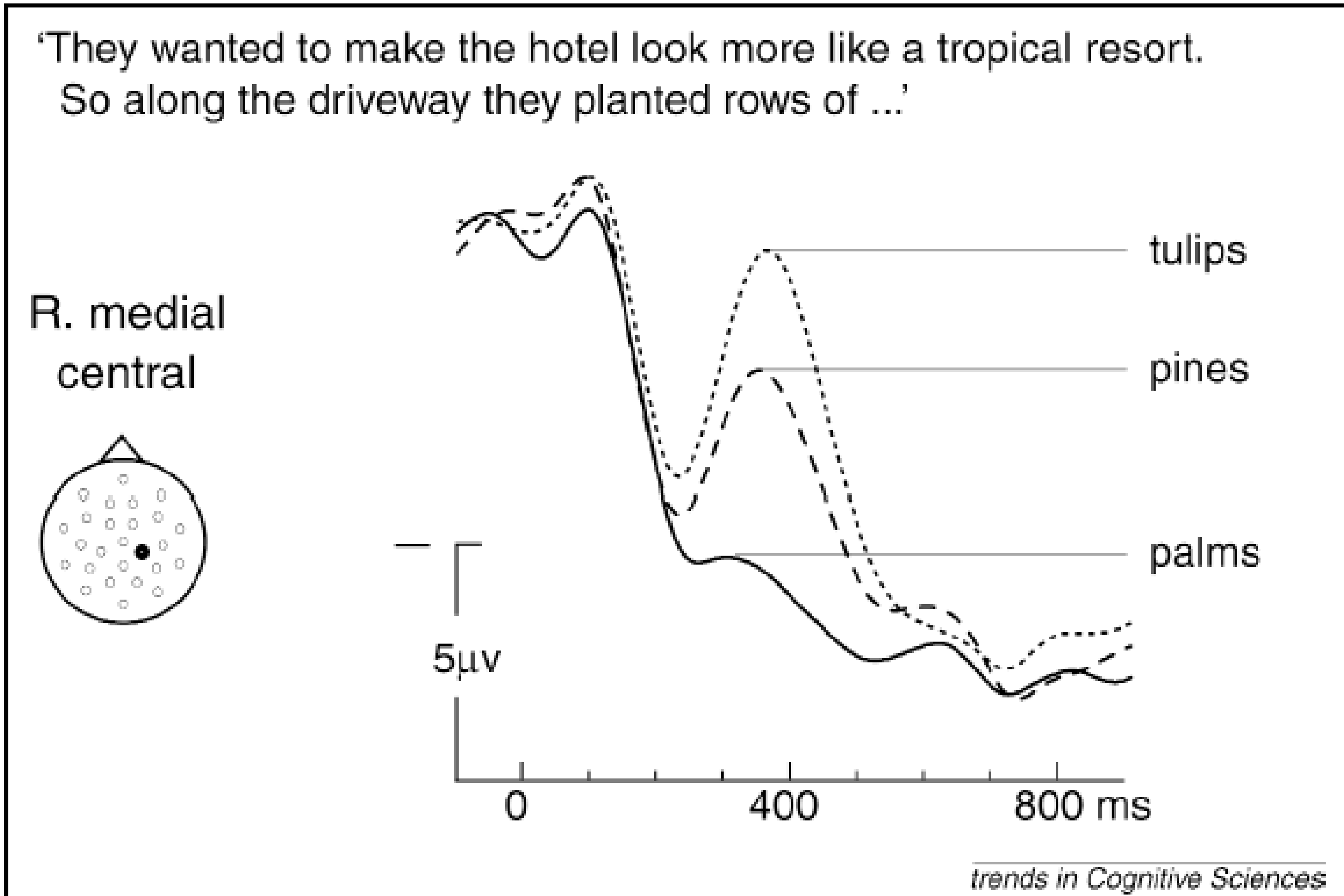
EKP Komponenten: Die N400

Negativierung auf semantische Abweichungen um etwa 400 ms

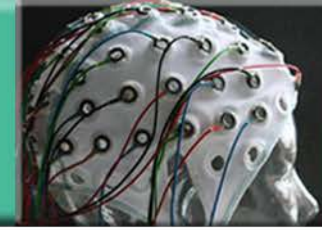


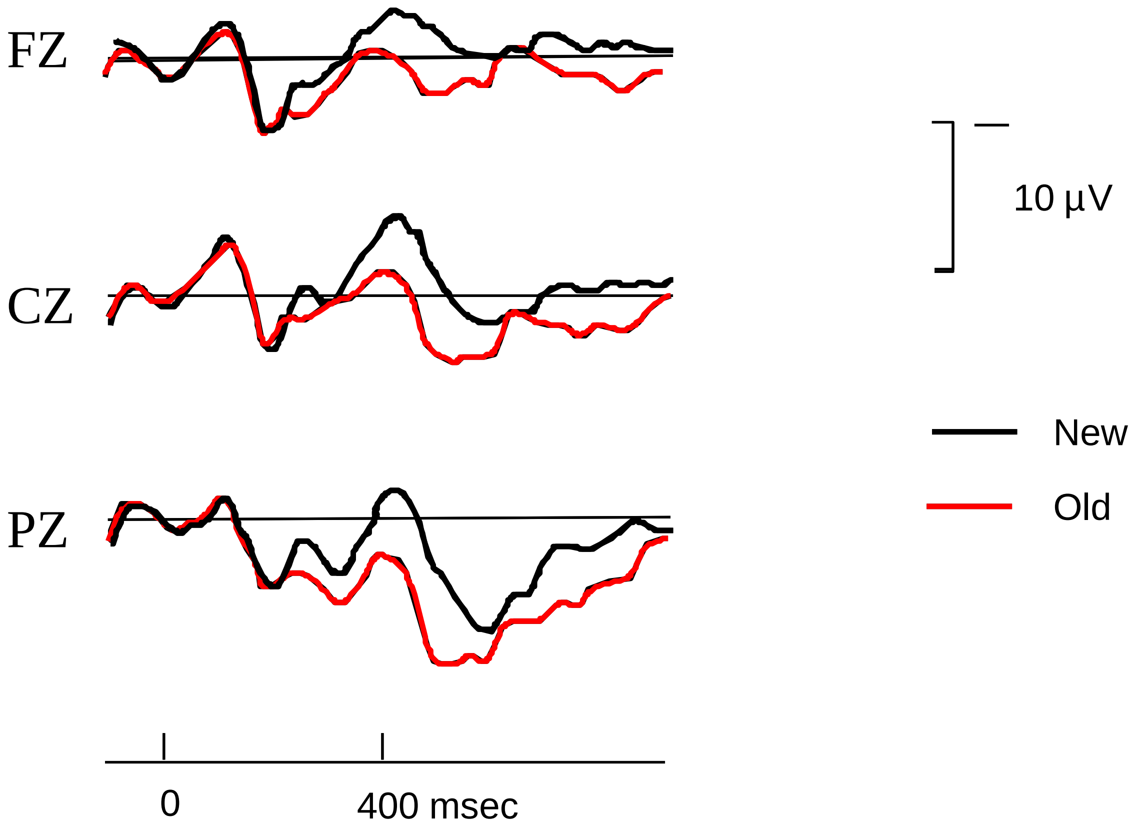
Die N400

... reflektiert Einfluss semantischen Wissens

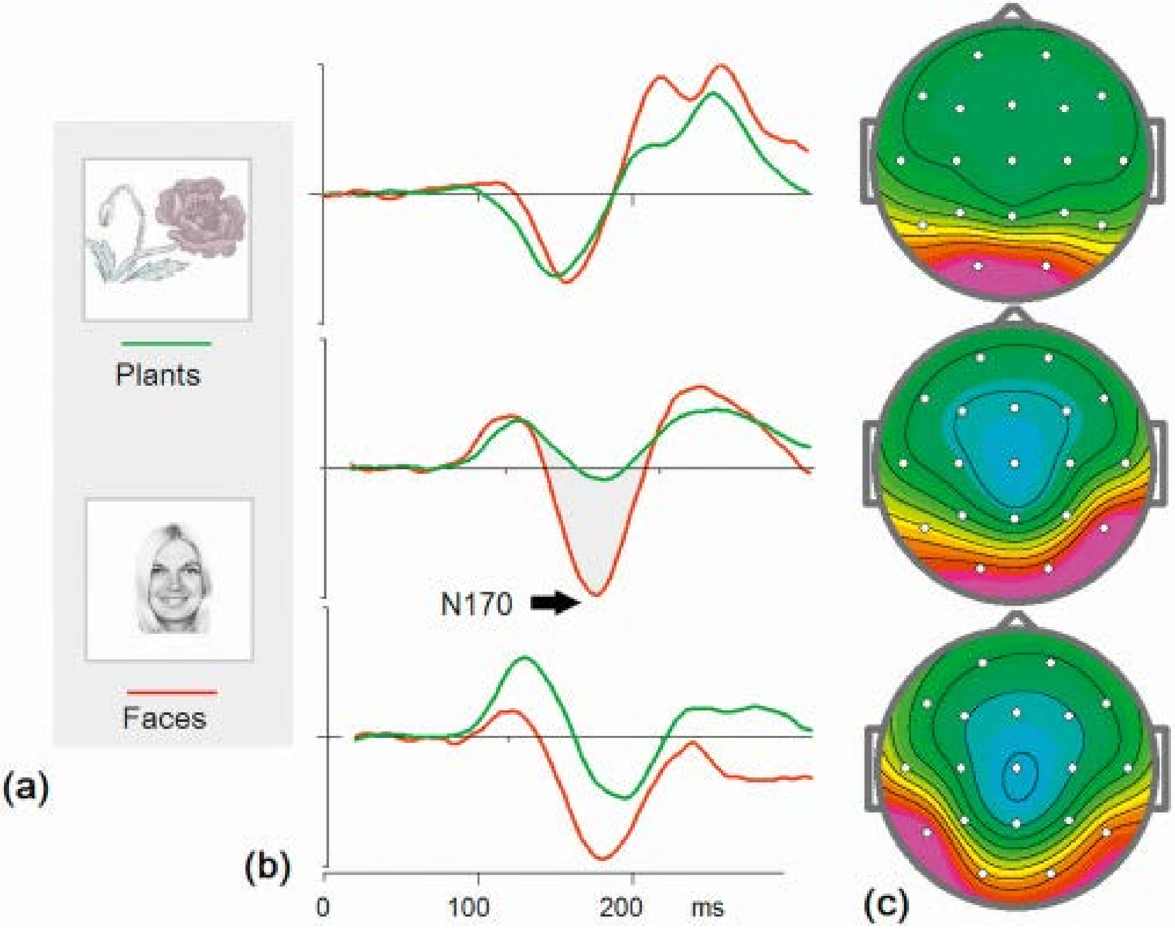


Der (EM) alt/neu Effekt

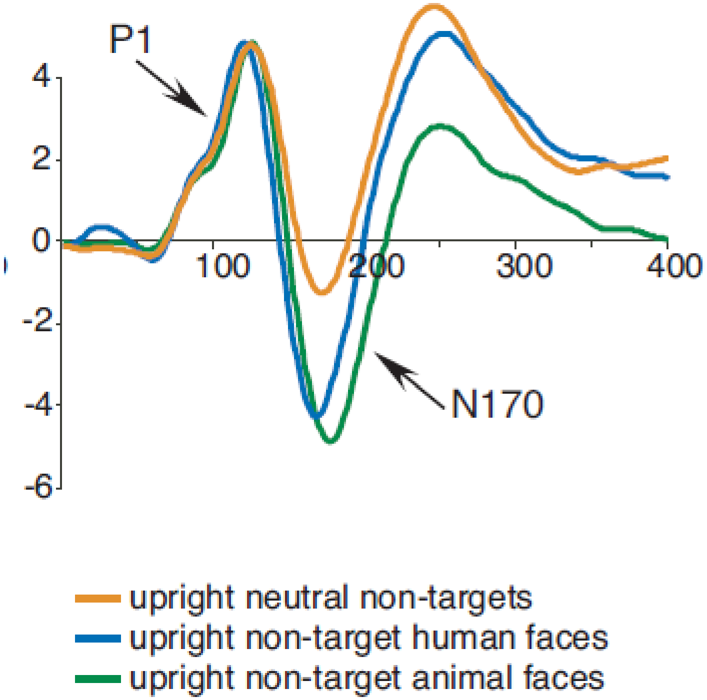




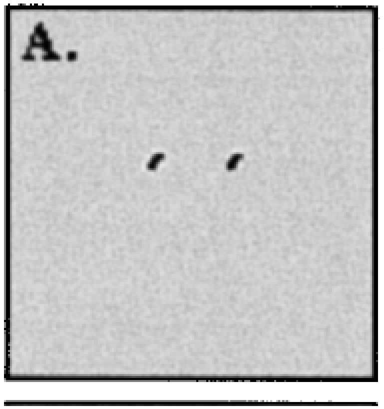
Die N170



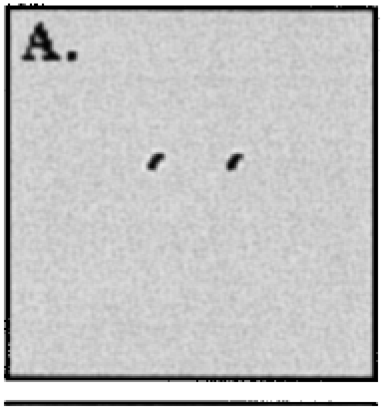
Die N170 reagiert nur auf Gesichter

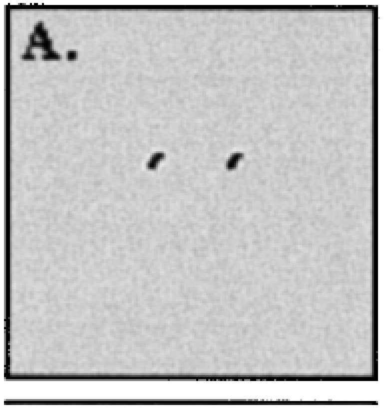


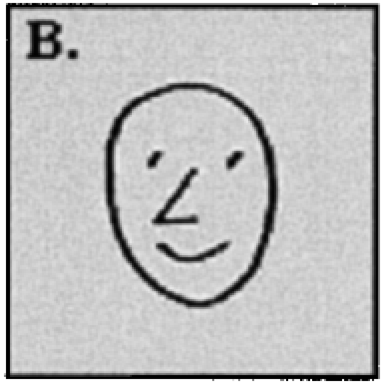
Ein kleines Experiment

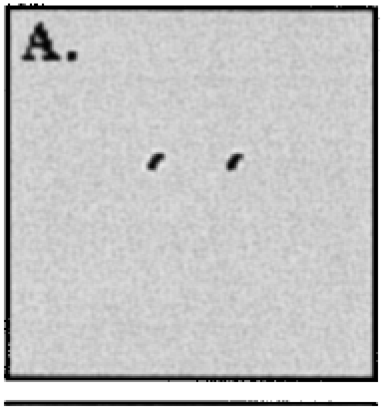


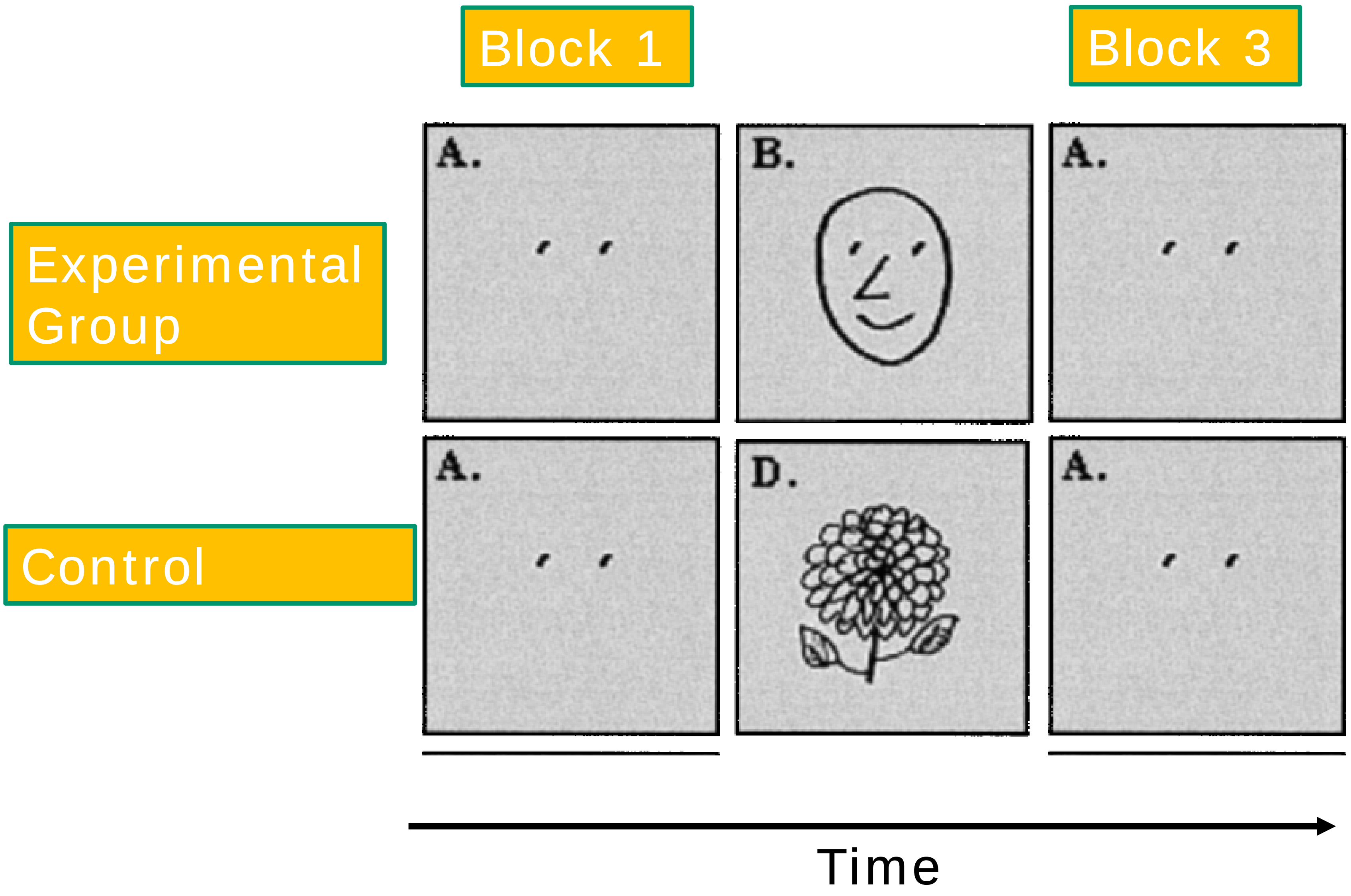
D.


A.

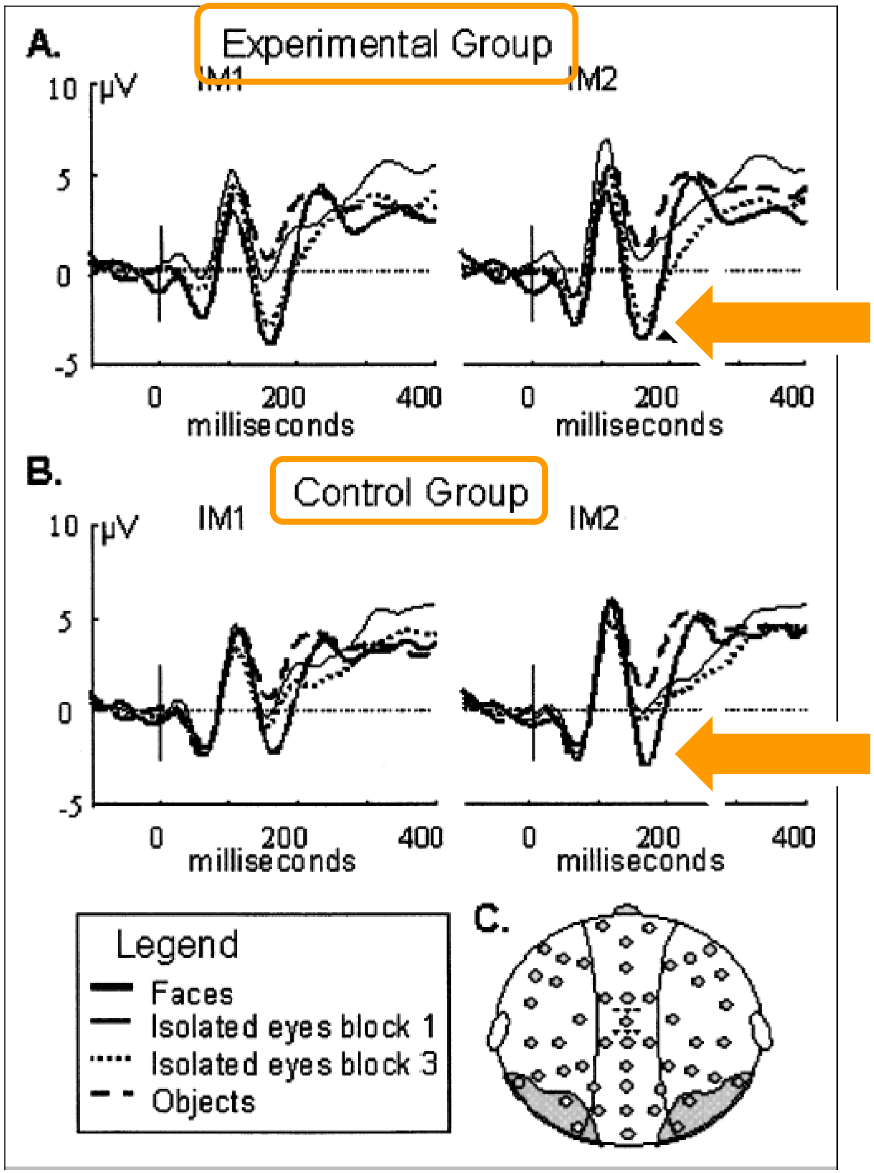

A.


B.


A.


Block 1
Block 3
Experimental Group
Control
A.
B.
A.
A.
D.
A.
Time

Block 3: EKP Effekte



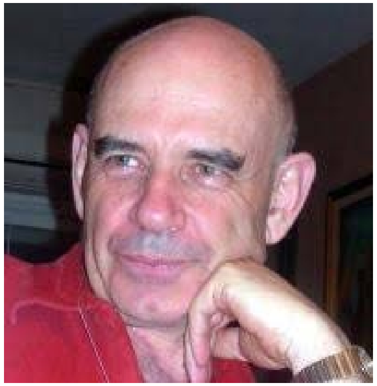
PSYCHOLOGICAL SCIENCE

Research Report

PRIMING VISUAL FACE-PROCESSING MECHANISMS: Electrophysiological Evidence

Shlomo Bentin,[1] Noam Sagiv,[1] Axel Mecklinger,[2] Angela Friederici,[2] and Yves D. von Cramon[2]

[1]Department of Psychology, Hebrew University of Jerusalem, Jerusalem, Israel, and [2]Max Planck Institute for Cognitive Neuroscience, Leipzig, Germany



Abstract—*Accumulated evidence from electrophysiology and neuroimaging suggests that face perception involves extrastriate visual mechanisms specialized in processing physiognomic features and building a perceptual representation that is categorically distinct and can be identified by face-recognition units. In the present experiment, we recorded event-related brain potentials in order to explore possible contextual influences on the activity of this perceptual mechanism. Subjects were first exposed to pairs of small shapes, which did not elicit any face-specific brain activity. The same stimuli, however, elicited face-specific brain activity after subjects saw them embedded in schematic faces, which probably primed the subjects to interpret the shapes as schematic eyes. No face-specific activity was observed when objects rather than faces were used to form the context. We conclude that the activity of face-specific extrastriate perceptual mechanisms can be modulated by contextual constraints that determine the significance of the visual input.*

Single-unit recordings in animals (Bruce, Desimone, & Gross, 1981; Desimone, Albright, Gross, & Bruce, 1984; Perrett, Rolls, & Caan, 1982; Young & Yamane, 1992), neuroimaging studies using positron emission tomography (PET; Sergent, Ohta, & MacDonald, 1992) or functional magnetic resonance imaging (fMRI; Kanwisher, McDermott, & Chun, 1997; McCarthy, Puce, Gore, & Allison, 1997), and intracranial recordings of event-related potentials (ERPs) in humans (Allison, Puce, Spencer, & McCarthy, 1999; McCarthy, Puce, Belger, & Allison, 1999; Puce, Allison, & McCarthy, 1999) have shown that faces elicit specific brain responses from relatively well-defined areas in the extrastriate regions of the visual cortex. Scalp-recorded ERPs in humans have extended the electrophysiological findings, revealing a face-specific negative component that peaks between 150 and 180 ms from stimulus onset (N170), is distributed over posterior temporal regions, and is larger at right- than at left-hemisphere sites (Bentin, Allison, Puce, Perez, & McCarthy, 1996; George, Evans, Fiori, Davidoff, & Renault, 1996). Because the N170 is not sensitive to face familiarity (Bentin & Deouell, 2000), it is probably associated with a precategorical structural-encoding mechanism responsible for the formation of the visual representation of a face, prior to its within-category identification.

Although this structural mechanism is selectively triggered by faces or face components,[1] recent studies have suggested that the scope of this specificity is quite wide: Schematically drawn human faces (such as a "smiley" face) are sufficient to elicit the face-specific N170 at the scalp (Sagiv & Bentin, 2001), as well as its intracranially recorded analogue, the N200 (Allison et al., 1999). A similar trend has been observed in neuroimaging studies: fMRI has identified regions in the middle fusiform gyrus in which the activity elicited by schematic faces (contrasted with the activity elicited by drawings of objects) overlaps with the activity elicited by photographs of natural faces (contrasted with the activity elicited by photographs of objects; Bentin, Mecklinger, Bosch, Sagiv, & von Cramon, 1999). These data suggest that the face-specific structural-encoding mechanism can adapt itself to process novel stimuli if they convey physiognomic information. How flexible is this adaptation ability? Can a face-specific structural-encoding process be induced by contextual information?

One way of addressing these questions is to teach the visual system to detect physiognomic features in stimuli that do not normally (or easily) convey such information. For instance, Dolan et al. (1997) showed that visual stimuli did, or did not, activate face-specific areas in the fusiform gyrus depending on whether the subject was, or was not, trained to detect a face in a visually masked display. These results suggest that perceptual learning involves a direct interaction between content-specific visual mechanisms, spatial-attention and feature-binding mechanisms. However, because the faces had actually been presented in that study, these results cannot tell whether priming can induce face-specific structural encoding of stimuli that normally do not activate face areas. We examined the latter question by recording ERPs elicited by visual symbols that, primed by a face context, could be interpreted as portraying eyes.

Previous studies have demonstrated that a robust N170 can be elicited by eyes isolated from photographs of natural faces (Bentin et al., 1996). However, whereas natural eyes are unequivocally perceived as a face component, even in isolation, sketched schematic eyes (e.g., two "+" symbols presented slightly apart on a horizontal axis) bear no physiognomic information outside the schematic face context. Indeed, subjects did not recognize schematic eyes as face components when these stimuli were presented outside the context of a schematic face. In the present study, we used this difference between the perception of schematic and natural eyes to examine whether induction of a face context may trigger face-specific activity during processing of stimuli that are not normally perceived as face components.

METHOD

Participants

The participants were 36 undergraduates from the Hebrew University, Jerusalem, Israel, who participated for payment or credit toward a course requirement. Among them, 18 participated in the experimental

Address correspondence to Shlomo Bentin, Department of Psychology, Hebrew University of Jerusalem, Jerusalem, 91905, Israel; e-mail: msbentin@mscc.huji.ac.il.

1. Several authors have demonstrated that the face-specific brain areas can be invoked to process other stimulus categories for which the viewer has acquired expertise with within-category item discrimination (e.g., Gauthier, Tarr, Anderson, Skudlarski, & Gore, 1999; Tanaka & Curran, 2001). Such findings, however, are not evidence against the hypothesis that domain-specificity in processing faces is a natural characteristic of the visual system.


Danke für Ihre
Aufmerksamkeit!