



11th

Winterconference

NvP, Nederlandse Vereniging voor Psychonomie

Programme

&

Abstracts

Egmond aan zee, 14-15 december 2007

WINTERCONFERENCE 2007 ★ EGMOND AAN ZEE

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Organizing Committee:

Ingrid Christoffels
Hilde Geurts
Martijn Meeter
Holger Mitterer
Jaap Murre
RenéZeelenberg

PROGRAMME

Friday

09:30	Bus leaves from Alkmaar train station	
	Registration	NVP desk
	Coffee and Muffins	2 nd Lounge
10:40	Opening	Zuiderduinzaal
10:50	Plenary lecture: <i>Akira Miyake</i>	Zuiderduinzaal
11:55	Parallel sessions	Rooms 557, 558, 559, Zuiderduinzaal
13:15	Lunch	Restaurant
14:10	Parallel sessions	Rooms 557, 558, 559, Zuiderduinzaal
15:30	Tea	2 nd Lounge
15:45	Parallel sessions	Rooms 557, 558, 559, Zuiderduinzaal
16:45	Poster session + drinks	Le Regal and Le Foyer
18:20	End of poster session	
18:30	NVP business meeting	Zuiderduinzaal
19:15	Dinner	Van Speykzaal
21:30	Bar open	

Saturday

8:00	Breakfast	Restaurant
9:30	Parallel sessions	Rooms 557, 558, 559, Zuiderduinzaal
11:10	Coffee	2 ^e Lounge
11:25	Plenary lecture: <i>Rainer Goebel</i>	Zuiderduinzaal
12:30	Lunch	Restaurant
13:20	Parallel sessions	Rooms 557, 558, 559, Zuiderduinzaal
14:50	Psychonomic dissertation award	Zuiderduinzaal
15:05	Lecture winner	Zuiderduinzaal
15:50	Closing	Zuiderduinzaal
16:10?	Bus leaves for Alkmaar train station	Central entrance hotel

HOTEL ZUIDERDUIN

Hotel Zuiderduin

Friday 14 December:

Arrival from 9.00, Registration Conference desk NVP

Luggage storage in room 534

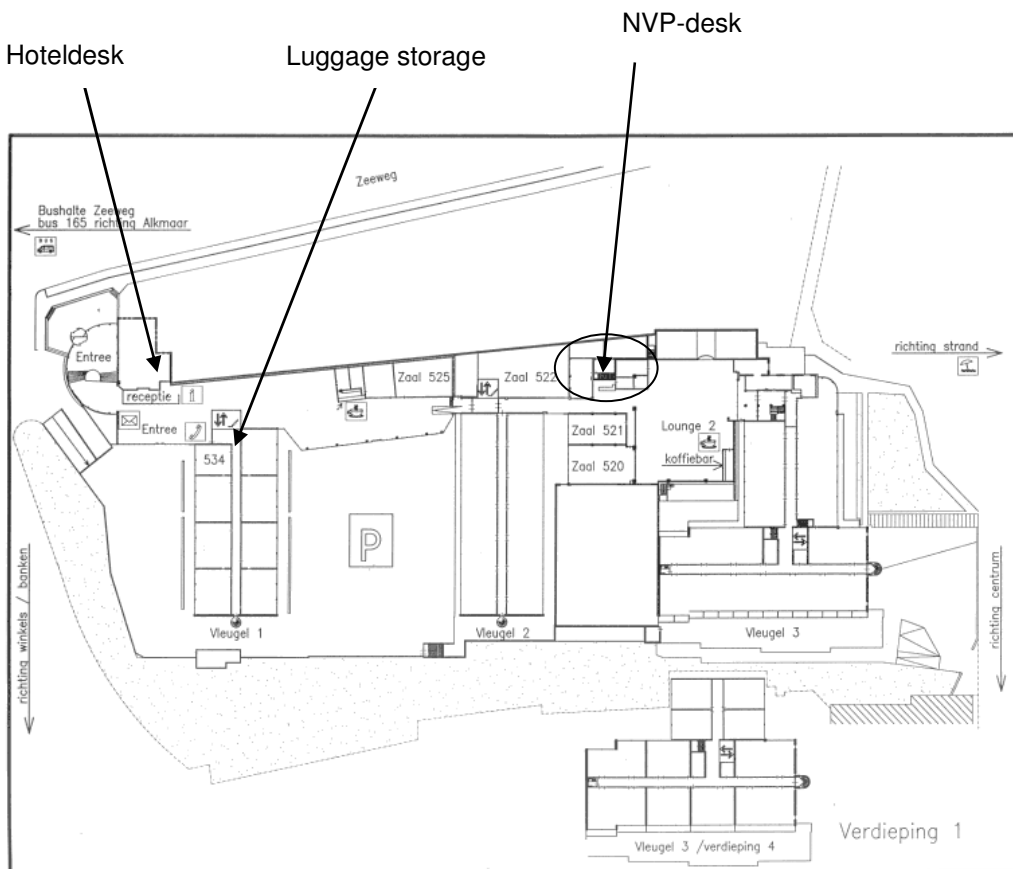
Check in Hotel Zuiderduin: from 15.00

Saturday 15 December

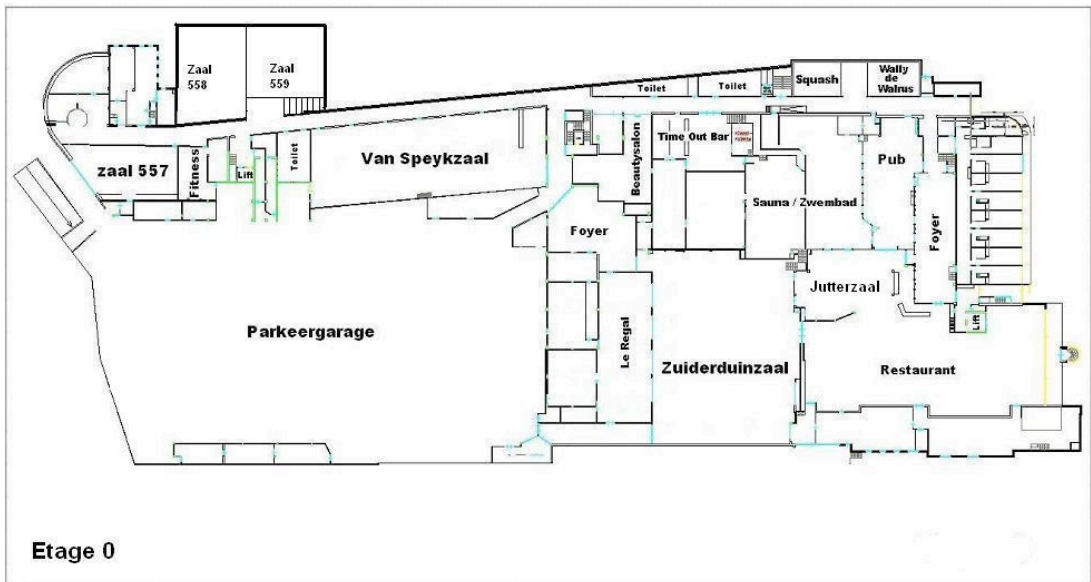
8.00 Check out possibility

Luggage storage in room 534

10.30 **Last possibility for Check out!!**



Map of the **first floor**: the *check in desk* of the hotel and of the conference, the *2nd Lounge* and the *Luggage store* (534).



Map of the **ground floor**: the *Zuiderduinzaal* (plenary sessions), the *conference rooms* (557, 558, and 559), *Le Regal* and *Le Foyer* (poster session Friday), the *Restaurant* (lunch and breakfast), the *van Speykzaal* (dinner Friday) and the *pub* (Friday night).

PROGRAMME FRIDAY

10:40	Opening	Zuiderduinzaal
10:50	Plenary lecture: <i>Akira Miyake</i>	Zuiderduinzaal

Parallel Sessions				
<i>Only first authors are mentioned</i>				
Room	557	558	559	Zuiderduin
Session	Attentional & Perception	Psycholinguistics I	Visual Perception	Feedback Processing
Chair	Hommel	Zwaan	Meeter	Crone
11:55	S01 Pannenbakker	S05 Roelofs	S09 van der Helm	S13 van Duijvenvoorde
12:15	S02 Jepma	S06 v/de Meerendink	S10 Mitterer	S14 van Meel
12:35	S03 Scheeringa	S07 Aveyard	S11 Paffen	S15 Band
12:55	S04 van der Lubbe	S08 Pecher	S12 Keizer	S16 Boksem
13:15	Lunch			
Session	Visual Attention	Psycholinguistics II	Perception & Action	Psychophysiology
Chair	Meeter	Mitterer	Verwey	Kenemans
14:10	S17 Pinto	S21 Schiller	S25 Crajé	S29 Mars
14:30	S18 Belopolsky	S22 Brouwer	S26 Abrahamse	S30 van Gaal
14:50	S19 Munneke	S23 Stevens	S27 Bergmann Tiest	S31 Lansbergen
15.10	S20 Donk	S24 McQueen	S28 Liesker	S32 Cohen

15:30	Tea			2 nd Lounge
<i>Session</i>	Embodiment & Action	Bilingualism	Reaching and Grasping	Psychophysiology
<i>Chair</i>	Pecher	Christoffels	Smeets	Ridderinkhof
15:45	S36 Kammers	S39 Verhoef	S42 Zaal	S33 Leijenhorst
16:05	S37 Willems	S40 Zeelenberg	S43 Bongers	S34 Jongen
16:25	S38 van Dantzig	S41 Hommel	S44 van de Kamp	S35 Groen
16:45	Poster Session + Drinks			Le Regal & Le Foyer
18:30	NVP business meeting			Zuiderduinzaal
19:15	Dinner			Van Speykzaal

PROGRAMME SATURDAY

8:00	Breakfast	Restaurant
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Parallel Sessions				
<i>Only first authors are mentioned</i>				
Room	557	558	559	Zuiderduin
<i>Session</i>	Perception	Learning & Memory	Action	Cognitive Control
<i>Chair</i>	Van der Lubbe	Zeelenberg	F. Zaal	Geurts
9:30	S45 Plaisier	S50 Sjerps	S55 Gevers	S60 v/den Wildenberg
9:50	S46 Overvliet	S51 Dutilh	S56 Adam	S61 Spapé
10:10	S47 van Rijn	S52 Kessels	S57 Hulstijn	S62 Aarts
10:30	S48 Stekelenburg	S53 Meeter	S58 Los	S63 Lamers
10:50	S49 Keetels	S54 Jakab	S59 Verwey	S64 Forstman
11:10	Coffee			2nd Lounge
11:25	Plenary lecture: <i>Akira Miyake</i>			Zuiderduinzaal
12:30	Lunch			Restaurant
<i>Session</i>	Attention	Language and the Brain	Development	Control across Lifespan
<i>Chair</i>	Donk	Christoffels	Bekkering	Geurts
13:20	S65 Olivers	S69 Bögels	S73 de Haan	S77 Huizinga
13:40	S66 Koelewijn	S70 Struiksema	S74 de Kleine	S78 Ridderinkhof
14:00	S67 Bocanegra	S71 Bastiaansen	S75 van Elk	S79 van Gerven
14:20	S68 van der Burg	S72 Noordzij	S76 Bullens	S80 Stiers

14:50	Psychonomic dissertation award	Zuiderduinzaal
15:05	Lecture winner dissertation award	Zuiderduinzaal
15:50	Closing	Zuiderduinzaal
16:10?	Bus leaves for Alkmaar train station	Central entrance hotel

Room 557

- S01 Does Mental Rotation affect T2 Spatial Attention in a Dual Task?
Merel M. Pannebakker, Guido P. H. Band, Pierre Jolicœur, K. Richard Ridderinkhof, Bernhard Hommel
- S02 Exploring the Accessory Stimulus effect: an ERP study
Marieke Jepma, Guido Band, & Sander Nieuwenhuis
- S03 Trial by trial BOLD correlates of working memory related alpha and theta power increases during simultaneous EEG/fMRI measurement
René Scheeringa, Marcel C. M. Bastiaansen,, Karl Magnus Petersson,, David G. Norris Peter Hagoort,
- S04 WHERE DOES IT HURT?
Rob H. J. van der Lubbe, Jan R. Buitenweg, Maria Herzog, Bernard Gerdes, & Marijtje L.A. Jongsma,
- S17 Dynamic items pop out : Saliency or Feature-driven?
Yair Pinto, Chris Olivers & Jan Theeuwes
- S18 The size of attentional window modulates attentional capture
Artem V. Belopolsky, Jan Theeuwes
- S19 Directing attention to a location results in retinotopic activation in primary visual cortex
Jaap Munneke; Dirk J. Heslenfeld; Jan Theeuwes
- S20 Saliency Effects are short-lived
Mieke Donk, Wieske van Zoest, & Leroy Soesman
- S36 The Rubber Hand Illusion in Action.
Marjolein Kammers, Frederique De Vignemont, Lennart Verhagen, Dennis Schutter, Chris Dijkerman,
- S37 Embodied action understanding in the motor system: Evidence from left- and right-handers
Roel M. Willems, Asli Özyürek,, Floris P. de Lange and Peter Hagoort,
- S38 Moving 'Love' away: Approach and Avoidance as Action Effects
Saskia van Dantzig, Diane Pecher, and Rolf A. Zwaan
- S45 Haptic pop-out in a hand sweep
Myrthe A. Plaisier, Wouter M. Bergmann Tiest, & Astrid M.L. Kappers
- S46 Finger Position Influences whether You Can Localize Tactile Stimuli
Krista E. Overvliet, Helen. A. Anema, Eli Brenner, H. Chris Dijkerman, Jeroen B.J. Smeets
- S47 Perception of multiple overlapping time intervals: Evidence for a single mental clock and temporal arithmetic
Hedderik van Rijn, &Niels A. Taatgen
- S48 Neural correlates of multisensory integration of ecologically valid audiovisual events
Jeroen J. Stekelenburg & Jean Vroomen
- S49 No effect of Auditory-Visual Spatial Disparity on Temporal Recalibration
Mirjam Keetels, Jean Vroomen
- S65 A Booster/Bouncer theory of temporal attention
Christian N. L. Olivers & Martijn Meeter
- S66 Costs and benefits in a crossmodal exogenous cueing task
Thomas Koelewijn, Adelbert Bronkhorst, & Jan Theeuwes
- S67 Emotion improves and impairs visual perception
Bruno Bocanegra and René Zeelenberg
- S68 Pip and pop: Non-spatial auditory signals improve spatial visual search
Erik van der Burg, Christian N.L. Olivers, Adelbert W. Bronkhorst, and Jan Theeuwes

Room 558

- S05 Dynamics of the Control of Word Retrieval Revealed Through Distributional Analyses
Ardi Roelofs
- S06 Monitoring in Language Perception: Mild and Strong Conflicts Elicit Different ERP Patterns
Nan van de Meerendonk, Constance Th.W.M. Vissers, Dorothee J. Chwilla, and Herman H.J. Kolk
- S07 Visual traces in language comprehension
Mark Aveyard, Rolf A. Zwaan, Ralph Radach, Christian Vorstius
- S08 Bricks don't breathe: Semantic decisions are made by weighing evidence for and against category membership
Diane Pecher, Eric-Jan Wagenmakers, & René Zeelenberg
- S21 Type of Letter Effects in Reading Aloud: The Case of Vowels vs. Consonants
Niels O. Schiller
- S22 Lexical Competition during the Comprehension of Spontaneous Speech
Susanne Brouwer, Holger Mitterer, and Mirjam Ernestus,
- S23 The role of token variability in perceptual learning of speech
Michael A. Stevens, James M. McQueen, Robert J. Hartsuiker,
- S24 Learning an Unfamiliar Foreign Regional Accent: The Effects of Subtitles
James M. McQueen & Holger Mitterer
- S39 Electrophysiological evidence for endogenous control of language switching in overt picture naming
Kim M. W. Verhoe, Ardi Roelof, Dorothee J. Chwilla
- S40 Lexical Selection in Bilinguals: Words in the Bilingual's Two Lexicons Compete for Selection
Rene Zeelenberg, Zofia Wodniecka, & Kalinka Timmer
- S41 Bilingualism and cognitive control: How learning a second language makes you better
Bernhard Hommel, Lorenza S. Colzato, Maria Teresa Bajo, Wery van den Wildenberg, Daniela Paolieri, Sander Nieuwenhuis & Wido La Heij
- S50 A perceptual learning study on the flexibility of native-language speech perception
Matthias J. Sjerps, James M. McQueen
- S51 A Diffusion Model Account of Practice
Gilles Dutilh, Joachim Vandekerckhove, Francis Tuerlinck & Eric-Jan Wagenmakers
- S52 The hippocampus as a binding device: within- and between-domain associations in human memory
Roy P.C. Kessels, Carinne Piekema, Mark Rijpkema & Guillén Fernández,
- S53 Recall deficits in schizophrenia: is it all in the context?
Martijn Meeter & Lucia Talamini
- S54 The Role of Item Strength in Retrieval Induced Forgetting
Emoke Jakab & Jeroen G.W. Raaijmakers
- S69 ERP Data on the Interplay of Prosody, Syntax and Semantics in Sentence Processing
Sara Bögels, Herbert Schriefers, Dorothee J. Chwilla, Wietske Vonk and Roel Kerkhofs
- S70 Neural Correlates of Spatial Sentence Processing in Blind and Sighted
Marijn E. Struiksma, Matthijs L. Noordzij, Bas F.W. Neggers, & Albert Postma
- S71 Oscillatory neuronal dynamics in the MEG dissociate parsing and working memory processes during online language comprehension
Marcel Bastiaansen.
- S72 Brain mechanisms underlying human communication
Matthijs L. Noordzij; Sarah E. Newman-Norlund; Jan Peter de Ruiter; Peter Hagoort; Stephen C. Levinson; Ivan Toni

Room 559

- S09 Visual regularity versus antiregularity in object perception
Peter A. van der Helm & Matthias S. Treder
- S10 Recalibrating Color Categories Using World Knowledge
Holger Mitterer, Jan Peter de Ruiter
- S11 The spatial origin of a perceptual flip in binocular rivalry
Chris L.E. Paffen, Marnix Naber, & Frans A.J. Verstraten
- S12 When moving faces activate the house area: an fMRI study of object file retrieval
André W. Keizer, Lorenza S. Colzato, Wouter Teeuwisse, Serge A.R.B. Rombouts, Bernhard Hommel
- S25 The effect of visual context on grip planning in cerebral palsy: Hemispheric differences.
Céline Crajé, John van der Kamp, Bert Steenbergen
- S26 Asymmetrical learning between a tactile and visual serial RT task
Elger L. Abrahamse, Rob H.J. van der Lubbe, Willem B. Verwey
- S27 The role of different cues in the perception of compressibility
Wouter Bergmann Tiest & Astrid Kappers
- S28 Visual and haptic search: Do eyes and hands perform tasks in parallel and independently?
Hanneke Liesker, Eli Brenner, and Jeroen Smeets
- S42 What is being controlled in the reaching component of prehension?
Frank T. J. M. Zaal & Ingeborg M. E. Jol
- S43 The role of hand opening in prehension
Raoul M. Bongers, Frank T. J. M. Zaal, & Marc Jeannerod
- S44 Adjusting the grasp just as rapid as the reach
Cornelis van de Kamp, Raoul M. Bongers & Frank T.J.M. Zaal
- S55 The SNARC Effect Does Not Imply a Mental Number Line
Wim Gevers, Seppe Santens
- S56 Motor Set Modulates Automatic Priming Effects of Uninformative Cues
Jos J. Adam & Jay Pratt
- S57 Joint action more successful than solo action if task dimensions can be distributed
Majken Hulstijn, Raymond H. Cuijpers, Ruud G.J. Meulenbroek, Harold Bekkering
- S58 Inferring metal processes using additive and underadditive-factor logic
Sander A. Los
- S59 Segmentation transfer in keying sequences
Willem B. Verwey & Elger L. Abrahamse
- S73 Modularity redefined; the case for studying the familial determination of selective developmental deficits
Edward de Haan, Tanja Nijboer & Martine van Zandvoort
- S74 Explicit Motor Learning and Chunking in Dyslexia
Eliaan de Kleine, & Willem B. Verwey
- S75 Psychophysiological evidence for motor resonance during infant's perception of walking and crawling
Michiel van Elk, Sabine Hunnius, Cordula Vesper, Hein van Schie & Harold Bekkering,
- S76 Children's ability to use stable and flexible cues in order to memorize an object's location
Jessie Bullens, Marko Nardini, Christian F. Doeller, Oliver Braddick, Albert Postma & Neil Burgess

Zuiderduinzaal

- S13 Evaluating the negative or valuing the positive? A developmental fMRI study on feedback-based learning
Anna van Duijvenvoorde, Kiki Zanolie, Serge Rombout, Maartje Raijmakers & Eveline Crone
- S14 Neural substrates underlying typical and atypical outcome processing during gambling in children and teenagers
Catharina van Meel, Linda van Leijenhorst, Michiel Westenberg & Eveline Crone
- S15 Feedback ERN to unexpected irrelevant action effects: Surprise!
Guido Band, Henk van Steenbergen, Bernhard Hommel, Richard Ridderinkhof & Michael Falkenstein
- S16 Punishment, Reward and the Error Related ERP Components v2.0
Maarten A.S. Boksem, David de Cremer
- S29 Studying motor preparation in the face of contextual uncertainty
Rogier B. Mars, John C. Rothwell, Patrick Haggard, Sven Bestmann
- S30 Frontal brain potentials predict individual differences in unconsciously triggered inhibitory control
Simon van Gaal K. Richard Ridderinkhof, Johannes J. Fahrenfort and Victor A.F. Lamme
- S31 Impulsivity: Deficient inhibitory control, delay aversion, or both?
Marieke M. Lansbergen, Koen B. Bocker, and J. Leon Kenemans
- S32 Dorsal cingulate cortex and response conflict: Evidence from intracranial EEG and medial frontal cortex lesion
Michael Cohen, Richard Ridderinkhof, Sven Haupt, Christian E. Elger, Juergen Fell
- S33 Neural correlates of reward anticipation and outcome processing through adolescence
Linda Van Leijenhorst, Kiki Zanolie, Catharina S. Van Meel, P. Michiel Westenberg, Serge A.R.B. Rombouts & Eveline A. Crone
- S34 The developmental pattern of stimulus and response interference in a Stroop task: an ERP study
Ellen M.M. Jongen & Lisa .M. Jonkman
- S35 Event related potentials on performance monitoring dissociate children with Attention Deficit Hyperactivity Disorder from children with High Functioning Autism and typically developing children
Yvonne Groen1, Albertus A. Wijers, Lambertus J. M. Mulder, Ruud B. Minderaa1, Monika Althaus
- S60 Stop Talking! Inhibition of Manual and Verbal Responses to High and Low Frequency Picture Names
Wery P.M. van den Wildenberg & Ingrid K. Christoffels
- S61 Between you and me: there is no conflict-adaptation
Michiel M. Spapé, Bernhard Hommel
- S62 Adjustments in attentional control by congruent information in anterior cingulate cortex
Esther Aarts, Ardi Roelofs
- S63 Sequential effects in the Eriksen and Stroop tasks: Widening or narrowing of attention?
Martijn Lamers & Ardi Roelofs
- S64 NEURAL MECHANISMS, TEMPORAL DYNAMICS, AND INDIVIDUAL DIFFERENCES IN INTERFERENCE CONTROL IN THE SIMON TASK
Birte U. Forstmann, Wery P. M. van den Wildenberg, K. Richard Ridderinkhof
- S77 Age-related change in the ability to switch between choice tasks and to shift from stopping to going
Mariette Huizinga, Maurits W. van der Molen
- S78 Never too old to learn
K. Richard Ridderinkhof, Mirre Stallen, Sanne Koemans, Tineke van de Linde
- S79 The Irrelevant Speech Effect in Aging: An fMRI Study
Pascal van Gerven, Koene van Dijk, Martin van Boxtel, & Jelle Jolles
- S80 Network of prefrontal cortical areas commonly active during cognitive performance
Peter Stiers, Maarten Mennes, Heidi Wouters, Jelle Jolles, & Lieven Lagae

POSTER- PRESENTATIONS

- P01 Mood congruence facilitates recall of autobiographical memories
Libby Curran and Katinka Dijkstra
- P02 The role of interference and inhibition in retrieval-induced forgetting
Gino Camp, Diane Pecher, René Zeelenberg, & Henk Schmidt
- P03 Modeling Bimodality in Spacing Effect Data
Peter P. J. L. Verhoeijen, & Samantha Bouwmeester
- P04 Attention, rather than Retrieval, contributes to Age differences in Emotional Memory: An Event-Related Potential study
Sandra J. E. Langeslag, & Jan W. Van Strien
- P05 Hemispheric lateralization and spatial relations in working memory: an ERP study
Irene J. M. van der Ham, Richard J. A. van Wezel, Anna Oleksiak, Albert Postma
- P06 Experience as a modulating factor in gender differences in configurational knowledge of a daily environment
Maartje de Goede, Albert Postma
- P07 Motion is Meaning: on the semantic representation of action-related objects
Shirley-Ann Rueschemeyer, Michiel van Elk, Ruby van de Heuvel, Christian Pfeiffer, Harold Bekkering
- P08 ERP correlates of morphological priming during Dutch language production
Dirk Koester+, Rick Giesbers+ & Niels O. Schiller+
- P09 Tracking over Time how Lexical-Stress Information Modulates Spoken-Word Recognition
Eva Reinisch, Alexandra Jesse, James M. McQueen
- P11 Facilitation from verb distractors on picture naming: Is it due to response-relevant criteria?
Rinus Verdonschot, Wido La Heij, & Niels O. Schiller
- P12 Pronoun Ambiguity in Sentences with VP Ellipsis
Frank Wijnen & Diána Bene
- P13 The Dynamics of Grammatical Learning
Doug Davidson & Daniel von Rhein
- P14 Voice Category Boundaries Are Flexible and Abstract
Attila Andics, James M. McQueen, Miranda van Turenhout
- P15 Redundant Auditory Labels Facilitate Perceptual Category Learning
Annemarie van Stee & Asifa Majid
- P16 How world knowledge influences color perception: PERCEPTUAL-MEMORY vs. LINGUISTIC-RELATIVITY ACCOUNTS
Jörn Horschig, Jochen Müsseler, Asifa Majid & Holger Mitterer
- P17 Similarity is Closeness: a Perceptual Task
Inge Boot & Diane Pecher
- P18 Contextual interactions constrained by spatial proximity and depth cue
Katinka van der Kooij, Susan te Pas
- P19 Binocular Orientation Perception
Tobias Borra, Ignace T.C. Hooge, & Frans A.J. Verstraten
- P20 Individual differences in learning to perceive length by dynamic touch: Evidence for variation in perceptual learning capacities
Margot van Wermeskerken, Rob Withagen
- P21 Curvature contrast in haptic perception
Maarten W.A. Wijnjtjes, Astrid M.L. Kappers

- P22 Skiers are different people than mountain bikers — Looking at textures reveals group differences based on pleasantness judgments
Paul Lemmens,, René van Egmond, Andrea van Doorn, Huib de Ridder
- P23 Perceptual appearance and disappearance are both influenced by feature similarity
Mark L. T. Vergeer & Rob van Lier
- P24 Predictive and postdictive visual interactions on the path of apparent motion
Hinze Hogendoorn, Thomas A. Carlson, & Frans A.J. Verstraten
- P25 Relative Saliency is Transient: Evidence from Apparent Motion
Leroy Soesman & Mieke Donk
- P26 On Motion Illusions in Static Op Art Patterns
Frouke Hermens, Johannes M. Zanker
- P27 Mask energy versus spatial layout: Influences on the masking function
Isabel Dombrowe, Frouke Hermens, Michael H. Herzog
- P28 Unmasking the attentional blink
Mark R. Nieuwenstein, Mary C. Potter, & Jan Theeuwes
- P29 The emotional modulation of the Attentional Blink: Effects of taboo and non-taboo arousing stimuli in a dual and single task paradigm
Helen Tibboel, Jan De Houwer, & Geert Crombez
- P30 How mood influences attention
Henk van Steenbergen, Guido P.H. Band, & Bernhard Hommel
- P31 Less is more: visual search behavior depends on percentage to be ignored non-targets.
Jeroen S. Benjamins, Ignace T. C. Hooge, Jacco C. van Elst, Lex Wertheim, & Frans A. J. Verstraten
- P32 Top down influences make saccades deviate away: the case of endogenous cues
Stefan Van der Stigchel, Martijn Meeter, Jan Theeuwes
- P33 Coarse-to-fine filtering in saccadic search
Jelmer de Vries, Ignace Hooge, & Frans Verstraten
- P34 Capture of the Eyes by Relevant and Irrelevant Onsets
Manon Mulckhuysse, Wieske van Zoest, Jan Theeuwes
- P35 Attending to Tactile, Visual and Bimodal Targets: Effects on the P300
Anne-Marie Brouwer & Jan van Erp
- P36 A case for the Stay-Central Cue: An Event-Related Potential Investigation of Attentional Switch vs. No-Switch Processes
Durk Talsma, Jonne Sikkens, & Jan Theeuwes
- P37 Changing One's Mind about Actions
Friederike Schüür, & Patrick Haggard
- P38 Function and Structure of Response Inhibition in the Right Inferior Frontal Cortex: A Model-based Approach
Sara Jahfari, K. Richard Ridderinkhof, Uta Wolfensteller, Wery P. M. van den Wildenberg, Birte U. Forstmann
- P39 Action and Desire: Basal Ganglia Orient Eyes to Potential Reward
Helga Harsay, Birte Forstmann, Nick Oosterhof, Tim van Oosterhout, Anna van Duijvenvoorde, Jasper Wijnen, Rogier Mars, Richard Ridderinkhof
- P40 Visual hand representations from first and third person perspective
Chris Dijkerman, Ilze Vliegenberg, Ryo Kitada & Susan J. Lederman
- P41 Grasping another's intention: inferring other's purposeful actions attract one's own attention!
Pines Nuku, Oliver Lindemann, and Harold Bekkering
- P42 Visual Attention in Bimanual Object Manipulation
Marieke Beuting, Loes Janssen, Ruud G.J. Meulenbroek, and Bert Steenbergen

- P43 Planning and Execution of Bimanual Object Manipulation
Loes Janssen, Marieke Beuting, Ruud G.J. Meulenbroek, and Bert Steenbergen
- P44 Absence of internally generated signals impairs coordination in joint action
Raymond H. Cuijpers, Jurjen Bosga, Ruud G.J. Meulenbroek, & Harold Bekkering
- P45 Do Simple and Selective Inhibition Use the Same Neural Mechanisms?
Maria C. van de Laar, Wery P. M. van den Wildenberg, Geert J. M. van Boxtel, Maurits W. van der Molen
- P46 Neural mechanisms for action understanding: MEG evidence for lower and higher levels of action representation
Hein van Schie, Thomas Koelewijn, Ole Jensen, Robert Oostenveld, Eric Maris, and Harold Bekkering,
- P47 Mu frequency bands in EEG reflect motor resonance while memorizing observed movements
Jurjen van der Helden, H. T. van Schie and C.Rombouts
- P48 Investigations of finger and hand representations in neurological patients
Helen A. Anema /, Edward. F. De Haan /, Martine. J.E. vanZandvoort /, & H. Chris Dijkerman /
- P49 Hyperactivity of the subcortical dopamine system in recreational cocaine users
Lorenza S. Colzato, Wery P. M. van den Wildenberg°, Bernhard Hommel
- P50 Brain regions involved in learning and application of reward rules in a two-deck gambling task.
Egbert Hartstra, Jonne Oldenburg, Linda Van Leijenhorst, Serge A. R. B. Rombouts, & Eveline A. Crone
- P51 Dissociating performance evaluation and adaptation using event related potentials
Jasper Wijnen, Mike Cohen, Birte Forstmann, & Richard Ridderinkhof
- P52 Do you like me? A psychophysiological analysis of social feedback processing
Bregtje Gunther Moor, Eveline Crone and Maurits van der Molen
- P53 What happens with the Back-Sight of the Brain?
Van Zandvoort,, Nijboer,, de Haan,
- P54 Temporal colour perception in colour agnosia
Tanja Nijboer, Susan te Pas, Edward de Haan, Maarten van der Smagt
- P55 Neural Processes Underlying Colour-Graphemic Synaesthesia
Sarah C. Plukaard, Tanja C.W. Nijboer, Edward H.F. de Haan
- P57 Validation of the Dutch Barratt Impulsivity Scale; Relations to Stop Signal Reaction Time and Use of Psychoactive Drugs.
Koen B.E. Böcker, Barbara Müller & J. Leon Kenemans
- P58 What's in a Game: The Effect of Social Motivation on Interference Control in Boys with ADHD and Autism Spectrum Disorders
Hilde M. Geurts, Mariolein Luman, & Catharina S. van Meel,
- P59 Practice makes the brain work better: A developmental training study
Jolles,D., Zanolie,K, Resing,W.C., Grol,M.J, van Buchem M.A., Rombouts,S.A.R.B., Crone,E.A
- P60 The developmental pattern of stimulus and response interference in a Stroop task: an ERP study
Ellen M.M. Jongen & Lisa L.M. Jonkman
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Information for presenters

Poster boards will have a size of 130 * 90 cm, which is big enough for an A0 landscape poster. Posters can be mounted at ??:???. Poster should be removed by ??:???

PLENARY LECTURES

T.b.a.

Akira Miyake

University of Colorado at Boulder

T.b.a.

C1

Real-time fMRI, BOLD communications and neurofeedback

Rainer Goebel

University of Maastricht

Several medical conditions (e.g., brain injury, stroke, progressive neurological diseases) can lead to complete paralysis while largely preserving sensory and cognitive functions and associated brain activation. The resulting inability to communicate impedes to assess the patient's state of consciousness. Recently, Owen et al. succeeded in using imagery tasks during fMRI to demonstrate preserved conscious awareness in a paralyzed patient. We investigated whether healthy subjects are able to "write" solely on the basis of voluntary control of the fMRI (BOLD) signal. Using a guided display technique, we show that subjects can learn in a few hours to produce any letter of the alphabet in single trials by modulating spatio-temporal properties of the fMRI signal in three different brain areas with three mental strategies. While the transmitted information (BOLD time courses from regions-of-interest) has been initially decoded offline by human observers, we currently implement multivariate analysis (machine learning) techniques to perform "brain reading" in near real-time. The developed technique might be applied in locked-in patients to let them communicate their wishes and thoughts without extensive pre-training.

C2

ORAL PRESENTATIONS

S01

Does Mental Rotation affect T2 Spatial Attention in a Dual Task?

Merel M. Pannebakker*, Guido P. H. Band*, Pierre Jolicœur**, K. Richard Ridderinkhof***, Bernhard Hommel*
 *Leiden University, **University of Montreal, ***University of Amsterdam

Within a dual-task, encoding and motor processes are generally considered to take place unimpeded, but central processes such as decision making or mental rotation may be sensitive to capacity limitations. In this experiment, we used a dual task to investigate whether mental rotation (T1) affects the onset and intensity of attention in T2 using event-related potentials like the N2pc. The N2pc is a contralateral visual-spatial measure of attention that reaches its peak on the posterior lateral sides of the head. If a more difficult mental rotation takes up more capacity, would this influence the attention of T2 as measured by the N2pc, or is the capacity of visual-spatial attention without any significant limitation? We manipulated the available capacity in two ways: for S1, we varied the angle from upright position to induce a smaller or a larger mental rotation. Second, we varied SOA to induce different amounts of task overlap. Preliminary results show that in case of an increased angle from upright position for S1 as well as for increased task overlap (short SOA), the N2pc at S2 was attenuated. This would argue against views that attention would not be modulated because its capacity is hardly limited.

S02

Exploring the Accessory Stimulus effect: an ERP study

Marieke Jepma*, Guido Band*, & Sander Nieuwenhuis*
 *Leiden University

It has been repeatedly shown that responses in a choice reaction time task are faster when an irrelevant 'accessory' stimulus (AS) accompanies the imperative stimulus (e.g. Bernstein et al., 1970). However, the processes by which the AS leads to this speeding of reaction time are not fully understood yet. We assessed the effect of an AS on several event-related potentials. In accordance with previous studies (Hackley & Valle-Inclán, 1998, 1999), the lateralized readiness potentials suggest that an AS does not speed decision making and late motor processes. Surface laplacians over the primary motor areas, however, revealed a nonspecific increase in motor activation, which can explain previous findings of an AS effect on response force. The amplitudes and latencies of the P1 and N1 components suggest that the AS effect results from multisensory integration during early sensory processing.

S03

Trial by trial BOLD correlates of working memory related alpha and theta power increases during simultaneous EEG/fMRI measurement

René Scheeringa*, Marcel C. M. Bastiaansen**, Karl Magnus Petersson**, David G. Norris* Peter Hagoort**,
 *FC Donders Centre for Cognitive Neuroimaging, Radboud University Nijmegen, The Netherlands, **Max Planck
 Institute for Psycholinguistics, Nijmegen, The Netherlands

PET and fMRI experiments have shown that several brain regions are involved in working memory (WM) maintenance. MEG and EEG experiments have shown parametric increases with load in oscillatory activity in the theta and alpha bands. By measuring simultaneous EEG and fMRI during a Sternberg task (0, 3, 5 and 7 consonants) we investigated whether the areas found with fMRI can be associated with the alpha and theta effects. By correlating single trial EEG power estimates with the BOLD signal we obtained two sets of regions that are functionally related to either increases in right posterior alpha or frontal theta. Alpha increases were functionally related to decreases in BOLD in the right middle temporal gyrus, and the primary visual cortex. We relate this to inhibition of neural processes that could disturb the WM maintenance process. For frontal theta we found a negative correlation with BOLD in regions that form the default mode network. PET and fMRI research has shown this network deactivates across a variety of cognitive tasks. We did not find a relation between alpha or theta power and the regions typically associated with WM maintenance in PET and fMRI experiments.

S04

WHERE DOES IT HURT?

Rob H. J. van der Lubbe*, Jan R. Buitengeweg**, Maria Herzog*, Bernard Gerdes**, & Marijtje L.A. Jongsma*,***
 *Cognitive Psychology and Ergonomics, University of Twente, The Netherlands, **Institute for Biomedical
 Technology (BMTI), University of Twente, ***Biological Psychology, Radboud University, Nijmegen.

Numerous studies have shown that spatial attention exerts an influence on processing of stimuli of various modalities. Application of the Posner paradigm revealed that responses to targets on attended locations are faster and more accurate than to targets at unattended locations. Neuroimaging studies additionally revealed that these behavioral effects are reflected in a modulation of sensory processes. Recently, interest accrued regarding the influence of cognition on pain perception, which raised the question whether spatial attention shows a modulatory effect on the processing of a nociceptive (pain) stimulus as well. Nociceptive stimuli (low or high intensity) were delivered to the left or right hand, being preceded by an arrow indicating the to-be-attended hand. EEG measures revealed that the influence of attention on initial stimulus-induced activity above central sites was largest at 200-220 ms after stimulus onset, being largest for high intensities. Furthermore, attentional effects above frontocentral sites were largest at about 320 ms after stimulus onset, being unaffected by stimulus intensity. Source analyses suggest that the early attentional effect reflects a modulation in somatosensory areas, whereas the late attentional effect seems to arise from the anterior cingulate cortex.

S05

Dynamics of the Control of Word Retrieval Revealed Through Distributional Analyses

Ardi Roelofs,
 Radboud University Nijmegen

Since Wundt (1904, *Principles of Physiological Psychology*) and Watt (1906, *Journal of Anatomy and Physiology*), researchers have found no agreement on how goals direct word retrieval. A prevailing associative account (Miller & Cohen, 2001, *Annual Review of Neuroscience*) holds that goals bias association strength, which determines retrieval latency and whether irrelevant words interfere. A symbolic account (Roelofs, 2003, *Psychological Review*) holds that goals enable retrieval rules, which predicts no strict dependence of interference on latency. I will report 3 chronometric experiments in which the role of relative retrieval latency was investigated through distributional analyses, following Watt (1906). Participants verbally categorized picture-word pairs that were semantically related or unrelated, or they categorized single pictures or words. The pairs yielded semantic latency effects in both word and picture categorizing although single words were categorized slower than single pictures. Semantic effects occurred in word categorizing even when post-exposure of the pictures compensated for the difference in categorizing latency. Distributional analyses showed that the semantic effects occurred in most latency deciles, excluding goal neglect as the cause of the effects. The results are interpreted as most consistent with the symbolic account, which was corroborated by computer simulations.

S06

Monitoring in Language Perception: Mild and Strong Conflicts Elicit Different ERP Patterns

Nan van de Meerendonk*, Constance Th.W.M. Vissers*, Dorothee J. Chwilla*, and Herman H.J. Kolk*
 *NICI, Radboud University Nijmegen

Although error monitoring has been exclusively studied in production, we also make perceptual errors and are able to detect them. So far, no attempt has been made to explain how perceptual errors are monitored for. We propose that a strong conflict between what is expected and what is observed triggers reanalysis to check for possible perceptual errors, a process reflected by the P600. This hypothesis is at variance with the dominant view that the P600 merely indicates the presence of some syntactic obstacle, a grammatical violation or ambiguity. A question is why typical N400 sentences like 'He spread the warm bread with socks' (Kutas & Hillyard, 1980) do not elicit a P600? We hypothesized that when a critical noun is medium implausible in the context, a mild conflict arises between the expected and unexpected event; the language system can still interpret the unexpected event and an N400 effect is elicited. When the noun is highly implausible however, a strong conflict arises; integration fails and a monitoring process is triggered, eliciting a biphasic N400-P600 pattern. An ERP study confirmed this hypothesis, showing that only when the conflict between the expected and unexpected event is strong enough, a monitoring process is triggered.

Visual traces in language comprehension

Mark Aveyard*, Rolf A. Zwaan**, Ralph Radach***, Christian Vorstius***

*American University of Sharjah, United Arab Emirates, **Erasmus University, Rotterdam, ***Florida State University, Tallahassee, USA

Recent studies have drawn a close relationship between perception and language, showing, for example, that readers respond faster to a picture of a flying eagle than a perched eagle after a sentence that implicitly constrains the eagle's shape (Zwaan, Stanfield, & Yaxley, 2002). Such experiments remain vulnerable to criticism regarding demand effects, in which readers develop unusual reading strategies based on the adjacent linguistic and perceptual tasks. The present experiments pursue an ecologically-stronger design, showing how connections between perceptual and linguistic experiential traces in the cognitive network can automatically affect later language comprehension. Two phases were employed here: a phase exposing participants to pictures of critical objects and a later, ostensibly unrelated reading phase. Eye tracking data show that reading times were shorter when the implied shape of objects in text passages matched the shape in first phase pictures, suggesting that incidentally acquired visual representations affect subsequent language processing.

S08

Bricks don't breathe: Semantic decisions are made by weighing evidence for and against category membership

Diane Pecher*, Eric-Jan Wagenmakers**, & René Zeelenberg*

Erasmus University Rotterdam
University of Amsterdam

In the animal decision task words are categorized as animals or non-animals. This task requires that people access the correct orthographic representation of a word such as parrot (i.e., the representation for parrot but not for carrot), and then access the semantic features that contain the relevant animal information. Deadline models propose that decisions are based on activation of an animal feature in combination with a temporal deadline (Carreiras, Perea, & Grainger, 1997; Forster & Hector, 2002). Instead, we propose that the decision process weighs several features that provide partial evidence for either an animal or non-animal decision. If this weighing provides strong evidence for either response, performance is better than if the weighing provides only weak evidence for either response. In Experiment 1 performance was worse for words having features correlated with the opposite response (e.g., organic for a non-animal) than for words not having such features. In Experiment 2 non-animal responses were faster than animal responses if the proportion of non-animals was high. These results are problematic for a deadline model but consistent with a model combining evidence from different features. Here we introduce a REM model to account for these and other findings.

S09

Visual regularity versus antiregularity in object perception

Peter A. van der Helm & Matthias S. Treder
Nijmegen Institute for Cognition and Information

Objectness (a.k.a. belongingness) refers to the degree to which visual stimulus elements are perceived to form some number of objects. For instance, (mirror) symmetry seems a cue for the presence of one object and repetition for the presence of multiple objects. To investigate this, empirical research focused on the detectability of symmetry and twofold repetition in one versus two objects. This yielded a jumble of results which, as is argued here, can be unraveled by distinguishing symmetry and repetition from antisymmetry and antirepetition. New empirical results suggest that visual regularities but not antiregularities play a role in perceptual organization.

S10

Recalibrating Color Categories Using World Knowledge

Holger Mitterer*, Jan Peter de Ruiter*
*Max Planck Institute for Psycholinguistics

When the perceptual system uses color to facilitate object recognition, it must solve the color-constancy problem: The light an object reflects to our eyes confounds properties of the source of the illumination with the surface reflectance of the object. Information from the visual scene (bottom-up information) is insufficient to solve this problem. We show that observers use world knowledge about objects and their prototypical colors as a source of top-down information to improve color constancy. Observers achieved this by recalibrating their color categories. So, if an ambiguous hue between yellow and orange is perceived on a banana, observers interpret it as yellow. If the same ambiguous hue is perceived on a carrot, observers perceive it as orange. Observers were then presented

with objects without a prototypical color, such as a sock, and had to decide whether it was either yellow or orange. Observers who had seen the ambiguous hue on a banana and other prototypically yellow objects perceived the sock as yellow more often than observers who saw the ambiguous hue on a carrot. These results also suggest that similar effects previously observed in language perception are the consequence of a general perceptual process.

S11

The spatial origin of a perceptual flip in binocular rivalry

Chris L.E. Paffen*, Marnix Naber*, & Frans A.J. Verstraten*
*Universiteit Utrecht

During binocular rivalry, incompatible images presented dichoptically compete for perceptual dominance. The alternation from one dominant image to the other does generally not occur in an all-or-non-fashion. Rather, the suppressed image gradually 'washes in' and becomes the dominant percept. These so-called traveling waves of perceptual dominance have recently gained much attention since they can provide insights into the correlation between cortical activity and conscious visual perception. Here we ask what determines at what location of a rival image a traveling wave originates. In three experiments we looked at the influence of contrast, spatial frequency and motion speed on the spatial origin of a perceptual flip. The results show that the spatial origin of a perceptual flip (1) is strongly modulated by stimulus features, (2) corresponds to the location where stimulus strength is highest, and (3) corresponds to the location where perceptual salience is highest.

S12

When moving faces activate the house area: an fMRI study of object file retrieval

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The visual cortex of the human brain contains specialized modules for processing different visual features of an object. Confronted with multiple objects, the system needs to attribute the correct features to each object (often referred to as 'the binding problem'). The brain is assumed to integrate the features of perceived objects into object files--pointers to the neural codes of these features, which outlive the event they represent in order to maintain stable percepts of objects over time. It has been hypothesized that if an object file is reactivated upon object reviewing, it will reactivate all the features they point to in a pattern-completion process. We investigated this using an event-related fMRI design. The results show compelling evidence for this mechanism: we demonstrate that encountering a moving visual object automatically reactivates the neural codes of the object that previously moved in the same direction. Reactivation correlated with performance costs, suggesting that the former indeed causes the latter.

S13

Evaluating the negative or valuing the positive? A developmental fMRI study on feedback-based learning

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During development, children greatly improve in the ability to use positive and negative performance feedback for subsequent behavioral adjustment. In this study, we used fMRI to examine the neural developmental changes related to feedback-based learning when performing a rule switch task. Behavioral results from three age groups (8-9, 11-13, and 18-25-years), demonstrated an age-related increase in feedback-based learning. Imaging data showed different developmental trajectories for dorsolateral (DL) prefrontal cortex (PFC), superior parietal cortex and medial PFC. DLPFC and superior parietal cortex were more active after negative feedback for adults (18-25), but after positive feedback for children (8-9). For 11-13-year-olds these regions did not show differential feedback sensitivity. Medial PFC, in contrast, was more active after negative feedback in both 11-13-year-olds and adults (18-25), but not in 8-9-year-olds. Together, the current data show that to adjust behavior efficiently, adults use brain regions that are important for goal-directed behavior following negative feedback, signaling response adjustment.

Young children, however, show activation in brain regions that are important for goal-directed behavior following positive feedback, signaling continuation of behavior. The neural activation patterns found in 11-13-year-olds indicates a transition around this age towards an increased influence of negative feedback on performance adjustment.

S14

Neural substrates underlying typical and atypical outcome processing during gambling in children and teenagers

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Institute for Psychological Research, Leiden University

Adolescence is characterized by a normative increase in risk taking, impulsivity and sensation seeking. Impulsivity is also a key symptom of ADHD. Behavior of both populations seems to be controlled by immediate prospects rather than longer term goals. Neural responses to the consequences of one's behavior may influence the motivation to select specific courses of action, indirectly affecting decision-making. The line of research presented here aims to clarify whether decision making of teenagers and children with ADHD is driven by diminished responsiveness to negative outcomes or by amplification of positive outcomes. Adolescents, adults, and children with and without ADHD performed a slot machine task in which they passively watched three pictures appearing on a screen. The picture sequence included either three different pictures, or two identical and one different picture, or three identical pictures. Depending on the condition, participants were told that they would either gain or lose money whenever the three pictures were identical. We examined ERPs related to anticipation and evaluation of averted and actual gains and losses: the SPN, the FRN and the P300. Adolescents displayed amplified responses to salient outcomes, while ADHD children's responses to motivationally relevant outcomes were blunted, suggesting that different processes account for impulsive decision making of the two groups.

S15

Feedback ERN to unexpected irrelevant action effects: Surprise!

Guido P.H. Band*, Henk van Steenbergen*, Bernhard Hommel*, K. Richard Ridderinkhof** & Michael Falkenstein***

*LIBC Leiden University, **ACACIA University of Amsterdam, ***IfADo University Dortmund

The feedback ERN (fERN) is a central negative brain potential observed after feedback indicating a response error, as compared to feedback indicating a correct response. The typical interpretation of the fERN is that performance is evaluated to be incorrect, the cingulate zone calls for investment of control. The current experiment investigated whether the fERN is unique to performance feedback information, or whether it is also observed if subjects hear an unexpected and irrelevant action consequence. Subjects engaged in a probabilistic learning task. Each response was followed by a vowel sound (a, e, o, or i) with or without added noise. The noise element indicated whether the stimulus was classified correctly or not, with 80% validity. The vowel sound was irrelevant, but specific vowels followed specific responses on 80% of the trials. A fERN occurred after a sound indicating an incorrect response. More important, a smaller central negative waveform with the same latency as the fERN occurred after an unexpected vowel sound. These results are a challenge to the typical interpretation of the fERN, and suggest that performance monitoring may involve the evaluation of exogenous information against a more sophisticated endogenous model of the consequences of behaviour.

S16

Punishment, Reward and the Error Related ERP Components v2.0

Maarten A.S. Boksem, David de Cremer
Tilburg University

Although the focus of the discussion regarding the significance of the error related negatively (ERN/Ne) has been on the cognitive factors reflected in this component, there is now a growing body of research that describes influences of motivation, affective style and other factors of personality on ERN/Ne amplitude. In a recent experiment (Boksem et al., 2006), we showed that ERN/Ne was related to punishment sensitivity, while the error positivity (Pe) was related to reward sensitivity. The present study was conducted to further evaluate the relationship between punishment/reward sensitivity and error related ERP components. Therefore, we scored our subjects on several measures of punishment and reward sensitivity: BIS, BAS, Neuroticism, Extraversion, Reward Dependency and Harm Avoidance. Then, subjects performed two versions of a Flanker task: in the first, they were financially punished for committing errors; in the second, they were financially rewarded for correct performance. Analyses of ERN/Ne amplitudes indicated significant interactions between personality measures of punishment and actual punishment/reward, while analyses of Pe amplitudes showed significant interactions between personality measures of reward and actual reward/punishment.

S17

Dynamic items pop out : Saliency or Feature-driven?

Yair Pinto, Chris Olivers & Jan Theeuwes
Vrije Universiteit Amsterdam

A dynamic item pops out in a static background. Although this fact is well known, it is less clear why this dynamic item pops out. Is it because dynamics are special, or is it because the object is pitched against a static background? In a series of studies we investigated this, by looking at the reverse question: what is the fate of a static object in a dynamic background? If dynamics are special, then we expect inefficient search for the static object. However, if saliency (i.e. the difference between objects) is what matters then we expect efficient search for the static target as well. The first study we did, reveals that against several dynamic backgrounds, the static object could be efficiently detected. Our second study reveals that this efficient search is not due to one mechanism, such as a motion filter. Our third study shows that the attentional guidance provided by the static object is involuntary. Altogether our findings argue for a 'saliency' account of attention.

S18

The size of attentional window modulates attentional capture

Artem V. Belopolsky, Jan Theeuwes
Vrije Universiteit Amsterdam

It has been proposed that during visual search a color singleton cannot capture attention in a bottom-up fashion (Jonides & Yantis, 1988). In the present study we used variety of ways to manipulate the size of the attentional window before the start of visual search. We demonstrate that increasing the size of attentional window causes the observers to frequently orient to an irrelevant color singleton. We conclude that while the size of attentional window might be under a top-down control, within the attentional window an irrelevant salient singleton can capture attention in a bottom-up fashion.

S19

Directing attention to a location results in retinotopic activation in primary visual cortex

Jaap Munneke; Dirk J. Heslenfeld; Jan Theeuwes
Vrije Universiteit Amsterdam

It is well-known that directing selective visual attention to a location in space enhances the processing efficiency of stimuli presented at that location. Previous studies have shown that directing spatial attention manifests itself as an increased baseline signal in the visual cortex at the retinotopic region corresponding to the target's location in the visual field. Until recently, it was assumed that this preparatory effect of attention mainly occurs in extrastriate cortex. We used event-related functional neuroimaging (fMRI) during a spatial cueing task and showed that in conditions in which there was no change in sensory stimulation, modulations due to flexibly shifting spatial attention were present throughout early visual cortex including areas V1, V2 and V3. In all early visual areas, the increased baseline shift in response to the cue was retinotopically specific at regions contralateral to the side to which participants directed their attention. The present study shows that primary visual cortex is involved in spatial attention and it is suggested that it is possible that primary visual cortex operates as the locus of initial sensory gain control, acting to prioritize visual input from the attended location.

S20

Saliency Effects are short-lived

Mieke Donk*, Wieske van Zoest**, & Leroy Soesman*
*Vrije Universiteit Amsterdam, **University of British Columbia Vancouver

A salient event in the visual field tends to attract attention and the eyes. Models of visual selection assume saliency to be persistently represented in our visual system such that visual selection is continuously affected by this information. In the present series of experiments we demonstrate that saliency in fact drives vision only during the short time interval immediately following the onset of a visual scene. In a saccadic target-selection task, human performance in making an eye movement to the most salient element in a display is accurate when response latencies are short, but is at chance when response latencies are long. In a manual discrimination task, performance in making a judgement of saliency is more accurate with brief than with long display-presentation durations. Finally, in a probe-RT task, saliency effects are only present immediately after the presentation of a display. These results suggest that saliency is represented in the visual system only briefly after a visual image enters the brain. Our results imply that interactions between saliency-driven and goal-driven processes play a much smaller role in visual selection than is typically assumed.

S21

Type of Letter Effects in Reading Aloud: The Case of Vowels vs. Consonants

Niels O. Schiller
Leiden University

Readers need to extract meaningful information from orthographic representations in order to understand words and sentences. Recognition of printed words in alphabetic script during reading is mediated by some orthographic processing involving at least the word's component letters or graphemes. However, there are suggestions in the literature that orthographic representations of words may include more than a flat string of graphemes. For instance, it has been proposed that they are hierarchically structured, with multiple tiers representing different aspects of orthographic representations such as the consonant-vowel (CV) status of graphemes or the grapho-syllabic structure of words. The current study supports this proposal through investigating the effect of type of grapheme (vowel vs. consonant) on the masked onset priming effect (MOPE). It was found that C-initial words show a standard MOPE, whereas V-initial words do not. The implications of this result for reading and reading disorders are discussed.

S22

Lexical Competition during the Comprehension of Spontaneous Speech

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**Radboud University, Nijmegen

In spontaneous speech, words are often not fully pronounced, so that 'computer' might come out as 'puter'. To investigate how listeners recognize reduced forms, we tracked participants' eye fixations to four printed words, while they listened to sentences from a spontaneous-speech corpus: a target word occurring in the sentence (e.g., 'computer'), a competitor phonologically similar to the unreduced form (e.g., 'companion'), one similar to the reduced form (e.g., 'puke'), and an unrelated distractor. The speech samples contained reduced and unreduced forms. Surprisingly, both competitors were equally attractive - in terms of the number of fixations - with both types of stimuli. To find out under which conditions the competitors differ in strength, we ran two additional experiments. First, we only presented unreduced forms in careful speech which showed that the unreduced-form competitors were more attractive than the reduced-form competitors. Second, we presented the unreduced forms in the same spontaneous-speech samples as in the first experiment, but now not intermixed with reduced forms. No competitors appeared to be attractive, possibly, because participants now heavily relied on context. These results indicate that lexical competition is regulated so that more words are activated when listeners are confronted with different degrees of reductions.

S23

The role of token variability in perceptual learning of speech

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When listening to speech, we must adapt to each talker's idiosyncratic realizations of phonemes. Part of this adaptation is achieved by a lexically-driven retuning of phoneme categories (Norris, McQueen & Cutler, 2003). The present experiments asked how stimulus-specific this perceptual learning effect is. Experiment 1 replicated the Norris et al. study. Flemish listeners made lexical decisions to stimuli including 20 [f]-final and 20 [s]-final words. One group heard the same ambiguous phoneme (halfway between [f] and [s]) in all the [s]-words; a second group heard this sound in all the [f]-words. The groups could thus learn that the sound was, respectively, [s] or [f]. Experiment 2 was identical, except that, as in Kraljic & Samuel (2005), a different ambiguous [f]-[s] sound was used in each lexical context during exposure. Lexically-driven retuning was measured in [f]-[s] categorization tests. Changes in categorization behaviour over the course of the tests were analysed using generalized linear mixed effect modelling. The results suggest that the learning effect is initially stronger when listeners are exposed to the same ambiguous sound in all the target words, but that it is more stable over time when a different ambiguous sound is heard in each target word

S24

Learning an Unfamiliar Foreign Regional Accent: The Effects of Subtitles

James M. McQueen & Holger Mitterer
Max Planck Institute for Psycholinguistics

Can listeners adapt rapidly to an unfamiliar regional accent in a foreign language they speak fluently, and, if so, do subtitles help or hinder those perceptual adjustments? Two groups of Dutch participants watched 25-minute videos involving a heavily-accented English speaker (selections from either a Scottish film or an Australian sitcom). They saw English, Dutch or no subtitles. All participants then had to repeat audio excerpts from the film and the sitcom. The excerpts came from the exposure material or were new utterances by the same speakers. There was adaptation to the unfamiliar accents: listeners in all groups could repeat excerpts in the accent they were exposed to better than those in the other accent. English subtitles enhanced this adaptation: participants who saw English subtitles were better at repeating utterances than those who saw no subtitles. But Dutch subtitles reduced the adaptation: listeners who saw Dutch subtitles with the Scottish video performed as well on the exposure utterances as those who saw English subtitles, but were worse at repeating new utterances. Native-language subtitles appear to draw participants' attention away from speech in a foreign accent, while subtitles in that foreign language seem to provide context for interpretation of unusual speech-sounds.

S25

The effect of visual context on grip planning in cerebral palsy: Hemispheric differences.

Céline Crajé*, John van der Kamp** ***, Bert Steenbergen*

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Cerebral Palsy (CP) describes a group of movement disorders following non-progressive brain damage acquired early in life. Recent evidence suggests that activity limitation in CP is not exclusively caused by movement execution disorders, but is also related to disorders in motor planning (Steenbergen & Gordon, 2006). Glover (2004) recently proposed the planning-control model, in which motor planning is hypothesized to be affected by visual task context. In the present study we tested if motor planning was affected by visual context in a CP group. Additionally, we investigated hemispheric differences, under the assumption that the left hemisphere is dominant for motor planning (e.g., Steenbergen et al., 2004). Participants with left hemiparetic CP (n=13) and right hemiparetic CP (n=12) had to grasp a rod embedded in a 'rod-and-frame' illusion and subsequently place the rod in a hole. The grip type that participants used was measured as a macroscopic variable of motor planning. First, participants with both left and right hemiparetic CP displayed some effect of the illusion, as was previously shown in a control group in a similar set-up (Crajé et al., in press). Second, different movement strategies were observed among participants with left and right hemiparetic CP.

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S26

Asymmetrical learning between a tactile and visual serial RT task

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According to many researchers, implicit learning in the serial reaction-time task is predominantly motor-based and therefore should be independent of stimulus modality. Previous research on the task, however, has focused almost completely on the visual domain. Here we investigated sequence learning when the imperative stimuli were presented tactilely to the fingers. Learning in this task was compared to sequence learning in a typical visual task, using very similar experimental conditions. The results indicate that sequential learning occurs in the tactile task, though to a lesser degree than in its visual counterpart. Furthermore, there was similar cross-modal transfer in both directions, meaning that transfer from the visual to the tactile task was partial. It is proposed that sequence learning involves a stimulus-specific component in the visual but not in the tactile task.

The role of different cues in the perception of compressibility

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Compressibility of materials is well-known property in daily life; think of judging the ripeness of fruits or the pressure in a bicycle tyre. Yet little is known about which cues are employed when compressibility is perceived. Possible cues are the ratio between the amount of applied force and the depth of the indentation, and the way the surface is deformed. In this talk, experiments are described that employ a wide range of silicon rubber stimuli to investigate the influence of stimulus thickness and finger span on the perception of compressibility. We report on the respective roles of force/displacement ratio cues and surface deformation cues. When hardness is expressed as the ratio of force and displacement, the discrimination thresholds in the different conditions follow Weber's law with a Weber fraction of about 13%. When the surface deformation cue was removed, thresholds approximately doubled.

S28

Visual and haptic search: Do eyes and hands perform tasks in parallel and independently?

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When performing everyday tasks, we often fixate an object before we manipulate it. But eyes and hands do not always move to the same spot; they can also perform tasks in parallel. In order to find out whether the eyes and the hand also perform tasks in parallel and independently in search, we had 10 subjects perform a combined visual and haptic search for one target present in both modalities and compared their search times to those on visual only and haptic only search tasks. In addition to the target, we added a varying number of distractors in the visual display. In the visual conditions with a small number of distractors search times were shorter than in the haptic search condition. In the visual conditions with a large number of distractors search times were longer than in the haptic search condition. Based on these search times, three models were built to predict search times in the combined task. Model 1: combined search is visual search for a small number of distractors and haptic search for a large number of distractors. Model 2: in combined search subjects move their eyes and hand in parallel and independently. Model 3: in combined search subjects' eyes and hand each search a different part of the display and meet somewhere in between. Search times in the combined search task best matched the prediction by the parallel model.

Symposium of the Dutch Psychophysiology Society

'Decision making and Impulse Control'

Organizers: Leon Kenemans and Richard Ridderinkhof

S29

Studying motor preparation in the face of contextual uncertainty

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Decision making refers to the processes responsible for determining the presence of task-relevant stimuli in the environment and mapping these onto appropriate responses. However, information provided by the environment is often inherently uncertain. It is not well understood how the brain might optimize motor performance in such uncertain environments. The hypothesis proposed here is that learned prior predictions concerning contextual uncertainty can be used to bias motor output, possibly ensuring fast responses required for survival. To test this hypothesis, we used information theoretic indices of contextual uncertainty during motor preparation tasks. These provided quantitative estimates of contextual uncertainty and the likelihood of particular responses, assuming a Bayesian updating scheme under ideal observer assumptions. We show that this can account for a substantial amount of variance in the behavioural data (RTs). We then apply these measures to physiological data obtained during motor preparation tasks. A significant degree of variance in both single-trial ERPs and motor evoked

potentials (elicited using TMS) can be explained with this approach. These results confirm that the brain estimates contextual regularities in the environment and uses these to bias motor preparation. This may provide the basis for efficient responding in an uncertain world.

S30

Frontal brain potentials predict individual differences in unconsciously triggered inhibitory control

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We combined the metacontrast masking paradigm and the Go/No-Go paradigm to study whether unconscious No-Go signals can trigger higher-level inhibitory control processes, strongly associated with prefrontal cortices. In our task, participants had to respond as fast as possible to a Go signal, but were instructed to withhold their response when they perceived a No-Go signal, preceding the Go-signal. We manipulated awareness of No-Go signals while measuring ERPs to track the depth and time-course of unconscious No-Go signals in the brain. Unconscious No-Go signals sometimes triggered response inhibition to the level of complete response withholding, as well as to yield a slow-down in the speed of responses that were not inhibited. The behavioral susceptibility to unconscious No-Go stimuli was strongly predicted by a neurophysiological measure observed at frontal electrode sites. These findings challenge traditional views concerning the proposed relationship between awareness and cognitive control and extend the proposed limits and depth of unconscious information processing.

S31

Impulsivity: Deficient inhibitory control, delay aversion, or both?

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Impulsivity in impulse-control disorders has been associated with the inability to inhibit inappropriate behavior, but also with an aversion to delay. The present study addressed the question whether impulsivity within the normal population is also related to deficient inhibition and an aversion to delay. Healthy individuals scoring high and low on self-reported impulsivity (as assessed by the I7 questionnaire) filled out a delayed reward questionnaires and performed an auditory stop-signal task. Delay aversion, stopping performance and neural correlates of stopping (i.e., auditory N1 and stop P3) were compared between the impulsive groups. Results indicated that individuals scoring high relative to those scoring low on self-reported impulsivity had a larger preference for small, immediate rewards than larger, delayed rewards. The impulsive groups did not differ with regard to stopping performance. Whereas previous studies revealed reductions in both N1 and P3 effect in patients with less impulse-control, participants scoring high relative to low on impulsivity had larger stop P3 and similar N1 effects. Concluding, self-reported impulsivity within the normal population may be associated with delay aversion, rather than deficient inhibition. Furthermore, high impulsive relative to low impulsive individuals may need more effortful inhibitory control to yield equal stopping performance.

S32

Dorsal cingulate cortex and response conflict: Evidence from intracranial EEG and medial frontal cortex lesion

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The medial frontal cortex has been implicated in monitoring response conflicts, but much remains unknown about its functional properties, including electrophysiological oscillations, during response conflict tasks. Here, we recorded intracranial EEG during a modified Flanker task from the medial frontal cortex of two patients undergoing presurgical evaluation for the treatment of epilepsy. One patient performed the task well, the other patient performed well following surgical resection of part of the medial frontal cortex, but performed poorly before surgery. Performance on the task was associated with a suppression of beta (15-30 Hz) frequency oscillation power prior to and just following the response, and an enhancement of theta (4-8 Hz) frequency power following the response.

Beta (theta) power was anatomically distributed towards more posterior (anterior) electrode sites along the cortex, suggesting an anatomical/functional specialization along the medial frontal wall for pre-response versus post-response conflict signaling. This was further supported by inter-site oscillation phase coherence analyses, which demonstrated that the ventral medial frontal theta oscillations were coupled with theta oscillations observed at scalp electrodes over medial frontal cortex (Fz and Cz). Together, these findings provide novel evidence for the electrophysiological functions of the medial frontal cortex in conflict monitoring.

S33

Neural correlates of reward anticipation and outcome processing through adolescence

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To date, fMRI studies have reported both underactive (Björk et al., 2004) and overactive (Galvan et al., 2006) motivational circuitry related to reward processing in adolescents. In this study, we used fMRI to examine developmental changes in the neural correlates of reward anticipation and outcome processing using the slot machine paradigm (Donkers et al., 2005). In this task, starting the slot machine resulted in three pictures to appear consecutively and participants were instructed that they gained € 0, 05 when the three pictures were identical. This design allowed us to dissociate effects of reward anticipation, reward processing and reward omission within three age groups: early adolescents aged 10-12, middle adolescents aged 14-15, and late adolescents aged 18-23. Regions previously associated with emotional arousal, the Insula/IFG and ventral striatum, were more active in the anticipation of reward in all age groups, but anticipation effects were strongest in the youngest age group with a linear decline with age. The delivery of reward was associated with activation in basal ganglia, including nucleus accumbens, and this effect was stronger for 10-12 and 14-15-year-olds relative to 18-23-year-olds. In contrast, reward omission resulted in lateral OFC activation, but only in 18-23 year-olds. Taken together, these results indicate that: 1) different brain circuitry underlies reward anticipation and outcome processing, 2) brain regions associated with reward anticipation and reward delivery are overactive in early adolescence, and 3) brain regions responsive to reward omission continue to develop after age 14-15.

S34

The developmental pattern of stimulus and response interference in a Stroop task: an ERP study

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ERPs were employed to investigate the temporal course and development of stimulus and response interference (SI; RI) in a color-object version of the two-choice button-press Stroop-task (de Houwer, 2003). Twenty-one adults and fifty-four children, allocated to one of three age groups (6-7, 8-9, 10-12 year-olds), participated. Behavioral results showed no effect of SI. Regarding RI, children were more susceptible to errors than adults. Reaction time results showed RI in every group, but no developmental differences. Interestingly, ERPs showed effects of SI in the youngest groups but not in older children and adults, whereas the reverse was true for RI. More specifically, SI evoked (1) N2 modulation at central and posterior sites only in 6-7 year-olds; (2) a negativity (440-660 ms) in 6-7 and 8-9 year-olds that was more widely distributed in the youngest children. RI evoked (1) a posterior negativity (440-540 ms) in 10-12 year-olds and adults; (2) a prolonged positivity (660-920 ms) in 8-9 year-olds, 10-12 year-olds, and adults. In all of these groups, it was distributed over central sites. In 8-9 year-olds and adults it also spread over posterior sites. The effect was present at frontal sites only in adults. The implications of these results will be discussed.

S35

Event related potentials on performance monitoring dissociate children with Attention Deficit Hyperactivity Disorder from children with High Functioning Autism and typically developing children

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Both the child developmental disorders Attention Deficit Hyperactivity Disorder (ADHD) and High Functioning Autism (HFA) have been related to deficiencies in cognitive control functions. One important cognitive control function is performance monitoring: the ability to continuously check whether the actions at hand are still goal-directed. In the present study a set of event-related potentials (ERPs) related to internal and external performance monitoring were measured in typically developing (TD) children, children with High Functioning Autism (HFA) and (Methylphenidate-treated and medication-free) children with Attention Deficit Hyperactivity Disorder (ADHD) while they were performing a probabilistic learning task. Error-related ERP components time-locked to the response (ERN and Pe) showed that ADHD children have an internal monitoring deficit, while the HFA children do not. A late feedback-locked ERP component (Late Positive Potential) showed that both ADHD and HFA children have an external monitoring deficit, which may be related to a decreased affective response to negative feedback. Using this set of ERPs, this study failed to find a performance monitoring deficit that was specific for the disorder HFA. Together with an anticipatory feedback component (prefeedback SPN), these ERPs do provide evidence for a diminished capacity of ADHD children to shift from an external mode of performance monitoring to an internal mode while they are learning by performance feedback. The capacity to internally monitor errors was partially normalised in ADHD children that were treated with Methylphenidate (Mph). The affected ERP components are discussed in terms of deficits in underlying neurobiological brain systems in the psychopathology of ADHD and HFA.

S36

The Rubber Hand Illusion in Action

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We need to know what is part of our body to incorporate it into a coherent mental representation. In turn, this internal body representation enables us to guide limb movements and to make perceptual judgements about the location of body parts. There is now a growing body of evidence suggesting that multiple body representations exist; one governing mostly actions and one underlying more perceptual judgements. One way of investigating the mental body representation is through the Rubber Hand Illusion. Synchronous stroking of a subject's hidden real hand and a visual congruent rubber hand leads to the experience that the rubber hand is part of the own body. This results in a relocation of the position sense of the stroked hidden hand towards the rubber hand. In the present experiments we demonstrate that this incorporation of the rubber hand into the body representation is task dependent. Whereby action responses are resistant to the illusion and illusion sensitive perceptual judgement are resistant to actions. Furthermore, we will show the result TMS over the inferior Parietal Cortex has on the task dependent illusion effect. These studies will contribute to the ongoing debate concerning the existence of multiple body representations, their characteristics and definitions.

S37

Embodied action understanding in the motor system: Evidence from left- and right-handers

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What is the role of our own motor system in understanding the actions of others? Two recent theoretical developments suggest that the observer's motor system is important for action understanding. Theories differ, however, in how the observer's motor system is related to neural correlates of action observation. Neural simulation theory states that an observed action is implicitly simulated, using the observer's own motor system. The embodied cognition framework also asserts that action meaning is grounded in motor parts of the brain, but it does not assume a one-to-one mapping between the observer's motor system and action understanding. Rather, action meaning can be abstracted away from an individual's motor practice. Here we used handedness to critically test the nature of cortical motor activation during understanding of common actions. Our results show that although the motor cortex is involved in gleaned meaning from actions, its activation is not influenced by the observer's hand preference. This is in contradiction to the strong coupling between motor production and action understanding

predicted by a neural simulation account. Rather, our findings support the embodied cognition framework, which allows for a more flexible relationship between an individual's motor system and the neural processing of action meaning.

S38

Moving 'Love' away: Approach and Avoidance as Action Effects

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Numerous studies have shown that emotional stimuli can trigger approach and avoidance behavior. These studies, however, are inconsistent in their definitions of approach and avoidance. Some researchers define arm flexion as approach and arm extension as avoidance, whereas others use the opposite mapping. Arm flexion and extension can thus not be unambiguously connected to approach or avoidance. The current study aims to resolve this ambiguity. Based on the Theory of Event Coding, we propose that approach and avoidance reactions can be regarded as flexible action plans that are represented in terms of their perceivable effects. Approach actions reduce the distance between a stimulus and the self, whereas avoidance actions increase that distance. In the present experiment, participants responded to positive and negative words using key-presses. These intrinsically 'neutral' responses (not involving arm flexion or extension) were consistently followed by a movement of the stimulus toward or away from the participant. Responses to positive words were faster when followed by a toward movement, whereas responses to negative words were faster when followed by an away movement. This suggests that approach and avoidance actions are indeed defined in terms of their outcomes rather than in terms of their physical properties.

S39

Electrophysiological evidence for endogenous control of language switching in overt picture naming

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Language switching in bilingual speakers requires attentional control to select the appropriate language. Previous language-switch studies used the color of pictures to indicate the required language thereby confounding endogenous and exogenous control. To investigate endogenous language control, our language cues preceded picture stimuli by 750 ms. Cue locked event-related potentials (ERPs) were measured, while Dutch-English bilingual speakers overtly named pictures. The response language on consecutive trials could be the same (repeat trials) or different (switch trials). Naming latencies were longer on switch than on repeat trials, independent of the response language. Cue-locked ERPs showed an early posterior negativity for switch compared to repeat trials for L2 but not for L1, and a late anterior negativity for switch compared to repeat trials for both languages. The early switch-repeat effect might reflect disengaging from the non-target native language, while the late switch-repeat effect reflects engaging in the target language.

S40

Lexical Selection in Bilinguals: Words in the Bilingual's Two Lexicons Compete for Selection

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A question that has interested many researchers is whether words in the bilingual's two lexicons compete for selection. Researchers have frequently used the language-switching paradigm to address this question. In the present study we used a new competitor priming paradigm. In the study phase, subjects studied words presented in English or Dutch. In the test phase, subjects named pictures in Dutch. Picture naming times (e.g., for KIKKER) were faster than a nonstudied control condition if the word had been presented in Dutch (e.g., KIKKER) during study (same-language condition). More important, picture naming times were slower than a nonstudied control condition if the word had been presented in English (e.g., FROG) during study (different-language condition). These results are problematic for theories claiming that words in the nontarget language do not compete for selection.

S41

Bilingualism and cognitive control: How learning a second language makes you better

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Current theorizing claims that bilingualism enhances cognitive performance by improving inhibitory control, but the available evidence is still sparse and equivocal. We evaluated several possible versions of the inhibition hypothesis by comparing monolinguals and balanced bilinguals with regard to tasks that are likely to tap into various aspects of inhibition: Stop-signal, Inhibition of Return, Attentional Blink, and the Simon task. Our findings do not support the idea that bilinguals enjoy more efficient active inhibition processes. Rather, balanced bilinguals seem to have acquired a better ability to maintain action goals and use them to bias goal-related information--which under some circumstances may indirectly lead to more pronounced reactive inhibition of irrelevant information

S42

What is being controlled in the reaching component of prehension?

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Prehension is the act of coordinated reaching and grasping. Whereas previous studies have agreed that the distance between thumb and index finger (in a precision grip) can be used to operationalize the grasping component, the operationalization of the reaching component has been equivocal; most studies have considered the position of the wrist to study the reaching component, others have opted for the position of the thumb, and also other choices have been made. We set out to identify the anatomical landmark that represents the reaching component of prehension, using the method of the 'uncontrolled manifold'. This method assesses how much of the variability in joint angles in the arm and hand (in this case of prehension) leads to stabilizing the position of (i.e. 'controlling') a certain anatomical part. We considered the thumb, index finger, and wrist. Preliminary analyses indicated that initially the wrist is being controlled, but that during the largest and final part of the movement it is the index finger that is being stabilized most.

S43

The role of hand opening in prehension

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To pick up an object, the transport of the hand to the object needs to be coordinated with the shaping of the fingers around the object. Most studies assume that the closing of the fingers is controlled in this coordination. However, in these studies the opening and closing is under time pressure because the object is placed relatively close to the starting point of the fingers. The current study examined prehension when there is ample time for finger opening and closure by placing the to-be-picked object at a large distance (i.e., 30, 60, 90, or 120 cm). The results showed that closing time of the fingers was independent of object distance, but that deceleration time of hand opening (i.e., the time that velocity of hand opening decreased) was adapted to object distance. Importantly, maximal hand opening did not change over the object distances, while it did depend on object size. These findings suggest that deceleration of hand opening is geared to hand transport to get at the required peak hand opening in time. Hence, the current contribution suggests shifting attention from the closing of the hand to the opening of the hand to understand the coordination between reaching and grasping.

S44

Adjusting the grasp just as rapid as the reach

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In this study we tested how fast the grasp component of prehension starts adapting to a change in object size. Whereas preceding perturbation studies all changed the object's size right on movement onset, we perturbed the grasping at four delayed occasions during the movement. Participants were asked to reach for and grasp an oblong object of which both sides surfaces could be made to quickly slide out unexpectedly approximately 150, 225, 300 and 375 ms following movement onset. The latencies at which motor adjustments in the grasping begin were found to be a function of when the perturbation took place. Especially in the long delay conditions, in which the system is really pushed to its limits, small adjustment latencies of around 100 ms were revealed by means of employing an

alternative more generic and sensitive method of analysis. These small latencies are equivalent to what has previously been reported for the reaching. Therefore the adjustment latencies in the reach and grasp component are not fundamentally different. As will be discussed, this has implications for our understanding of the coordination in prehension.

S45

Haptic pop-out in a hand sweep

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Visually, a red item is easily detected among green items, whereas a mirrored S among normal Ss is not. The former is known as the pop-out effect. Although most research on search tasks has been done in the visual domain, this is not the only modality in which humans perform searches on a daily basis. When we reach into our pocket to take out our keys, we perform a haptic search. In this research, a touch version of a classic visual search task was carried out, in which subjects had to search for a target item differing in roughness from the surrounding distractor items varying in number. We report reaction time slopes as low as 20 ms/item and a search asymmetry. Furthermore, using a position-tracking device we show that differences in search slope were accompanied by search strategy differences. In some conditions a single hand sweep over the display was sufficient, while in others a more detailed search strategy was used. This illustrates a transition from a parallel strategy to a more serial strategy. These results suggest that a haptic pop-out effect can occur under free manual exploration, and provide new insights into information processing in haptic search.

S46

Finger Position Influences whether You Can Localize Tactile Stimuli

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Subjects had to localize tactile stimuli applied to their fingertips. We measured the number and locations of errors that subjects made in three configurations: fingers together, fingers spread and fingers interwoven. We reasoned that if there are tactile receptive fields that span more than one finger, fewer errors will be made when the fingers are spread. We indeed found that fewer errors were made when the fingers were spread. However, the reduction of errors was not specific to the neighbouring fingers. This suggests that more distinct information about the positions of the fingers can improve tactile detection.

S47

Perception of multiple overlapping time intervals: Evidence for a single mental clock and temporal arithmetic

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It has been shown that humans and animals perceive short (1-60s) time intervals on a logarithmic scale, and that they are capable of perceiving multiple overlapping time intervals. Based on the assumption that there are internal time-keeping mechanisms, it has been proposed that tracking multiple intervals is driven by multiple timers. We propose an alternative account in which a single timer in combination with simple arithmetic on time intervals is used to estimate overlapping time intervals. We found that when two equal but overlapping time intervals had to be estimated, the second estimate was affected by logarithmic scaling caused by the addition of intervals. This type of effect was also found in a second experiment with unequal intervals, where explaining the results required subtraction of intervals. A previously validated model (Taatgen, Van Rijn, & Anderson, 2007) precisely predicted the effects of temporal arithmetic, and explains why the multiple-timer account is wrong in the details. As the signature of arithmetic on time intervals are the errors caused by the logarithmic scale, these results are in favor for the single timer account, and show that people are capable of performing addition and subtraction on time intervals.

S48

Neural correlates of multisensory integration of ecologically valid audiovisual events

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A question that has emerged over recent years is whether audiovisual (AV) speech perception is a special case of multisensory perception. Electrophysiological (ERP) studies have found that auditory neural activity (N1 component

of the ERP) induced by speech is suppressed and speeded up when a speech sound is accompanied by concordant lip movements. In Experiment 1, we show that this AV interaction is not speech-specific. Ecologically valid non-speech AV events (actions performed by an actor such as handclapping) were associated with a similar speeding up and suppression of auditory N1 amplitude as AV speech (syllables). Experiment 2 demonstrated that these AV interactions were not influenced by whether A and V were congruent or incongruent. In Experiment 3 we show that the AV interaction on N1 was absent when there was no anticipatory visual motion, indicating that the AV interaction only occurred when visual anticipatory motion preceded the sound. These results demonstrate that the visually induced speeding-up and suppression of auditory N1 amplitude reflect multisensory integrative mechanisms of AV events that crucially depend on whether vision predicts when the sound occurs.

S49

No effect of Auditory-Visual Spatial Disparity on Temporal Recalibration

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It is known that the brain adaptively recalibrates itself to small (~100 ms) auditory-visual (AV) temporal asynchronies so as to maintain intersensory temporal coherence. Here we explored whether spatial disparity between a sound and light affects AV temporal recalibration. Participants were exposed to a train of asynchronous AV stimulus pairs (sound-first or light-first) with sounds and lights emanating from either the same or a different location. Following a short exposure phase, participants were tested on an AV temporal order judgement (TOJ) task. Temporal recalibration manifested itself as a shift of subjective simultaneity in the direction of the adapted audiovisual lag. The shift was equally big when exposure and test stimuli were presented from the same or different locations. These results provide strong evidence for the idea that spatial co-localisation is not a necessary constraint for intersensory pairing to occur.

S50

A perceptual learning study on the flexibility of native-language speech perception

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Four experiments examined perceptual flexibility in speech perception. In Experiment 1, during an exposure phase, two groups of Dutch listeners heard the English sound theta (as in bath) replacing /f/ in 20 /f/-final Dutch words (Group 1), or /s/ in 20 /s/-final Dutch words (Group 2). At test, theta replaced the final sound in minimal pairs such as doof/doos (deaf/box). Listeners heard these critical primes and made visual lexical decisions to e.g. doof and doos. Group 1 were faster on doof decisions after critical primes than after unrelated primes; Group 2 were faster on doos decisions. The groups had thus learned that theta was, respectively, /f/ or /s/. This learning was thorough as the effects were of the same nature, and just as large, when the theta was replaced by an ambiguous /fs/-mixture (Experiment 2), and even when the critical primes contained unambiguous /f/ or /s/ instead of theta (Experiment 3). In Experiment 4, a nonspeech noise replaced the theta. Listeners treated the noise as an /f/, irrespective of exposure conditions, showing that learning about a new sound depends on its spectral characteristics. Perceptual learning in one's native language is thorough, and can override years of second-language phonetic learning.

S51

A Diffusion Model Account of Practice

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When people repeatedly perform the same cognitive task, their response times (RTs) invariably decrease. This effect has been extensively studied in the past, with most research focusing on the specific question of how the RT mean decreases with practice. In order to provide a more general account of the practice effect, we applied the Ratcliff diffusion model to data from a 10,000-trial lexical decision task. The diffusion model estimates parameters that represent psychological processes by describing the practice-induced changes for both entire RT distributions and the proportion of errors. The data show that practice leads to improvement on RT when participants are instructed to respond accurately, and leads to improvement on accuracy when participants are instructed to respond quickly. A diffusion model analysis suggests that the effect of practice is to enhance the speed of information processing, to decrease response caution, and to decreasing peripheral processing time.

The hippocampus as a binding device: within- and between-domain associations in human memory

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Relational memory is mediated by the medial temporal lobe (MTL), specifically the hippocampus. In a previous fMRI study, we showed that the hippocampus is involved in the short-term maintenance of object-location associations, but not in maintaining object-colour associations. This counters the notion that the hippocampus acts as a general binding device and shows that different forms of memory binding may exist. Here, we examine the hypothesis that the MTL is involved in the integration of information that is primarily processed in distinct brain regions (between-domain) and not in the integration of information from closely linked brain areas (within-domain). 19 Healthy subjects performed a 3-item delayed-matching-to-sample task in the MRI scanner (Siemens Sonata 3T). In each trial, 3 stimulus pairs were presented (2.5 s each) consisting of 2 houses, 2 faces or a face and a house, followed by a jittered delay (8-20 s) and a probe stimulus. Subjects had to indicate whether the probe stimulus was present in the previously shown set or not. Results showed bilateral activation in the parahippocampal gyrus and activation in the right hippocampus comparing between-domain and within-domain associations. These findings support our hypothesis that the hippocampus integrates information streams from distinct brain regions within memory.

Recall deficits in schizophrenia: is it all in the context?

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Vrije Universiteit Amsterdam ^{**} Universiteit van Amsterdam

Episodic memory deficits are regarded as fundamental in schizophrenia. A computational model suggests that an inability to integrate contextual and object information in episodic representations underlies these deficits. We have tested this conjecture in recent-onset schizophrenic patients. Results show that whereas contextual cues strongly aid retrieval in healthy controls, they did not do so in patients with schizophrenia. Surprisingly, retrieval was equivalent for both groups when contextual information was not available, and retrieval could only occur from word stems. These results suggest that deficient context integration may lie at the heart of episodic memory impairments in schizophrenia.

The Role of Item Strength in Retrieval Induced Forgetting

Emoke Jakab & Jeroen G.W. Raaijmakers
University of Amsterdam

Experiments on retrieval inhibition show that retrieval practice on some category items reduces recall of the nonpracticed items. Anderson's inhibition theory proposes that retrieval inhibition should be larger for stronger items since these items are more likely to interfere during retrieval practice. To test this hypothesis, we manipulated the strength of the nonpracticed items in two different ways. In the first experiment we made use of the fact that there is a strong within-category serial position effect with the first presented items being recalled much more often than later items. However, compared with control items from the same serial positions, the inhibition effect was not larger for the stronger items (if anything, the effect was smaller). A similar result was obtained when strength was manipulated by presenting some of the "to-be-inhibited" items twice. All in all, we have found no support for the hypothesis proposed by Anderson.

The SNARC Effect Does Not Imply a Mental Number Line

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In this study, we directly contrast two approaches that have been proposed to explain the SNARC effect. The traditional direct mapping approach suggests that a direct association exists between the position of a number on the mental number line and the location of the response. On the other hand, accounts are considered that propose an intermediate step in which numbers are categorized as either small or large between the number magnitude and the response representations. In a magnitude comparison task, we departed from the usual bimanual left / right response dimension and instead introduced the unimanual close / far dimension. A spatial-numerical association

was observed: small numbers were associated with a close response, while large numbers were associated with a far response, regardless of the movement direction (left / right). We discuss why these results cannot be explained by assuming a direct mapping from the representation of numbers on a mental number line to response locations and discuss how the results can be explained by the alternative accounts.

S56

Motor Set Modulates Automatic Priming Effects of Uninformative Cues

Jos J. Adam, University of Maastricht
Jay Pratt, University of Toronto

In three experiments, we examine facilitatory and inhibitory effects of uninformative spatial cues in a four-choice reaction time (RT) task that required three different types of responses: detection, reaching, and keypressing. Results revealed a pattern of facilitation and inhibition that strongly depended on response mode: Whereas detection and reaching showed longer RTs for cued than uncued locations (reflecting inhibition of return), keypress responses showed shorter RTs for cued than uncued locations (reflecting automatic response activation). Together, these results provide converging evidence for the Grouping model of precuing effects (Adam, Hommel, & Umiltà, 2003, 2005) and add further support to the notion that distinct mechanisms dominate performance in single- and multiple-effector visuomotor tasks.

S57

Joint action more successful than solo action if task dimensions can be distributed

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Radboud Universiteit Nijmegen

Previous research in our lab has shown that in a virtual ball lifting task the coordination of forces in joint action is worse than in solo action. Here, we investigated how people distribute the control of two task dimensions, viz., balancing and lifting. The task was to jointly balance a ball on top of a virtual bar while lifting the ball to a goal location. In the symmetrical condition the left and right index fingers controlled the left and right heights of the bar ends. In the asymmetrical condition one finger of each participant controlled the height of the bar and the other the orientation. In the latter condition we expected that dyads would improve performance by taking responsibility for only one task dimension each. Preliminary results confirm that participants distribute the task dimensions in the asymmetrical condition more than in the symmetrical condition. Although the task is more difficult in the asymmetrical condition, the relative performance of joint action over solo action is better than in the symmetrical condition. This suggests that when executing a task together, participants tend to distribute the task dimensions to facilitate joint performance and prevent interference.

S58

Inferring mental processes using additive and underadditive-factor logic

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Vrije Universiteit Amsterdam

By applying Sternberg's (1969) additive-factor method (AFM), temporally non-overlapping mental processes are inferred from additive as opposed to interactive effect relations between two independent variables. Recently, Los & Schut (2007) argued that the application of the AFM is not justified if one of the variables dynamically influences the preparatory state of a process. To deal with those variables, Los and Schut proposed an underadditive-factor method (UFM) that infers the architecture of mental processes from a trichotomy of effect relations (additive, overadditive and underadditive). In this talk I will present data that demonstrate the scope and limitations of both AFM and UFM.

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S59

Segmentation transfer in keying sequences

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Earlier research demonstrated that discrete 6-key sequences are spontaneously segmented in individually different ways suggesting there is some limit in the length of motor chunks. The present experiment examined whether the

rhythmic pattern of one 6-key sequence (the prestructured sequence) determines spontaneous segmentation in other 6-key sequences, and whether a common segmentation pattern develops in two simultaneously executed sequences when there is no imposed rhythm. The results showed neither transfer from the prestructured to a concurrently practiced unstructured sequence, nor to two new sequences that were carried out later on. Also, segmentation of these two new sequences was often different. So, whereas segmentation is a robust phenomenon affecting all 6-key sequences, the exact pattern is unpredictable and probably determined by both individual and sequence-specific factors. In addition, the effect of using other fingers of the same hands appeared more in line with a sequence representation in terms of a hand-based frame of reference than with direct finger activation.

S60

Stop Talking! Inhibition of Manual and Verbal Responses to High and Low Frequency Picture Names

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Whether gossiping or organizing a surprise, one immediately stops speaking when the topic of conversation arrives. Speech is a complex natural response with a non-arbitrary and rich stimulus-response mapping. To quantify the level of inhibitory control over speech production and its relation to hand response inhibition we administered three tasks in which responses had to be stopped upon presentation of a stop signal: (1) a classical stop signal task with two pictures indicating left/right hand responses, (2) a vocal version with overt naming of two pictures, (3) classic picture naming of 60 pictures. Word frequency was manipulated as a stimulus intrinsic variable. Stop-signal RT was slower for vocal than for manual choice responses and slowest in classic picture naming. Furthermore, stopping was slower for naming low than for high frequency pictures. Apparently, response inhibition interacts with task relevant processes in speech production.

S61

Between you and me: there is no conflict-adaptation

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*Leiden University

People respond more slowly when an irrelevant feature of a target stimulus is incompatible with the relevant feature or the correct response. Such compatibility effects are often reduced in trials following an incompatible trial, which has been taken to reflect the suppression of the irrelevant feature dimension by executive control operations. To test this hypothesis, we asked participants to respond to high or low-pitched tones by saying 'high' or 'low' and to ignore the simultaneously presented auditory word 'high' or 'low'. As expected, performance was impaired if the heard word was incompatible with the required response, and this Stroop-like effect was reduced after incompatible trials. However, the sequential modulation was only observed if the voice in the two successive trials was the same, while no modulation was obtained when the speaker changed. This demonstration that sequential modulations are affected by episodic context provides support for episodic accounts but not for control or conflict-monitoring interpretations.

S62

Adjustments in attentional control by congruent information in anterior cingulate cortex

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According to a dominant theory of attentional control (Miller & Cohen, 2001), adjustments in control are made upon detection of response conflict by the anterior cingulate cortex (ACC). In line with this view, previous research has demonstrated less conflict and less ACC activity after incongruent than after congruent trials. It is unclear, however, whether this sequential effect is induced by expected incongruency (Miller & Cohen, 2001) or congruency (Gratton et al., 1992). To investigate this, we ran an fMRI study using a Stroop-like task with incongruent and congruent targets following cues predicting with 75% certainty the incongruent or congruent targets or predicting the target condition with 50% certainty. We observed that conflict and ACC activity was larger for targets following the 75%-congruent cues than following the 75%-incongruent or non-predictive cues, which did not differ. However, in contrast to the conflict-detection view, this effect was not due to low control induced by the 75%-congruent cues, because, if anything, ACC activity was largest for these cues. Together, these results suggest that the cues induced processing strategies mediated by the ACC. These strategies included a widening of attention following expected congruency and a narrowing following expected incongruency or when no information is available.

S63

Sequential effects in the Eriksen and Stroop tasks: Widening or narrowing of attention?

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Previous studies demonstrated trial-to-trial adjustments of attention in the Eriksen and Stroop tasks. In the Eriksen task, participants respond manually to a target letter (e.g., H or S) flanked by two congruent or incongruent letters (e.g., HH or SS). In the Stroop task, participants vocally name the ink color of incongruent or congruent color words (e.g., the word GREEN in red or green ink). The distractor effect (i.e., the response time difference between incongruent and congruent trials) is usually smaller after incongruent than after congruent trials, indicating (strategic, context-driven) adjustments of attention. The adjustments could involve a narrowing of attention after incongruent trials, which is the dominant conflict-adaptation view in the literature (Botvinick et al., 1999, *Nature*), a widening of attention after congruent trials (Gratton et al., 1992, *JEP:G*), or both. We tested between these views by conducting Eriksen and Stroop experiments that included neutral trials in addition to incongruent and congruent ones. In both experiments, the distractor effect was larger after congruent trials than after incongruent and neutral trials, which did not differ in effect. These findings suggest that the trial-to-trial adjustments involve only a widening of attention after congruent trials, challenging the conflict-adaptation view.

S64

NEURAL MECHANISMS, TEMPORAL DYNAMICS, AND INDIVIDUAL DIFFERENCES IN INTERFERENCE CONTROL IN THE SIMON TASK

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University of Amsterdam

Functional magnetic resonance imaging (fMRI) methods may help in understanding processes of response capture and response inhibition in conflict tasks, such as the Simon task. However, data-driven approaches thus far have not yielded consistent insights into these processes. In my talk I will present a theory-driven approach that capitalizes on individual differences in the processes of central interest. Based on the so-called activation-suppression model, specific behavioral parameters for each individual derived from reaction time (RT)-distribution analysis were computed. These parameters correspond closely to the processes of inappropriate location-driven response activation (capture) and of the subsequent inhibition of this response as detailed by the model. I will show data of an fMRI study with 24 participants in which activation in pre-supplementary motor area (pre-SMA) was found to correlate with the RT-distribution measure of response capture, whereas the right inferior frontal cortex (IFC) was found to correlate with the RT-distribution measure of response inhibition. These results, that are consistent against the backdrop of the larger literature on cognitive control, could have been derived neither from the standard data-driven fMRI approach, nor from inspecting overall mean RT only.

S65

A Booster/Bouncer theory of temporal attention

Christian N. L. Olivers & Martijn Meeter*
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What is the time course of visual attention? Attentional blink studies find that the second of two targets is often missed when presented within about 500 ms from the first target, resulting in theories about temporary capacity limitations or bottlenecks. Earlier studies, however, have reported quite the opposite finding: Attention is transiently enhanced, rather than reduced, for several hundreds of milliseconds after a relevant event. Here we present a theory that integrates these contradictory findings. There is no central role for capacity limitations or bottlenecks. It is assumed that relevant events trigger a ballistic subcortical attentional booster function, meant to enhance the target information. However, in the attentional blink task, the distractor after the target is being boosted instead, resulting in a strong inhibitory response in working memory, which closes the gate to consciousness (the "bouncer"). The theory explains many findings that are problematic for limited-capacity accounts.

Costs and benefits in a crossmodal exogenous cueing task

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When a visual target is preceded by an auditory cue, the spatial location of the cue influences the speed and accuracy of the response to the target. This crossmodal spatial cueing effect has been studied extensively, but it has not been clarified whether it is based on an automatic process and whether the effect is made up of 'benefits' for the validly cued target, 'costs' for the invalid cue, or both. First we compared spatial cueing with a neutral condition in which the cue was non-localizable. The results show both costs and benefits suggesting that crossmodal cueing should be explained in terms of attentional 'shifts'. Secondly, we used a paradigm in which visual attention was focused prior to the presentation of the auditory cue, by indicating the correct target location at the beginning of the trial. The results show a cueing effect when attention is in a focused state composed of both costs and benefits. However, when in a subsequent experiment the target locations were also designated by means of placeholders these benefits disappear. The finding that costs for invalid cues remain even when visual attention is highly focused indicates that crossmodal cueing is an automatic process.

S67

Emotion improves and impairs visual perception

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Research has shown that emotional stimuli are better perceived than neutral stimuli. We propose that two mechanisms contribute to emotion-induced perceptual enhancement: (a) a general enhancement in the efficiency of visual processing that carries over onto the identification of other stimuli, and, (b) a stimulus-specific attentional enhancement that prioritizes emotional stimuli at the cost of competing stimuli. To disentangle the potential contributions of these mechanisms we investigated whether an emotional cue word improves or impairs the perception of a subsequent neutral target word. In two experiments we manipulated the relative contribution of each mechanism by varying cue-target inter-stimulus interval (ISI) and cue visibility. Interestingly, our results show that emotional cues impaired target identification at short ISIs but improved target identification when competition was diminished by either increasing ISI or reducing cue visibility. Our findings indicate that two distinct mechanisms contribute to the rapid and effective detection of motivationally significant stimuli.

S68

Pip and pop: Non-spatial auditory signals improve spatial visual search

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Searching for an object within a cluttered, continuously changing environment can be a very time consuming process. Here we show that a simple auditory pip drastically decreases search times for a synchronized visual object that is normally very difficult to find. This occurs even though the pip contains no information on the location or guise of the visual object. The experiments also show that the effect is not due to general alerting, nor due to top-down cueing of the visual change. Instead, we propose that the temporal information of the auditory signal is integrated with the visual signal, generating a relatively salient emergent feature that automatically draws attention. Phenomenally, the synchronous pip makes the visual object pop out from its complex environment, providing a direct demonstration of spatially non-specific sounds affecting competition in spatial visual processing.

S69

ERP Data on the Interplay of Prosody, Syntax and Semantics in Sentence Processing

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Event-Related Potentials were measured while participants listened to locally ambiguous Dutch sentences like (1) 'De verpleegster hielp de zieke te lopen' (The nurse helped the patient to walk) and (2) 'De verpleegster hielp de zieke te vervoeren' (The nurse helped to transport the patient) with either a prosodic break (PB) right after the first verb ('hielp') or no PB. In (1), a PB suggests that the NP 'zieke' (patient) is not the object of 'hielp' (helped), but this syntactic expectation is eventually contradicted by the verb 'lopen' (walk) because it is intransitive. By contrast, in (2), a PB fits with the eventual syntactic analysis. Different methodological quantifications revealed a very robust Closure Positive Shift in response to the PB. More importantly, in sentences with a PB, an N400 effect was found for a prosody-syntax mismatch as in (1), compared to the match in (2). This contrasts with an earlier finding by

Steinhauer and colleagues (1999) of a biphasic N400/P600 pattern. Thus, a mismatch of prosodic and syntactic information does not necessarily trigger a syntactic reanalysis, but can lead to a semantic integration problem. These and other results will be discussed in the light of methodological and theoretical considerations.

S70

Neural Correlates of Spatial Sentence Processing in Blind and Sighted

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In order to describe where objects are in the world we use spatial language (e.g. left of, above). One way to process spatial language is by means of a linguistic strategy, another way is by means of a visuospatial strategy (leading to an analogue spatial mental model). We were interested in the influence of visual experience on the processing of spatial language. An intriguing question is whether or not blind and sighted generate similar spatial mental models, and whether they recruit the same neural networks. In our fMRI experiment early blind and sighted subjects performed a spatial sentence comprehension task in which they had to evaluate pairs of spatial and non-spatial sentences. Preliminary results for the blind subjects suggests that the left parietal cortex is active during spatial conditions, as has been found in previous research with sighted individuals. Cortical reorganization in the blind could explain the possible differences between the sighted and blind. There is indeed evidence for reorganization from a control task (verb generation). During language processing the blind subjects showed additional activation in the occipital cortex. Related effects of this reorganization for spatial language processing in the blind will be addressed.

S71

Oscillatory neuronal dynamics in the MEG dissociate parsing and working memory processes during online language comprehension

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During language comprehension, incoming sounds or orthographic patterns trigger a cascade of memory retrieval operations that make available the necessary ingredients for understanding the message. Once available, these different ingredients have to be integrated (unified) into a coherent interpretation of the utterance. Thus, two different cognitive processes, namely memory retrieval operations and unification operations, play a crucial role during language comprehension (cf Hagoort, 2005). EEG/MEG Power and coherence changes during language comprehension have been observed in three different frequency bands (Bastiaansen & Hagoort, 2006): theta (4-7 Hz), lower beta (13-18 Hz) and gamma (above 30 Hz). Previously, we have related changes in gamma power to semantic unification operations (Hagoort et al., 2004; Hald et al., 2006). Here I present MEG data that suggest that increases in theta power across the sentence reflect the formation of a working memory trace, while increases in lower beta power across the sentence reflect syntactic unification operations.

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S72

Brain mechanisms underlying human communication

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Human communication involves more than language abilities or symbolic codes: it relies on an infrastructure involving the attribution of communicative intentions, which a successful communicator must anticipate. We isolate this underlying ability by using a task requiring communication without prior conventions. Planning communicative actions and recognizing their communicative intention relied on the same brain region, the right posterior superior temporal sulcus. The response of this region was lateralized to the right hemisphere, modulated by the ambiguity in meaning of the communicative acts, but not by their sensorimotor complexity. This finding supports the notion that our communicative abilities are distinct from both sensorimotor processes and language abilities.

S73

Modularity redefined; the case for studying the familial determination of selective developmental deficits

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An important aspect of research into the link between genes and behaviour concerns the identification of familial determination of developmental impairments. For instance, there is now strong evidence for familial (and even distinct indications for genetic) factors involved in dyslexia. We have recently investigated the possibility of a familial factor in developmental prosopagnosia and developmental colour agnosia. If these observations are substantiated by further research, we feel that we have a new tool in the quest for defining the 'building blocks' of the cognitive system. The definition of modules as put forward by Fodor (1973) is no longer tenable. The assumptions regarding 'information encapsulation', 'mandatory processing', 'domain specificity' and 'shallow output' have all been challenged. At the same time, we continue to use the theoretical framework of function differentiation and localisation. We suggest that if the development of a specific mental ability depends on familial factor, it is likely that this ability is represented as separate entity in the brain. This idea might help us in developing a more operational definition of what constitutes a 'module'.

S74

Explicit Motor Learning and Chunking in Dyslexia

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The goal of this study was to investigate if people with dyslexia have problems with the execution of movement sequences and if this is related to motor chunking. People with dyslexia generally have difficulties with learning to read, spell and write, despite normal intellectual capacity, adequate sociocultural and educational opportunities and intact sensory abilities. In addition, there are indications that people with dyslexia also have problems with processing rapidly successive information, as is suggested by the temporal processing theory. Results of our study with the Discrete Sequence Production (DSP) task show a slower execution rate in participants with dyslexia. In particular, participants with dyslexia had specific difficulties with the execution of a sequence with two non-identical segments compared to a sequence with two identical segments. This suggests that people with dyslexia have a temporal processing deficit during the explicit execution of movement sequences.

S75

Psychophysiological evidence for motor resonance during infant's perception of walking and crawling

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Recent studies suggest that observing another person who is performing an action results in activation of motor-related brain areas that are involved in performing the action oneself. In addition, developmental studies have shown at a behavioral level that infants' ability to perform a specific action alters the way in which that action is perceived. However, still little is known about the development of an observation-execution matching system in infants and how action experience relates to the activation of motor-related brain areas during action observation. In the present study we hypothesized that infants who are able to walk might show stronger motor resonance during the observation of walking compared to crawling infants. EEG and eye-movements were measured while 12-to-16-month old infants watched short videos displaying both walking and crawling infants. EEG-data analysis focused on the 5-8 Hz frequency band, which is thought to be functionally similar to the adult mu-rhythm. Observation of both walking and crawling was reflected in suppression of the mu-rhythm. Preliminary results suggest differential effects of action experience on the perception of other's actions.

S76

Children's ability to use stable and flexible cues in order to memorize an object's location

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It has been suggested (Doeller et al., submitted) that, within spatial memory, learning the association between an object's location and a flexible, moving intramaze landmark and learning the association between an object's location and a stable boundary run in parallel. This idea is supported by the evidence for distinct neural systems in adult humans which are involved in the two types of learning, the right dorsal striatum and the right posterior hippocampus respectively. Up to this point, however, little is known about the interaction of both systems during spatial learning in children. The current study tested 5- and 7-year old children and students on a task in which both memory systems were addressed. It was shown that, unlike the 5-year-olds, half of the 7-year-olds and the students learned within test blocks on both the landmark related object and the boundary related object. This finding indicated that 7 years seems to be a transitional age for learning the association between an object's location and stable environmental cues, thus creating a cognitive map of the environment. Only the students learned the association of an object's location to a flexible moving cue, as was shown by the between test blocks improvement.

S77

Age-related change in the ability to switch between choice tasks and to shift from stopping to going

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This study examined developmental differences in the ability to switch between tasks and to shift from stopping to going. Three age groups (7-8-year-olds, 11-year-olds, and 25-year-olds) performed on a standard version and on a hybrid version of the task-switching paradigm, in which participants were cued to consider the color or shape of a target stimulus. In the standard version, participants had to execute a choice response; in the hybrid version, they had to execute a choice response on some trials, but a disjunctive response on others (Go-NoGo). The paradigm allowed the assessment of the speed of switching between choice tasks, and of shifting from stopping to going. The results showed that the costs involved in switching between choice tasks decreased with advancing age until late childhood. The developmental trend was less steep when the interval between cue and target increased. In addition, the costs in shifting from stopping to choice (Choice trials) decreased with the children's age, and reached mature levels beyond childhood. Shifting from stopping to going (Go trials) was associated with an RT benefit and already reached mature levels by early childhood. The results indicate that switching between color and shape responses and shifting between stopping and going are time-consuming processes that mature at different rates.

S78

Never too old to learn

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Ageing is generally associated with decline. Among others, seniors experience more difficulty in learning which choices provide the desired outcomes, which is important in all kinds of new ICT-applications. Science, politics and media nowadays take a serious interest in life-long learning. From this perspective, there is actual news value in the finding that older adults can learn as effectively as young adults by merely showing them a happy Disney-filmclip. Because the natural quantities of dopamine in the brain diminish with aging, various cognitive processes lose efficiency among seniors. Positive affective states happen to be associated with a transient increase in dopamine, especially in those brain areas that are important for learning capacities. Individuals with reduced natural quantities of dopamine in their brains therefore are better at learning which choices produce the desired outcomes after viewing a merry film clip than after an emotionally neutral fragment. Thus, based on new neuropsychological insights, the decline in learning capacities can be countered in an easy and straightforward way."

The Irrelevant Speech Effect in Aging: An fMRI Study

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It has been repeatedly demonstrated that irrelevant background speech has similar disruptive effects on cognitive performance (especially serial recall) in younger and older adults. This is peculiar in light of the inhibitory deficit hypothesis of aging, which would predict a disproportionate irrelevant speech effect (ISE) in older adults. Several explanations have been proposed for the age-independence of the ISE, only one of which has been fully tested: Age-related hearing loss, which appears not to affect the ISE. We tested the hypothesis that older people might show more extensive prefrontal and parietal cortical activation to sustain their performance under irrelevant speech. For that purpose, we collected fMRI data among 11 younger (mean age = 23.2 years) and 10 older individuals (mean age = 65.2 years), who were engaged in a numerical immediate recognition task while being exposed to three within-groups background speech conditions: (1) silence, (2) repeated digits, and (3) alternating digits. Behavioral data show an ISE, which, in line with previous research, does not interact with age group. Imaging data, however, reveal disproportionate activity in the prefrontal, parietal, and temporal lobes of the older participants. These results will be discussed in relation to current theories of cognitive and neural aging.

S80

Network of prefrontal cortical areas commonly active during cognitive performance

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While various aspects of cognition (response control, working memory, decision making, etc.) are studied with a variety of tasks, fMRI revealed roughly similar activation sites across these tasks. Meta-analyses of these studies suggest three or four common prefrontal activation sites (cingulate gyrus, inferior frontal sulcus, anterior insula). The aim of the present study was to find direct confirmation of a common cognition related prefrontal network. Fast event-related fMRI was used in 12 participants while performing four different cognitive tasks: go-nogo, response switching, back matching and gambling. Ten overlapping activation sites were found bilaterally in the prefrontal cortex, including these reported in the meta-analyses. Three subtypes were evident: in four areas the response was modulated by the amount/duration of cognitive load; in three areas the response was not significantly modulated; (3) three areas showed a significant deactivation contingent upon stimulus appearance. Distributed pattern analysis using split-half correlations showed that it was possible to identify from the response pattern across voxels within each area what task a participant was performing. Moreover, classification of voxels according to response preference showed that each area comprises sub-regions exhibiting a relatively stronger response to one type of cognitive task than another.

POSTER PRESENTATIONS

P01

Mood congruence facilitates recall of autobiographical memories

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This study examined the effects of both mood congruence and mood-dependent memory on the recall of autobiographical memories. Participants submitted 50 diary entries to an online database over a 90 day period (Phase I). At the time of submission, participants rated each event's valence (positive/negative) and the emotional intensity of each event, as well as their mood. Participants were tested on their recall of submitted events after a 10-day delay (Phase II), which involved a baseline mood rating upon arrival, a film mood induction procedure, and an additional mood rating before a free recall exercise. The negative mood induction was not only more effective than the positive one, but also yielded higher recall of mood congruent entries. Mood congruence occurred within the negative mood manipulation group, as these participants recalled more mood-congruent than incongruent entries. The results suggest that mood-dependent memory and mood-congruence may be more effective for negative mood and events than positive mood and events in subsequent recall of autobiographical memories. Future research could explore how a more effective positive mood elicitation procedure could be established to demonstrate facilitation of mood congruence in the laboratory setting.

P02

The role of interference and inhibition in retrieval-induced forgetting

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Retrieval practice with particular items from memory (e.g., orange) can result in forgetting of related items (e.g., banana) that are associated to the same cue (e.g., FRUIT). This retrieval-induced forgetting effect can be explained by both interference and inhibitory processes. The independent cue technique has been developed to differentiate between the contributions of interference and inhibition to the forgetting effect. Independent cues are not associated to the practiced item (e.g., YELLOW or monkey-b___ for banana). Inhibition theory predicts forgetting with this type of cue. However, interference theory predicts forgetting only with the studied category (FRUIT) and does not predict forgetting with independent cues. Therefore, forgetting with independent cues is seen as an empirical criterion for inhibition. However, in three experiments, we demonstrate that, even when participants are only cued with independent cues, studied categories are activated at test. Thus, independent cues may not differentiate effectively between interference and inhibition.

P03

Modeling Bimodality in Spacing Effect Data

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A recently proposed theory of the spacing effect (Raaijmakers, 2003) suggests that the spacing effect is conditional on study phase retrieval leading to two groups of students showing different magnitudes of the spacing effect. This bimodality was also observed in histograms of spacing data. In this study we used latent class regression analysis to investigate whether these groups can be detected in existing datasets (Experiment 1). Specific hypotheses about the magnitude of the spacing effect in the latent classes were assessed in Experiment 2. Latent class regression analysis in both experiments showed that the fit of the two-class model was considerably better than the (1-class) ANOVA model. Moreover, the results of Experiment 2 showed, in line with our predictions, that when the presentation rate changed from 1 second to 4 seconds the increase in spacing effect was larger for the low-performing class than for the high-performing class.

Attention, rather than Retrieval, contributes to Age differences in Emotional Memory: An Event-Related Potential study

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Older adults generally have relatively increased memory for positive stimuli compared to younger adults. In this study, Event-Related Potentials were employed to examine whether attention or retrieval processes underlie this so-called positivity effect. Younger (17-27 years) and older (63-77 years) participants completed recognition and free recall tests with unpleasant, neutral and pleasant pictures. The older adults demonstrated a positivity effect in the free recall, but not in the recognition test. Familiarity, recollection and post-retrieval operations, as indexed by the early frontal, the parietal and the right frontal old/new effects respectively, did not show age differences in emotional modulation consistent with the positivity effect. The early portion of the Late Positive Potential (LPP) (400-700 ms) was enhanced for emotional compared to neutral pictures in both age groups. The late portion of the LPP (700-900 ms), however, was relatively enhanced for pleasant pictures in the older adults. Thus, attention to pleasant stimuli appeared more sustained in the older than in the younger adults. These results are in line with the notion that top-down, but not bottom-up controlled attention for emotional stimuli differs between younger and older adults, and suggest that attention plays an important role in the occurrence of a positivity effect.

P05

Hemispheric lateralization and spatial relations in working memory: an ERP study

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Spatial relations between objects can be represented either categorically or coordinately. The metric, coordinate representation is associated with predominant right hemisphere activity, while the abstract, qualitative categorical representation is thought to be processed more in the left hemisphere (Kosslyn, 1987). This hypothesised lateralization effect has been examined thoroughly over the years, but positive results depend largely on task demands and population of subjects. In our event related potential (ERP) experiment, visual half field tasks in a match-to-sample format were conducted to examine these lateralization effects over time, in order to observe how they are affected by the length of the retention interval between the two stimuli. The interval between the two stimuli was either brief (500 ms), intermediate (2000 ms) or long (5000 ms) to examine ERP data at different stimulus processing stages. The stimuli used are an adapted version of the traditionally used dot bar figures, to increase task complexity. Behavioural data reveal the hypothesised lateralisation effect, but only at the 2000 ms interval. The lateralisation effects found for spatial relation processing therefore appear to vary over time. The ERP results will illustrate brain activity at different stages of stimulus processing (encoding, memorization, retrieval) during task execution.

P06

Experience as a modulating factor in gender differences in configurational knowledge of a daily environment

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Males tend to outperform females in their configurational knowledge of spatial layouts and environments. A proposed cause for this finding is the fact that males have an initial preference for developing this specific type of spatial knowledge, as opposed to a more route-oriented approach in females. Since in many studies new (computerized) environments are used to assess spatial abilities, a male advantage in configurational knowledge might be merely attributed to this initial preference. Over time, with more experience, females might become however as proficient as males in developing configurational knowledge. In order to test this assumption, configurational knowledge of the city of Utrecht in the Netherlands is assessed in male and female inhabitants who have different levels of experience with this city. Moreover, this gives further insight in the temporal dynamics of the process of acquiring knowledge about one's spatial environment. Data collection is about halfway presently. Two different tasks are used to assess the configurational knowledge of twelve locations in the centre of Utrecht. In one task, distances between two pairs of places have to be compared. In the second task subjects have to evaluate whether a depicted spatial orientation between three places is correct or not. Verbal and spatial working memory as well as mental rotation are measured to investigate the relation between these abilities and the presence of configurational knowledge of a daily environment.

P07

Motion is Meaning: on the semantic representation of action-related objects

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Action semantics (AS) refers to conceptual knowledge used by an actor to prepare object-oriented actions. Such knowledge includes information about the normal function and use of concrete objects. AS is suggested to be an integral part of objects' semantic representations and as such to be activated whenever semantic information about an object is retrieved. In the current reaction time study, we test this hypothesis by investigating whether lexical decision times to words denoting functional objects are modified by congruency between required response movements and normally associated functional movements. Specifically, we hypothesized that participants would be faster to respond to words denoting objects used on the body (i.e. hairdryer) when the required response was a movement towards rather than away from the body. Likewise, we hypothesized that participants would respond faster to words denoting objects used away from the body (i.e. hammer) when the required response was away from rather than towards the body. The results confirm our hypothesis, suggesting that preparation of an action congruent to an object's AS representation facilitates general lexical semantic processing. This is a strong indication that basic motor information about how an object is used is indeed part of the semantic representation of an object.

P08

ERP correlates of morphological priming during Dutch language production

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Morphological knowledge of words is essential for the production of complex words ('hand.appel' [eating apple], not 'han.dappel'; dots=syllable boundaries). In German, the production of morphologically complex words facilitates the subsequent production of picture names that are part of the previously produced complex words (Dohmes et al. [2004] *Brain & Language*). These facilitative effects were interpreted as morphological priming. We tried to replicate the effect in another language, Dutch, and to determine the neurophysiological correlates of morphological priming. Previous studies in language comprehension suggested that the N400 component can reflect morphological processes (McKinnon et al. [2003] *NeuroReport*). Here, a long-lag word-picture priming design was employed to collect behavioral data in Experiment 1 and event-related potentials (ERPs) in Experiment 2. While behavioral priming effects confirmed previous results and extended these to another language, analyses of the ERP data yielded large positive-going ERPs before speech onset. The production of morphologically primed picture names was associated with a negativity in the typical N400 time window. These findings suggest a morphological processing component in speech production that cannot be reduced to semantic or form processing. Furthermore, the ERP effects related to morphological processes appear to be different for language production and comprehension.

P09

Tracking over Time how Lexical-Stress Information Modulates Spoken-Word Recognition

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Lexical competition among words during spoken-word recognition is resolved based on segmental information but also on suprasegmental information, such as changes in amplitude, duration, and pitch due to lexical stress placement. The time-course of the effect of suprasegmental stress information on word recognition was investigated by tracking Dutch listeners' looks to arrays of four printed words on a computer screen as they listened to spoken sentences. Target trials included word pairs that did not differ segmentally in their first two syllables but differed in their stress placement (e.g., 'CAvia' and 'kaviAAR'; capitals marking stressed syllables). The listeners' eye-movements showed that they used stress information to disambiguate rapidly between word candidates. For example, when hearing 'kaviAAR', participants looked more at 'kaviAAR' than at its competitor 'CAvia' even before segmental information could disambiguate the words. Furthermore, there was an asymmetry in the amount of competition. The competitor 'CAvia' received more looks when listeners heard 'kaviAAR', than the competitor 'kaviAAR' did when they heard 'CAvia'. That is, words with stress on the first syllable provided stronger competition than words with non-initial stress. Lexical stress information thus affects the degree to which words compete, and it is used immediately to modulate the recognition process.

Facilitation from verb distractors on picture naming: Is it due to response-relevant criteria?

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Mahon, Costa, Peterson and Caramazza (JEP:LMC, 2007) recently investigated, among other things, the role of response-relevant criteria (RRC) in English language production. Using the picture-word interference paradigm, they compared the effects of semantically related (e.g. chair) vs. unrelated (e.g. rifle) distractor nouns with semantically related (e.g. sleep) vs. unrelated (e.g. shoot) distractor verbs on picture (e.g. BED) naming latencies. Their results demonstrated interference from semantically related nouns, but facilitation from verbs. Mahon et al. suggested that the language production system may discard distractor verbs as competitors more easily because they do not fulfill the RRC (i.e. produce a noun phrase). We would like to argue, however, that sleep may have a unique relationship with BED, and that the observed facilitation may arise due to the way uniquely related nouns and verbs are cognitively represented. In the present Dutch study, we attempted to empirically support our hypothesis by contrasting the effects of uniquely (e.g. slapen 'to sleep'; as Mahon et al. did) and non-uniquely (though semantically) related verb distractors (e.g. zitten 'to sit') on picture (e.g. BED) naming latencies. We were unable to replicate the facilitation effect for uniquely related verb distractors but found significant facilitation for non-uniquely related verb distractors.

Pronoun Ambiguity in Sentences with VP Ellipsis

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VP ellipsis is a process in which a repeated verb phrase is replaced by an anaphoric element, such as 'did (too)' in English. Perceivers retrieve (or copy) the missing VP quickly and effortlessly, which in itself raises interesting questions about sentence processing. If a VP that is later on referred to by 'did too' contains a pronoun, the processing scenario becomes more complicated, due to an ambiguity. E.g., in 'The policeman defended his brother, and the fireman did too', the second clause may either mean that the fireman defended his own brother, or that he defended the policeman's brother. The two interpretations can be viewed as resulting from copying 'defended his brother' from the first clause into 'did too' in the second, either before or after linking 'his' to 'the policeman'. In offline tests, most people prefer the interpretation in which 'his' is connected to a local noun phrase ('fireman'), but a number of online studies suggest that a representation in which 'his' is connected to the non-local noun phrase ('policeman') is constructed. We will present new results from end-of-sentence probe recognition and cross-modal priming experiments that are meant to shed light on the online reconstruction of ambiguous VP ellipsis.

The Dynamics of Grammatical Learning

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Prior learning of a morphosyntactic pattern may change the way learning proceeds at later test sessions by narrowing the search space for inference. Inflectional paradigms such as the German case-gender-number system are characteristically difficult morphosyntactic patterns for second language learners to acquire because they require the conditional application of grammatical rules. The present experiment explored how Dutch learners of German acquire morphosyntactic knowledge during comprehension. Twenty Dutch speakers classified German prepositional phrases presented over pre-test, training, and post-test phases over the period of one week. A follow-up phase was presented three months after the post-test. Feedback (correct/incorrect) was presented during the training and the post-test. Participants' classification was near chance during the pre-test, and did not change over trials of the pre-test. Classification improved over trials in the training and post-test. After three months, classification returned to near chance levels, but importantly, it improved during the follow-up session in the absence of feedback. The results indicate that learners' prior knowledge can influence acquisition rates for some time after testing, even at when classification performance is initially low.

Voice Category Boundaries Are Flexible and Abstract

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Sixteen Dutch listeners were presented with morph continua between two voices using Dutch CVC words in a two-day voice category boundary training experiment. Listeners had to make forced-choice decisions on speaker identity. During training, a continuum with the word [mes] was used. The category boundary was made explicit by giving feedback according to a predefined boundary at 50-50% morphs on one day and at either 30-70% or 70-30% the other day. This boundary training was amplified by presenting more stimuli from around the category boundary. At test the whole continuum was sampled equally. Three continua were tested: the trained [mes] continuum, another [mes] continuum and a [lot] continuum. Novel stimuli from the trained continuum were tested. As a result of training, perception became more categorical and, as a function of the changes in the boundary settings, identification curves were shifted. These findings show that listeners are able to set and reset voice category boundaries during training with feedback. This category boundary shift generalizes to non-trained utterances (1) of the same continuum, (2) of a different continuum with the same word, (3) and even to a different word with no phonemic overlap. Voice category boundary representations are thus flexible and abstract.

P15

Redundant Auditory Labels Facilitate Perceptual Category Learning

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Can learning a perceptual category be facilitated by the presence of a redundant verbal label? The findings presented here suggest that it can. Participants took part in an experiment where they had to categorize line drawings distinguishable from perceptual information alone, i.e. category members shared a diagnostic part (either a natural or unnatural part, according to Gestalt principles). We tested whether learning to categorize the objects improved when a label was presented after the participant had made a categorization judgement. Thus the label was redundant for learning. Participants showed better overall performance for natural than for unnatural categories. Moreover, the presence of redundant linguistic labels improved the learning of object categories during the training phase, as well as later retrieval of category knowledge and extension of category structure to novel exemplars. This demonstrates that language can influence perceptual learning. It corroborates recent findings of conceptual influences on perception and shines light from a new angle onto the language and thought debate.

P16

How world knowledge influences color perception: PERCEPTUAL-MEMORY vs. LINGUISTIC-RELATIVITY ACCOUNTS

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In many domains, perception is influenced by world knowledge. In color perception, for example, an ambiguous hue between yellow and orange is more likely to be labeled as yellow when it appears on a banana than when it appears on a carrot. There are two different accounts for this bias. According to one account, perceivers remember what colors typically occur on an object and use that perceptual knowledge in a top-down fashion to decide the color of a specific object. According to a second account, the bias arises because bananas are labeled as yellow and the linguistic labeling of color affects subsequent judgments (cf. linguistic relativity). We exploited a difference between Dutch and German to test these competing theories. Speakers of Dutch usually name the colors in a traffic light as red, ORANGE, and green, while Germans call the colors red, YELLOW, and green, although traffic lights in both countries are bound to the same European Norm (EN 12368). Hence, perceptual memory should be similar for both groups of participants. Nevertheless, in line with the linguistic-labeling account, we found that Germans are more likely to categorize an ambiguous hue on a traffic light as yellow than Dutch participants.

P17

Similarity is Closeness: a Perceptual Task

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The Conceptual Metaphor Theory suggests that image schemas of concrete concepts are mapped onto abstract concepts (e.g. Lakoff and Johnson, 1980; Gibbs, 1994). Researchers investigating this idea often used linguistic materials, such as words or sentences. The results they found could be explained by metaphorical word associations. In the present study we examined the metaphor SIMILARITY IS CLOSENESS in a perceptual paradigm not used before in this research field. The underlying image schema is the Near-Far image schema (SIMILAR IS NEAR and DISSIMILAR IS FAR). Participants had to decide whether two squares had similar or dissimilar colors. The squares were presented near or far from each other. If SIMILARITY is represented by the Near-Far image schema then the distance between the squares would influence judgment time and accuracy. We found that participants were faster and more accurate for 'similar' judgments when the squares were near than when they were far, and for 'dissimilar' judgments when they were far than when they were near. These results are

consistent with the metaphorical mapping SIMILARITY IS CLOSENESS presumed by Lakoff and Johnson in their Conceptual Metaphor Theory.

P18

Contextual interactions constrained by spatial proximity and depth cue

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Introduction: The general geometry of a scene influences shape perception, as is demonstrated in shape contrast effects. We investigated whether spatial proximity or the nature of the depth cue is more important to inducing a curvature contrast effect. Methods: A central disparity defined paraboloid was flanked by two inner and outer inducing paraboloids. The inner and outer inducers could be presented by different cues, disparity and structure-from-motion, or by disparity only, depending on condition. We varied the curvature difference between inducers in the reference and test interval. Observers had to decide which of the two intervals contained the central paraboloid with the highest curvature. This way, we could determine the curvature contrast effect. Results: We found that only the inducers that were both spatially close and presented in the same depth cue invoked a reliable contrast effect in the central paraboloid. Conclusion: Spatial proximity and the nature of the depth cue both constrain the curvature contrast effect.

P19

Binocular Orientation Perception

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In the present study we investigate whether binocular orientation matching is determined by the orientation of retinal projections, or by the perceived orientation. Retinal projections for vertical objects with backwards slant contain rotational differences between both eyes. One hypothesis is that binocular orientation matching is determined by retinal projections, with low matching precision for oblique retinal projections, and high matching precision for vertical retinal projections, due to the oblique effect (a decreased sensitivity for oblique orientations compared to horizontal/vertical orientations). An alternative hypothesis is that binocular orientation matching is determined by a combined percept of left and right eye images, independent of the orientation of retinal projections. This is studied in an orientation matching task, using the method of adjustment. Results of this experiment indicate that binocular orientation matching is dependent on perceived object orientation, not the orientation of retinal projections. The orientation of the combined percept of left and right eye images is more precisely adjusted to a reference orientation than can be predicted from the orientations of individual left and right eye projections. Since orientation matching for the conditions containing binocular disparity is not influenced by retinal projections, we conclude that orientation matching under these conditions must occur after binocular fusion.

P20

Individual differences in learning to perceive length by dynamic touch: Evidence for variation in perceptual learning capacities

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Recent studies on perceptual learning have explored and commented upon individual differences in learning trajectories. Although several factors have been suggested to account for these differences, thus far the idea that humans vary in their perceptual learning capacities has received scant attention. The present experiment aimed at providing a detailed picture of the variation in this capacity by examining the perceptual learning trajectories of a considerable amount of participants. The learning process was studied in the paradigm of length perception by dynamic touch. The results show that there are substantial individual differences in the way participants respond to feedback. Indeed, after receiving feedback, the participants' perceptual performances diverged. Although the learning trajectories were uniquely different from each other, several patterns in the learning paths were observed. The results of the current study indicate that humans vary in their perceptual learning capacities. This finding has profound implications for research on both perception and perceptual learning.

P21

Curvature contrast in haptic perception

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When one explores a raised line drawing or a 3D object, quite often the fingers are touching different geometrical properties simultaneously. It is likely that these properties interact. We studied how a curved line presented on one finger influences the perceived straightness on the other finger. For both raised line stimuli and 3D objects, we measured points of subjective straightness. We found that if a curved and a straight line are explored simultaneously, the straight line seems oppositely curved compared with the curved line. This was true for both the 2D and 3D stimuli. Initially, we hypothesised that this effect was caused by the hand serving as a centre of reference. With Optotrak recordings we showed that the hand follows a path described by the average curvature of the two lines touched with the fingers. If this path is (falsely) assumed to be straight, then straight lines touched with the fingers will be perceived as curved. However, we falsified our hypothesis by showing that the effect persists when the two lines are touched with the index fingers of two hands. We interpret our results as an example of perceptual contrast: a phenomenon thoroughly investigated for the visual sense but still unexplored for haptics.

P22

Skiers are different people than mountain bikers — Looking at textures reveals group differences based on pleasantness judgments

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In terms of modality appropriateness, touch seems to be the best modality to perceive surface textures. Less is known about how surface textures are perceived visually and whether relations exist between surface texture and perceived pleasantness thereof. In two experiments we, first, evaluated whether participants could visually perceive varying degrees of roughness of CURET surface textures using a pairwise comparison task. Then, employing a rating task, we investigated the relation between pleasantness and roughness of the stimuli. The results showed that (a) a Bradley–Terry model of the comparisons data resulted in index of increasing roughness that at face value appeared reasonable and (b) that a correlation seemed to exist between roughness and pleasantness. Closer inspection showed that some participants, dubbed 'skiers', preferred samples of relatively smooth surfaces. The group of 'mountain bikers' preferred samples of relatively rough surfaces. These findings seem to be in line with recent work on haptic perception by Bergmann Tiest & Kappers who showed that roughness perception for some participants depended on roughness measures mostly based on high spatial frequencies whereas for other participants the perception depended on measures predominantly based on low spatial frequencies.

P23

Perceptual appearance and disappearance are both influenced by feature similarity

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In two studies, we demonstrate that the moment at which a stimulus respectively exits and enters visual awareness is influenced by similarity between this stimulus and other stimuli presented. In flash-induced perceptual fading (Kanai & Kamitani, 2003) peripherally presented stimuli perceptually disappear as a result of flashing a white ring around them. In the first study we show that this effect is influenced by feature similarity; two peripheral presented stimuli disappear more often simultaneously when they are similar in either color, shape, or orientation than when they are not. In the second study we used the dichoptic suppression paradigm (van Lier & de Weert, 2003). We suppressed two orthogonal gratings (presented to one eye) by presenting two high-contrast elements (i.e., suppressors) at the same location to the other eye for 600 msec. Subsequently, the suppressors were removed and a third (trigger) grating with the same orientation as one of the suppressed gratings was presented at the center. We show that after the trigger grating becomes visible, the grating with the same orientation as the trigger grating becomes visible earlier than the orthogonal grating, independent of the eye to which the trigger is presented. We explain our result in terms of early feature-specific facilitative and inhibitory activation.

Predictive and postdictive visual interactions on the path of apparent motion

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A target moving in discrete steps can appear to move continuously even along sections of the path in which no stimulus is presented. We investigated whether this representation is constructed predictively, along the expected trajectory of the target, or postdictively, after the appearance of the next target. Observers viewed an unambiguous apparent motion display, which either occasionally reversed direction or moved continuously. Observers carried out a speeded 2AFC discrimination task on probes presented between the possible target locations. In the continuous condition, observers' reaction times to detect a probe change were longer when it occurred ahead of the disc than when it occurred elsewhere on the motion path. Conversely, when the disc reversed direction, significantly less interference was observed ahead of the disc (along the predicted motion path), and significantly more interference was observed behind the disc (along the updated motion path). We conclude that the representation of a moving object in an apparent motion display is constructed postdictively, after the predicted motion path is confirmed.

P25

Relative Saliency is Transient: Evidence from Apparent Motion.

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Different studies have shown that salient information can automatically attract attention, thereby affecting the attentional selection process (e.g., Nothdurft, 2002; Joseph & Optican, 1996). Yet, these saliency effects do not always occur. The results of a number of studies point to the idea that saliency only affects the most immediate responses (e.g., van Zoest & Donk, 2004). We used an apparent motion task to investigate how attention is dynamically allocated as a function of relative saliency. Observers were presented with two color changes in an array of oriented line segments such that the color changes were perceived to occur either simultaneously or sequentially such that the color was perceived to move from one location to another. Observers reported the perceived direction of motion. Manipulating the presentation duration of the oriented line segments prior to the color changes tested the dynamics of the saliency effects produced by the orientation singletons. In Experiment 1 both color change locations were indexed by orientation singletons. The results showed that relative saliency contrast between the singletons affected performance only briefly after stimulus onset. In Experiment 2 only one color change location was indexed by an orientation singleton.. The results showed that performance was invariably affected by the presence of the orientation singleton at all presentation durations. Together these results are taken to indicate that relative saliency information is transiently represented in the visual system whereas the presence of saliency is persistently encoded.

P26

On Motion Illusions in Static Op Art Patterns

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When looking at Bridget Riley's fall, observers report a vivid motion percept, even though the image they look at is static. In earlier investigations, participants were asked to rate the strength of the motion percept, which served to determine how the illusion depends on stimulus parameters, such as the shape of the lines in the image, or their frequency. To overcome the problems with subjective ratings that are difficult to compare across observers, we here present a newly developed method to measure the strength of the motion percept in such images. In this method, we vary the relative contrast of checkers and line patterns, respectively, that are superimposed to form one image, and ask participants to judge whether the image with checkers elicits stronger or weaker motion percepts than a comparison stimulus. With this method, we obtain psychometric curves describing the motion strength as a function of checker contrast. The point of subjective equivalence estimated from such psychometric curves can be used as a quantitative measure of illusion strength, to be compared to the statistics of fixational eye movements which are thought to be the source of the motion illusion.

P27

Mask energy versus spatial layout: Influences on the masking function

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In visual backward masking, a masking stimulus reduces the visibility of a preceding target stimulus. It is assumed that the strength of this reduction is mainly determined by the mask's energy, i.e. the product of its luminance and duration. The higher the mask's energy the more target visibility is impaired. If the mask's energy is higher than that of the target, masking strength usually decreases monotonically with increasing stimulus onset asynchrony (type A masking). If the mask's energy is lower than that of the target, masking strength first increases with increasing stimulus onset asynchrony before it declines (type B masking). We show that contrary to these assumptions, increasing the energy of a mask can result in weaker masking and that type B masking can also be obtained with a high energy mask. Therefore, energy is less predictive than previously thought. We will propose that grouping is a main factor to understand visual backward masking.

P28

Unmasking the attentional blink

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When asked to identify two letters embedded in rapid serial visual presentation of digits, observers will often correctly identify the second target letter (T2) when it appears directly after T1 ("sparing"), but they will fail to identify T2 when it appears within 200-500 ms of T1 – the attentional blink. Recent work shows that sparing can be extended across sequences of 3 to 4 targets, suggesting that inter-target distractors play a causal role in the attentional blink. Here, however, we show that an attentional blink occurs even in the absence of distractors, with two letter targets separated by a blank interval. We further show that this effect is attenuated for targets that are part of a sequence of successive target items and for targets that are precued by another target. These findings show that the root cause of the blink lies in the difficulty of engaging attention twice within a short period of time for two temporally discrete target events.

P29

The emotional modulation of the Attentional Blink: Effects of taboo and non-taboo arousing stimuli in a dual and single task paradigm

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We wanted to elucidate some unsolved issues concerning the emotional modulation of the attentional blink (AB): the extent to which emotionally arousing T1 stimuli interfere with T2 processing; the attenuation of the AB by emotionally arousing T2 stimuli; the question whether these effects occur for all arousing stimuli; and the impact of having to report T1 and T2. Our results show that arousing T1 stimuli consistently cause a greater AB than neutral T1 stimuli. For arousing T2 stimuli, the AB was diminished only in some conditions. However, these effects were found only for arousing taboo stimuli.

P30

How mood influences attention

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The influence of affective state on humans' information processing mode has remained underinvestigated in the hot cognition literature until recently. The goal of this study is to face this latest challenge by examining the influence of both positive and negative mood on attentional processes. We investigated the effects of mood (induced through a short movie fragment) on subjects' performance on the Attentional Network Test (ANT). Use of the ANT enabled us to investigate the modulatory influences of emotion on three different attentional networks in one task; specific neuroanatomical structures and neurotransmitters systems have been attributed to these networks. The orienting reflex is thought to involve a cholinergic posterior attention system and was measured through a spatial cueing task. Phasic alertness, mediated by the norepinephrine system, was assessed by calculating latency differences between conditions where target onset was cued versus uncued. Finally, the anterior attention system which is thought to regulate selective attention through dopaminergic pathways, was measured by the Eriksen flanker task.

Our study not only shows how different attentional networks are influenced by mood, but might also give an indication of the underlying neurotransmitter systems that are modulated by positive and negative mood.

P31

Less is more: visual search behavior depends on percentage to be ignored non-targets.

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In visual search, selecting one set of items that differs in only one feature from target (a 1D set), while ignoring another set of items that differs in two features from target (a 2D set) yields mixed results (Luria & Strauss, 1975; Zelinsky, 1996; Hooge & Erkelens, 1999). We systematically varied the percentage of 2D non-targets to determine the contribution of these non-targets to search behavior. Increasing the percentage to be ignored 2D non-targets is expected to result in increasingly faster search, since it decreases the size of the to be searched 1D set. Four observers searched large displays (96-600 set size) with a percentages of between 0% and 100% 2D non-targets (different in size and colour as opposed to 1D non-targets differing only in size from the target). Apparently, search time critically depends on the irrelevant subset size. Search time is longest with 5% irrelevant non-targets, independent of set size. Moreover, this effect on search time is only reflected in the number of fixations, suggesting visual span is decreased, possibly by means of attentional mechanisms.

P32

Top down influences make saccades deviate away: the case of endogenous cues

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We tested a recent hypothesis suggesting that the eye deviates away from a location when top-down preparation can influence target selection. Participants had to make an eye movement to a peripheral target. Before the upcoming target, a central cue indicated the likely target location. Results show that when the target was presented at a location different from that indicated by the cue, eye movements to the target deviated away from the cued location. Because central cues are under top-down control, the present results are in line with a determining role of top-down preparation on saccade direction. These results contrast with findings reported in a similar paradigm executed with hand movements, in which the movements were mostly initiated in the direction of the cued location. Therefore, we conclude that inhibitory effects typically observed when executing eye movements may not be observed when executing hand movements in similar conditions.

P33

Coarse-to-fine filtering in saccadic search

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When trying to locate an object in a visual scene, our eyes move around quickly to process the enormous amounts of information available in the scene. When the object is hard to find, saccade amplitudes tend to diminish as visual search progresses. Such a coarse-to-fine process could be an indication of a more and more detailed search relying on filters of increasing resolution. Here, we revisit a previous study that found a clear coarse-to-fine process in a difficult search task using military search images containing camouflaged vehicles. This study was limited to a quantitative analysis of the eye movements. In the current experiment we extend the study by attempting to match eye movements to image properties such as contrast and illumination. Our specific interest is whether the coarse-to-fine process can be linked to the usage of filters of increasing resolution over the course of the search process.

P34

Capture of the Eyes by Relevant and Irrelevant Onsets

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During early visual processing the eyes can be captured by salient visual information in the environment. Whether a salient stimulus captures the eyes in a purely automatic, bottom-up fashion or whether capture is contingent on task demands is still under debate. In the first experiment, we manipulated the relevance of a salient onset distractor. The onset distractor could either be similar or dissimilar to the target. Error saccade latency distributions showed that early in time, oculomotor capture was driven purely bottom-up irrespective of distractor similarity. Later

in time, top-down information became available resulting in contingent capture. In the second experiment, we manipulated the saliency information at the target location. A salient onset stimulus could either be presented at target or at a non-target location. The latency distributions of error and correct saccades had a similar time-course as those observed in the first experiment. Initially, the distributions overlapped but later in time task relevant information decelerated the oculomotor system. The present findings reveal the interaction between bottom-up and top-down processes in oculomotor behavior. We conclude that task relevance of a salient event is not crucial for capture of the eyes to occur. Moreover, task relevant information integrates with saliency information to initiate saccades, but only later in time.

P35

Attending to Tactile, Visual and Bimodal Targets: Effects on the P300

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The P300 is a positive peak in EEG occurring approximately 300 ms after the presentation of a target stimulus among a series of non-targets. Until now, the P300 has mainly been investigated for either visual or auditory stimuli. We used tactile and visual stimuli unimodally as well as bimodally. The tactile stimulus was a burst of vibration delivered by one of eight tactors around the participants' waist. The visual stimulus was a red-colored circle on a monitor in a schematic drawing of the tactor layout. Participants attended to the front 'target' tactor and ignored the others. The first results indicate that 1. tactile targets evoke equally clear or clearer P300s as visual targets, 2. bimodal targets produce at least equally clear responses as the tactile targets alone. In conclusion, we established that tactile stimuli can elicit P300s. In the presentation we will further discuss to what extent P300 latency and location are modality dependent, which may be related to the processing level at which the P300 occurs. Further, we will answer the question whether multimodal stimuli enhance the P300 or the signal-to-noise ratio between targets and non-targets. This work is relevant for the development and improvement of brain machine interfaces.

P36

A case for the Stay-Central Cue: An Event-Related Potential Investigation of Attentional Switch vs. No-Switch Processes

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This study investigated the temporal dynamics of shifting visual attention to peripheral spatial locations. This was done by recording event-related potentials (ERPs) during a symbolic cuing task. Symbolic cues (digits 1 through 6) provided information regarding the most likely location of an imperative stimulus, which was presented shortly after the cue. ERP responses to left- and rightward attention-shift-inducing cues were compared with either a Stay-Central cue (main experiment) that unambiguously instructed participants to maintain the focus of attention at fixation, or with a Non-Informative cue (control experiment) that did not provide any meaningful information regarding the imperative stimulus' location. Additionally, effects of advance information regarding imperative stimulus difficulty and cue to stimulus onset asynchrony (SOA) were investigated. Stay-central cue-elicited ERPs were characterized by a positively deflecting component, starting around 500 ms after cue onset, and the ERP waveform remained more positive than those elicited by shift-inducing-cues thereafter. In contrast, compared to shift-inducing cues, the non-informative cues were negatively deflected at short SOAs, but did not differ from each other at longer SOAs. These differences question earlier interpretations of the longer latency shift-related potentials and we conclude that a stay-central cue is a viable tool for investigating attentional shift processes.

P37

Changing One's Mind about Actions

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We investigated physiological and phenomenological differences between executing and cancelling pre-prepared actions, either in response to an external 'go/nogo' cue, or on the basis of an endogenous decision. Subjects either implemented their decision to act or not to act following a cue or indicated their subjective experience associated with action preparation using an analogue scale to report the strength of intention to act (positive values) or to cancel action (negative values). Both voluntary and stimulus-driven cancellation lead to decreased motor excitability measured using TMS. Subjective ratings showed a stronger contrast between positive intentions to act and negative intentions to cancel following external 'go/nogo' cues than endogenous decisions, particularly when the intentions were not implemented. Finally, to investigate the relation between neural preparation and conscious experience, we correlated ratings of intention with TMS-derived measures of preparation for action. Interestingly, these correlations were significant only when subjects made endogenous decisions which they did not eventually implement. We conclude that although subjective intentions are phenomenally thin and penetrable by other sensory and motor representations, they are genuine conscious correlates of action preparation.

P38

Function and Structure of Response Inhibition in the Right Inferior Frontal Cortex: A Model-based Approach

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The right inferior frontal cortex (rIFC) is known to play an important role in implementing inhibitory control. In a functional magnetic resonance imaging (fMRI) study, for instance, Forstmann et al. (in press) showed that activation in rIFC covaried with response time distribution parameters that are believed to reflect selective response inhibition. The goal of the present study is to elucidate the functional and structural role of the rIFC in selective response inhibition by means of a model-based analysis. Fourteen participants took part in an fMRI experiment while performing a cueing version of the Simon task, and also underwent diffusion tensor imaging (DTI). The analyses aimed to quantify the extent to which model-based measures of response inhibition are associated with individual differences in both rIFC function and rIFC coherency of white matter tracts. Preliminary results revealed a strong correlation between the model-based measures of response inhibition and both functional and structural indices of the rIFC.

P39

Action and Desire: Basal Ganglia Orient Eyes to Potential Reward

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In the interface between motivation and action, expectancy of reward plays a critical role. Potential reward can enhance action readiness in systems concerned with action preparation. Nonhuman primate research suggests that the enhancement of action readiness is achieved by a gating mechanism within subcortical areas that upregulates the throughput of cortical information to executive structures in the presence of potential reward. In a combined eyetracker-fMRI-setup subjects engaged in an antisaccade task. Reflexive responses had to be suppressed and voluntary responses had to be generated. Information on reward and spatial preparation was precued. Antisaccadic onset-latency served as a behavioural measure for the level of action preparation. In anticipation of reward the striatum was strongly activated and antisaccadic onset latency was reduced. Specific preparatory information on an upcoming action activated cortical and subcortical structures within the oculomotor circuit and reduced antisaccadic onset latency. Furthermore with both reward- and preparatory information available in the preparatory phase the caudate seemed to serve as an integrative structure to improve cross talk among reward- and oculomotor circuits by "pushing" the superior colliculus to an "up" state to facilitate afferent cortical input. Thus action preparation and efficiency was successfully maximized in the expectation of a potential reward.

P40

Visual hand representations from first and third person perspective

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Mirror neuron studies suggest that observing another person's action and performing an action activate similar representations (Rizzolatti, 1996). Other studies suggest that the behavioural and neural characteristics differ when mentally rehearsing or observing hand actions from a first or a third person perspective (Sirigu & Duhamel, 2001). Here we used the Parson's mental imagery tasks (Parsons, 1994) to study differences in hand representation from a first and third person perspective. Participant and experimenter sat opposite to each other. Hand stimuli varying from 00 (prototypical with respect to the participant) to 3600 were shown on a computer screen placed flat on the table between the experimenter and subject. Two different instructions were given: "Imagine this is your hand. Determine as fast as possible whether it is your left or right hand." (First person perspective). "Imagine this is my hand. Determine as fast as possible whether it is my left or right hand." (Third person perspective). Opposite reaction time (RT) patterns were found for first and third person perspective. RT was highest for the 1800 hand orientation in first person's perspective, but lowest for the third person's perspective. These findings suggest that imagining a hand from a third person perspective does have significant effects on the RT pattern.

P41

Grasping another's intention: inferring other's purposeful actions attract one's own attention!

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It has been shown that the observation of human actions affects the planning and execution of the observer's motor responses. It is, however, unclear whether action observation affects the observer's behavior already at an earlier attentional stage of cognitive processing. To this purpose, we (1) investigated whether visual attention depends on the observers' belief of whether an observed act is being performed by animated agents (i.e., humans) or not, and (2) whether inferring a causal relationship between a human posture and an object affects the observer's visual attention. We started by asking participants to respond to static targets appearing either next to still images of human grasping postures (animate cues) or next to geometric, u-shapes (inanimate cues). We found that only when primed by the human posture the observers' attention align with the target appearance. Then, we asked them to respond to either (horizontally) rotating or (vertically) flipping targets. We found that participants responded faster to targets previously primed by the appropriate posture (the rotating hand for rotating targets; turning hands for flipping targets) than the inappropriate (turning hand for rotating targets; rotating hands for flipping targets) one. Taken together, this study shows that 'animacy' is crucial to orienting behavior, and inferring the causal interaction between hands and objects does trigger one's attention.

P42

Visual Attention in Bimanual Object Manipulation

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Previous research showed that end-state comfort effect acts as a powerful cognitive constraint on motor planning even in bimanual tasks(1). However, in previous work on bimanual movement performance we demonstrated that right-handed participants did not always end comfortable with their left hand(2). It has been suggested that motor planning involves the activation of an internal model that has the appropriate force and timing characteristics factored in. Thus defined, visual guidance of the movement may not be strictly necessary. In contrast, Mechsner et al. (2001) demonstrated the dominance of visual attention in bimanual movement performance. In the present study we examined the role of visual attention on motor planning of each limb separately in a bimanual CD-placement task. We combined movement registration of both upper limbs using Optotrak with gaze pattern registration using Eyelink. The first results will be discussed.

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P43

Planning and Execution of Bimanual Object Manipulation

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The end-state comfort effect is a powerful cognitive constraint on motor planning in both unimanual and bimanual prehension tasks(1,2). Likewise, in bimanual tasks the preference to move both hands mirror-symmetrically relative to the sagittal plane acts as an important coordination constraint. Thus far, the role of these constraints on bimanual task performance has primarily been studied in isolation. In the present study, participants had to pick up two CDs, each with each hand, and subsequently place them in a CD-rack. Start and end orientations of the CDs were systematically manipulated such that conditions were created in which a conflict between both, cognitive and coordination, constraints was present. The results showed that participants moved their hands symmetrically in only 46.3% of all trials. A larger preference was given to ending the task with a comfortable posture (65.9%). Interestingly, end-state comfort for the right hand was reached in the majority of trials (82.0%), but only at chance level for the left hand (49.8%). To conclude, the findings of preference of comfortable ending over mirror-symmetry in bimanual tasks are in line with Weigelt et al. (2006), but simultaneously extend these findings as this preference was not shown for the left hand.

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P44**Absence of internally generated signals impairs coordination in joint action**

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When carrying objects together, people easily coordinate their actions. We wondered what mechanisms underlie this capability. Our subjects had to lift a virtual ball on top of a bar to a target location while preventing the ball from rolling off. In the solo condition one subject lifted each bar end by pressing upwards on two isometric force sensors with each index finger. In the joint condition two subjects lifted the bar ends each with one index finger. Haptic information about the co-actor was absent in this task. We found that the average rate of success was 41% in the solo condition and 11% in the joint condition. Over the course of trials performance improved equally fast for both conditions. Analysing the dynamics revealed that the lifting speed and balancing frequency were lower for unsuccessful trials in the joint condition than in the solo condition, otherwise the dynamics were similar. This suggests that joint coordination is impaired because visual information is processed more slowly than internally generated signals (which were absent in the joint condition).

P45**Do Simple and Selective Inhibition Use the Same Neural Mechanisms?**

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Participants performed on three different stop-signal tasks: a simple stop-all task (i.e., stop any response when the stop-signal occurs), a selective stop-signal task (i.e., stop to one stop signal but ignore the other stop signal), and a selective stop-response task (i.e., stop when stop signal and response to go signal correspond). Stop times increased from stop-all to stop-signal to stop-response requirements. Psychophysiological data showed no task differences for N200 amplitudes following stop signals, whilst N200 appeared earlier in simple stopping than selective stopping. P300 amplitude was larger for successful compared to failed inhibits in all three stopping tasks. However, greater amplitudes were found in the simple and selective-signal tasks, compared to the selective-response task. Premotor LRPs and Laplacians showed a substantial reduction on successful and partial inhibits compared to failed inhibits and go trials, in all stopping tasks. This pattern of results point to an inhibition system that operates stopping in the premotor cortex, with the inhibition-agent situated in the prefrontal cortex serving as the control system. Together, these data suggest that stopping responses in our design occurs at the cortical level, not more peripherally.

P46**Neural mechanisms for action understanding: MEG evidence for lower and higher levels of action representation**

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Recent research has demonstrated that cortical motor areas are engaged when observing motor actions of others. In the present study we investigated the sensitivity of induced motor activation to the correctness of the observed actions, using MEG. Subjects both executed and observed the execution of speeded button-presses following an instruction cue. Observation of left and right hand movements generated a fast (83ms onset) lateralized readiness field (LRF) over contralateral motor cortex, that was indifferent to the correctness of the action. Interestingly, time-frequency analysis of modulations in the Beta band (15-35 Hz) revealed clear differences between the processing of correct and incorrect actions in primary and dorsal premotor areas with a relatively late timing (450ms onset), as compared to the LRF. These findings suggest the operation of two separate processes: one fast and automatic process that provides a literal copy of the observed action, irrespective of the correctness of the behavior that is observed, followed by a higher level cognitive process that includes an evaluative component operating at a slower pace.

P47

Mu frequency bands in EEG reflect motor resonance while memorizing observed movements

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Many skills are learned by imitation of a teacher, a model, a sportsman, etc. Mu-activation (~8-15 Hz) in the EEG is thought to reflect motor cortex activation and has repeatedly been shown to be increased in active reaching or grabbing action observation, or finger movement observation. The central question addressed in this study concerns how this mu-activation develops with sequence learning by observation, and how these effects can be distinguished from well known alpha-activations. Fifteen participants (6 male, 9 female, mean age 20.5 y) first observed two index fingers pushing two target buttons in a fixed sequence. After this sequence, a pause followed. After 4 repetitions of this sequence observation, participants had to repeat the same sequential finger movement in the Learning Task (LT) and had to indicate whether a deviant movement had been made (i.e. with a thumb rather than an index finger) in the Detection Task (DT). Both alpha and mu power were decreased in the LT as compared to the DT. In the pause in the DT, alpha showed to be increased in comparison with the observation of movements. In contrast, in the pause in the LT, mu power showed to be decreased in comparison with the observation of movements. These data suggest that in observation in order to imitate the movement, the motor cortex is activated and may recruit the visual cortices in addition.

P48

Investigations of finger and hand representations in neurological patients

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Input from skin, muscle and joint receptors about the position of different parts of our body is used in a wide variety of tasks. Previous studies have suggested that different body representations exist and that their activation is task-dependent. A well-known distinction is that between body image and body schema, involved in conscious perceptual judgments and unconscious sensorimotor guidance respectively. This distinction is based mainly on a double dissociation between perceptual identification and sensorimotor guidance in patients with peripheral and central neurological damage (Paillard, 1999). In the present study we investigated task dependent effects in patients with hand and finger representation impairments after stroke. First we report a double dissociation between a pointing towards and perceptually identifying the location of a tactile stimulus in two patients with central nervous damage. Second we explore task dependent impairments of finger representations in patients with finger agnosia. The results are consistent with the idea of parallel processing for perception and action within the cortical somatosensory system (Dijkerman & De Haan, in press).

P49

Hyperactivity of the subcortical dopamine system in recreational cocaine users

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Chronic use of cocaine is known to impair the functioning of D2 receptors in prefrontal cortex, with negative consequences for cognitive control processes. Increasing evidence suggests that cognitive control is also affected in recreational cocaine consumers. This study aimed at linking these observations to dopaminergic malfunction by studying the spontaneous eyeblink rate (EBR), a marker of striatal dopaminergic functioning, in adult recreational users and a cocaine-free matched sample controlled for age, race, gender distribution, level of intelligence, and alcohol consumption. Results show that EBR is significantly higher in recreational users than in cocaine-free controls, suggesting that use of cocaine induces a hyperactivity of subcortical dopamine systems—presumably compensating for cortical hypoactivity.

P50

Brain regions involved in learning and application of reward rules in a two-deck gambling task.

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Decision-making involves the ability to choose between competing actions that are associated with uncertain benefits and penalties. The Iowa Gambling Task (IGT), which mimics real-life decision-making, involves learning a reward –punishment rule over multiple trials. It is thought that the ventromedial (VM) prefrontal (PFC) cortex is important for learning these rules, because patients with damage to VMPFC show deficits learning these rules. In this study, we used functional Magnetic Resonance Imaging to study the role of PFC regions involved in rule learning and rule application in healthy adults using an experimental version of the Iowa Gambling Task, the Leiden Gambling Task (LGT). Participants were asked to infer rules over 16 trials in a 2-deck card game. Reward was given on each trial and punishment was unpredictable. For half of the rules, those decks that gave high rewards were also the better decks, for the other half, those trials that gave low reward were the better decks. Behaviourally, participants started to differentiate between advantageous and disadvantageous trials after approximately 4-6 trials, and the learning occurred faster for decks where decks with high reward were the better choice. Lateral PFC (lat-PFC) cortex and pre-SMA/anterior cingulate cortex (ACC) were most active during rule learning, whereas VMPFC was most active during rule application. These results suggest that lat-PFC and pre-SMA/ACC are important when directing behaviour towards long-term goals, whereas VMPFC represents reward values.

P51

Dissociating performance evaluation and adaptation using event related potentials

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Monitoring performance and comparing internal goals with actual performance is critical for optimizing behavior and implementing appropriate performance adjustments. External feedback can provide information about previous actions, and in some cases may additionally provide information that can help guide future behavior. The present study attempts to separate neural processes responsible for evaluating information pertaining to past behavior from the processes that use such feedback information to guide future behavior. Subjects performed in a simple reaction-time task and received feedback consisting of bonus points for an on-time response and a penalty for a late or early response. In addition a cue at the start of each trial informed them of a potential extra reward or punishment (if any) on the subsequent trial. The valence of any future reinforcement (positive/negative) in the subsequent trial was dependent on performance in the current trial. In this way subjects can use reinforcements to evaluate their current performance, but only trials where an extra reward is promised in the following trial provide a context by which subjects can benefit from future adjustments in performance. Data on both response- and feedback-related neural activity will be discussed in the context of theories on adaptive control.

P52

Do you like me? A psychophysiological analysis of social feedback processing

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Given the importance of social encounters in human life, social rejection has been conceptualized as a potent social cue resulting in feelings of hurt. In this study, we measured phasic heart rate and skin conductance responses during the processing of faces communicating social rejection. Adults (18-25 years) performed a task adopted from Somerville et al. (2006), in which participants were presented with a neutral face of an unfamiliar peer on each trial, and were asked to answer the question 'Do you think this person would like you?'. Each judgement was followed by feedback where the participant learned whether he/she was accepted or rejected by the person on the picture. Preliminary findings revealed heart rate slowing to feedback communicating social rejection, in particular to incongruent feedback. This result points to the impact of social rejection on the autonomous nervous system and is consistent with recent notions suggesting that social rejection hurts.

P53

What happens with the Back-Sight of the Brain?

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Background and aims: Early cognitive functioning proved to be a strong and valid predictor for long term outcome after stroke. Moreover, subacute impairment in the visuoperceptual and constructional domain forms the strongest predictor for instrumental ADL (Nys et al. 2005). This remarkable since visuoperception and construction appeared to be the domain in which most recovery occurred. This means that, although the impairments tend to recover, the prognostic value continues. In clinical practise occipital stroke is thought of as favourable. However, longitudinal studies on the outcome of occipital stroke are lacking. Despite the seemingly prognostic importance, impairments in the higher order visuoperception and construction often go unnoticed. The aim of the current study is to: 1) prospectively study visuoperceptual impairments in subacute stroke patients admitted to the stroke unit, and 2) investigate long term outcome. Methods: 1) patients admitted to the stroke unit (age: 18-80 and MRS > 5) were tested in the subacute stage with a standardized testbattery specifically aimed at visuoperception and construction. 2) retrospective database research over the last 10 years by means of the Utrecht Stroke Database. Results: Results so far demonstrated that 16% of the included patients presented with an occipital stroke (5% bilateral). Only one third of these patients was able to be tested, whereas the feasibility in the patient group in general was 63%. All but one of the tested patients presented with higher order visual perceptual disturbances such as, metamorphopsia and visual agnosia, but none of these patients openly complaint about these impairments. Conclusions: Preliminary conclusions support the suggestion that higher order visuoperceptual and constructional impairment are far more frequent than currently thought of. Secondly, outcome of patients admitted to a stroke unit with an occipital stroke (unilateral and bilateral) appeared to be significantly worse as compared to the study population in general.

P54

Temporal colour perception in colour agnosia

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It has already been shown that patients with colour agnosia have problems with colour categorisation, colour naming, and (object-) colour knowledge, whereas they have normal colour perception. In this study, we investigated temporal colour perception in a man (MAH) with developmental colour agnosia. Participants were presented with carefully designed (equiluminant) coloured circles that would gradually change colour and had to indicate when they perceived a change in colour. Whereas for the control participants, these colour changes were always indicated within one colour category (e.g. slightly different shade of the same colour), MAH had severe problems doing this task. Not only did he 'perceive' the colour changes when the circles were presented in (almost)the opposite colour, but he also let the stimuli change colour through the starting position again, before responding. These results indicate that, although colour perception has been found to be unimpaired in colour agnosia, an impairment in temporal colour perception/judgements can be found.

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Neural Processes Underlying Colour-Graphemic Synaesthesia

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In colour-graphemic synaesthesia, perceiving numbers or letters induces vivid experiences of colours. In the present study, neural processes involved in colour-graphemic synaesthesia were investigated using EEG recordings. We developed a priming task and an oddball task, in which we presented letters and numbers evoking a synaesthetic experience. A priming effect was found with more positive brain activity between 400 and 600 ms in the incongruent condition compared to the congruent condition for both number-to-colour and colour-to-number priming. In the oddball task, physically coloured stimuli, compared to non-coloured stimuli, induced a larger N1 component within the control group and not within the group of synaesthetes. The results demonstrate that previously found priming effects are reflected in brain activity and evidence for bi-directionality of synaesthesia is extended. The difference between synaesthetes and controls for the N1 component in the oddball task implies possible involvement of early visual processes. This would be consistent with the claim that synaesthesia is purely perceptual, automatic and involuntary.

Validation of the Dutch Barratt Impulsivity Scale; Relations to Stop Signal Reaction Time and Use of Psychoactive Drugs.

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Impulsivity is an important trait in psychopathologies such as ADHD, OCD, mania and addiction. It is assessed using behavioral tasks as well as with questionnaires. A few years ago a Dutch translation of the IVE questionnaire has been validated, which includes an Impulsivity subscale. In this study we validated a translation of the Barratt Impulsivity Scale (BIS), which consists of separate Motor, Cognitive and Non-Planning scales. The translation was administered to 277 university students and 39 people from the general population. Factor Analysis of the items in first sample showed that all three factors could be represented with 22 of the 30 original items. Furthermore, the scores on the BIS correlated with the use of psychoactive substances such as alcohol, caffeine and nicotine. In the (smaller) sample from the general population motor impulsivity as scored by the BIS did not correlate with the number of commission errors on a CPT. The data will be discussed with reference to the multidimensionality of impulsivity.

What's in a Game: The Effect of Social Motivation on Interference Control in Boys with ADHD and Autism Spectrum Disorders

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Background: Children with Attention Deficit Hyperactivity Disorder (ADHD) and with autism spectrum disorders (ASD) are known to have cognitive control deficits. Some studies suggests that such deficits may be reduced when motivation is increased through tangible rewards. Whether these deficits can also be modulated by social motivators has hardly been studied. Methods: Therefore, the effect of social context on the ability to suppress irrelevant information elicited by either stimulus or response incongruency was investigated in 22 ADHD boys, 22 ASD boys, and 33 typically developing (TD) boys. An adapted Eriksen Flanker task was administered under a motivational condition in which the boys were told that they were competing with peers, and under a neutral condition in which standard instructions were given. Results: Boys with ADHD were impaired on all trial types compared to TD boys, while this was not the case for the ASD boys. The performance of both clinical groups was affected more by response competition than by interference at a stimulus level. In contrast, the performance of the TD boys was equally affected by stimulus and response interference. All groups benefited from social motivation. Although the boys with ADHD were still slower than TD boys in the game condition, they performed as accurately as TD boys when they were motivated. Children with ASD improved slightly in accuracy and response speed, but this did not reach significance. Conclusion: Children with ADHD are capable to exert sufficient cognitive control when they are (socially) motivated which is in line with the current models of ADHD. In contrast, children with ASD do apply more cognitive control when motivated, but this is insufficient to overcome their difficulties.

Practice makes the brain work better: A developmental training study

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Working memory, which is associated with recruitment of the lateral prefrontal cortex, is important for learning new information. It is not yet known how the maturation of this function is influenced by maturation (age) of neural circuitry on the one hand and by practice on the other hand. In a behavioral study we showed that practice is important for the maturation of working memory skills in 7-10 year olds: these children improve their working memory skills over the course of a 6-week training period. To further study age and practice effects, we will train working memory functions in children of 8-25 years old over a period of 6 weeks. Age effects on brain structure will be assessed with MRI. fMRI and behavioral measurements will be used to study both age and practice effects on brain activation and behavior during working memory performance. With this study we expect to improve our understanding of the potential of a child's developing brain. This will have consequences for our expectations of children's learning potential across school-aged development.

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The developmental pattern of stimulus and response interference in a Stroop task: an ERP study

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ERPs were employed to investigate the temporal course and development of stimulus and response interference (SI; RI) in a color-object version of the two-choice button-press Stroop-task (de Houwer, 2003). Twenty-one adults and fifty-four children, allocated to one of three age groups (6-7, 8-9, 10-12 year-olds), participated. Behavioral results showed no effect of SI. Regarding RI, children were more susceptible to errors than adults. Reaction time results showed RI in every group, but no developmental differences. Interestingly, ERPs showed effects of SI in the youngest groups but not in older children and adults, whereas the reverse was true for RI. More specifically, SI evoked (1) N2 modulation at central and posterior sites only in 6-7 year-olds; (2) a negativity (440-660 ms) in 6-7 and 8-9 year-olds that was more widely distributed in the youngest children. RI evoked (1) a posterior negativity (440-540 ms) in 10-12 year-olds and adults; (2) a prolonged positivity (660-920 ms) in 8-9 year-olds, 10-12 year-olds, and adults. In all of these groups, it was distributed over central sites. In 8-9 year-olds and adults it also spread over posterior sites. The effect was present at frontal sites only in adults. The implications of these results will be discussed.

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Neurocognitive development of imitation inhibition: an fMRI study

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Whereas the ability to imitate has an early onset in life, the ability to inhibit imitative actions has a much slower developmental trajectory. Thus, with age children learn to exert voluntary control on which actions to inhibit. In this study, we used fMRI to study the neurocognitive development of imitation inhibition relative to cognitive inhibition in children aged 8-12 ($n = 16$ mean age, 12,9) and adults aged 18-25 ($n=20$, mean age 20,5). Participants performed two tasks in the scanner (1) an imitation inhibition task adapted from Brass et al. (2000) and (2) a Simon task. For the Simon task, children were slower in performance than adults and showed protracted development of the right inferior frontal gyrus (BA 47) and anterior cingulate cortex (BA 32). For the imitation inhibition task, no differences were found between age groups in performance but children did show a deviant pattern of activation relative to adults in the anterior fronto-median cortex (BA10) and Broca's area (BA44). Thus, concurrent with earlier findings, children have difficulties with cognitive inhibition. They, however, show adult levels of imitation inhibition performance even though there are still differences at brain level related to perspective taking and automatic imitation tendency.

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Infants' knowledge about objects: the case of action semantics

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Infants' knowledge about object use has been studied frequently during the last decade. However, these studies mainly concentrated on infants' categorization of objects (e.g., Elsner, in press) or the influence of action effects (e.g. Hauf, Elsner, & Aschersleben, 2004). According to the concept of action semantics (van Elk, van Schie, Lindemann, & Bekkering, in press), conceptual knowledge about object use can be differentiated in terms of action goals and action means. The present studies investigate the development of infants' functional object knowledge by means of a visual anticipation task. Experiment 1 examined infants' understanding of everyday objects. Infants watched a person bringing objects either to the correct or incorrect goal location (e.g., a cup to the mouth or to the ear). It could be shown, that from 8 months on infants anticipated the correct goals of everyday objects. Experiment 2 investigated infants' capability to acquire the action semantics of yet unknown objects by presenting complex tool use actions with varying mean-goal combinations. Preliminary analyses indicate that after observing the actions a few times, infants as young as 12 months anticipated the goals of these tool use actions on the basis of grip cues.

Neural correlates of Reward anticipation and Outcome processing through adolescence.

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Recent fMRI studies have reported both underactive (Björk et al., 2004) and overactive (Galvan et al., 2006) motivational circuitry related to reward processing in adolescents. In this study, we used fMRI to examine developmental changes in the neural correlates of reward anticipation and outcome processing using the slot machine paradigm (Donkers et al., 2005). In this task, three pictures appear consecutively and participants are instructed that they gain € 0,05 when all three pictures are identical. This design allowed us to study brain activity associated with anticipation and processing of monetary rewards that are not contingent on previous choices or actions. To understand developmental transitions in reward processing, we included three age groups: early adolescents aged 10-12, middle adolescents aged 14-15, and late adolescents aged 18-23. As expected, insula and nucleus accumbens activation was related to reward anticipation in all age groups, but more so in 10-12 year-olds than older participants. In contrast, reward omission resulted in lateral OFC activation, but only in 18-23 year-olds. Taken together these results indicate that: 1) different brain circuitry underlies reward anticipation and outcome processing, 2) reward anticipation develops relatively early - before age 14-15 -, and 3) outcome processing develops after age 14-15.

Development of Trust and Trustworthiness in Adolescence

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Adolescence is characterized as a developmental period in which social interactions changes in focus and in which brain maturation allows for more advanced decision-making and social interaction. During this period children spent more time with their peers and relations become more collaborative in nature. In this study, we developed a developmentally appropriate version of the Trust Game (Gambetta, 1998; Malhotra, 2004), called the Children's Trust Game, targeted at different processes involved in trusting and repaying trust (reciprocity) in 4 age groups ranging from 9-25 years. By manipulating the possible outcome alternatives, we could distinguish between two processes that are important for trust and reciprocity, the risk for the trustor and the benefit for the trustee. The results demonstrated an increase of risk-sensitivity and benefit-sensitivity with age, but these developmental changes had different time courses, with benefit-sensitivity developing latest. These findings support the hypothesis that there are several processes involved in trust and trustworthiness, some of which only emerge in middle or late adolescence. The results are interpreted vis-à-vis developmental theories on perspective-taking and neurobiological models of social interaction.

Development of Colour-, Shape-, and Object Concepts in Children between 3 and 7 Years Old

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The ability to perceive and know about colours, shapes and objects is important in daily life. Colours and shapes play an essential role in recognizing objects (e.g. redness of tomatoes and shape of keys). Knowledge of colours, shapes and objects is stored in our brain as concepts. Children begin to form these concepts during their first year of life and they generally acquire concrete concepts (e.g. objects) before developing knowledge about abstract concepts (e.g. colour, shape). The current study investigated the development of conceptual knowledge (abstract versus concrete) in children between three and seven years of age. A distinction is made between different levels (perception, naming and associations) of colour, shape, and object knowledge. These levels are measured with a diverse set of tasks that consisted of fluency tasks, naming tasks, verbal association tasks and pictorial association tasks. In general, our results indicate that children's acquisition of shape concepts is relatively late compared to both colour and object concepts. Children's performance on all shape tasks appeared to be worse in comparison to the colour and object tasks. Our finding of a relative delay in the shape acquisition extends existing evidence for the late obtainment of colour concepts.

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Automatic Quantity Processing in 5-Year Olds

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In this study adults performed numerical and physical size judgments on a symbolic (Arabic numerals) and a non-symbolic (groups of dots) size congruity task to investigate whether a size congruity effect (SCE) could be obtained irrespective of notation. Subsequently, 5 year old children performed the physical size judgment task on symbolic and non-symbolic stimuli to investigate whether their inability to process numbers automatically (Girelli et al. 2000; Rubinsten et al. 2002) is related to limited mathematical ability. Adult performance on the symbolic and non-symbolic size congruity tasks revealed a SCE for both number and size judgment tasks, indicating that the non-symbolic size congruity task is a valid indicator for non-symbolic numerosity processing. In contrast, physical size judgments both in symbolic and non-symbolic notations by children revealed a SCE only for non-symbolic notation. The results suggest that in contrast to symbolic notation, 5 year old children can process quantities presented in non-symbolic notation automatically.

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Coding Strategies in Number Space

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The present study investigates the impact of task demands on the association of spatial and numerical response codes (SNARC effect). Participants were instructed to memorize three simultaneously presented Arabic digits describing a left-to-right ascending number sequence, a descending sequence or a disordered sequence. Afterwards participants indicated the parity status of a centrally presented digit. As the response latencies showed, SNARC effects in the parity task were mediated by the coding requirements of memory tasks. That is, SNARC effects were only present after memorizing ascending or disordered number sequences but disappeared after processing descending sequences. Interestingly, the impact of the memory task was only present if all sequences within one experimental block had the same type of order. Our findings are inconsistent with the notion of an automatic activation of the 'mental number line' and suggest rather that spatial strategies might be responsible for the cognitive link between numbers and space.

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A diffusion model analysis of the worst performance rule

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The worst performance rule (WPR) states that slower RT's correlate stronger with IQ scores than faster RT's. The central question of this study is whether the WPR can be found in a two-choice RT task and whether the WPR effect can be explained by Ratcliff's diffusion model. This model uses RT distributions to estimate latent processes such as the quality of information extraction, response caution, and non-decision time (e.g., time for encoding and response processes). In a two-choice RT experiment with 45 high-school students, no evidence for the WPR was found. However, a diffusion model analysis showed that high IQ participants have a higher drift-rate, which indicates that they are better at extracting stimulus-information than are low IQ participants. Also, high IQ participants have a lower boundary separation, which indicates that high IQ participants use a more liberal response threshold. Finally, the diffusion model analysis showed that high IQ participants were slower in the RT component that reflects the non-decision time, which also explains the absence of the WPR. We conclude that a diffusion model analysis yields a detailed account of IQ-related differences that is considerably more informative than the traditional analysis.

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Testing the Validity of the Expectancy-Valence Model for the Iowa Gambling Task

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In order to examine real-life decision making deficits in a laboratory context, Damasio and Bechara developed the Iowa Gambling Task (IGT). In the IGT, participants have to repeatedly choose a card from one of four decks; each choice leads to wins and losses, and participants have to discover through trial and error which decks are profitable and which are not. Choice behavior in the IGT is often analyzed using the Expectancy-Valence model (Busemeyer & Stout, 2002). The EV model allows one to identify and measure three latent psychological processes that are

assumed to underlie performance in the IGT: response consistency, memory for previous outcomes, and attention to wins versus losses. Each latent process is associated with a single parameter in the EV model. We investigated the validity of the EV-model through a test of parameter specificity. Three manipulations were designed to separately affect each of the three EV parameters, and the results are contrasted with those from a control condition. Preliminary analyses show that the experimental manipulations selectively influenced the parameters of the EV-model. This result attests to the validity of the EV-model.

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The heart has its reasons: Exploring the role of the heart during an intuitive decision making process

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According to Damasio, decision making is at least partly directed by unconscious processes, involving signals from skin, gut, and heart. We used an artificial grammar task with trial by trial decisions and feedback to explore the relation between intuitive decision making and interoception (sensitivity to one's own physiology), as measured by ability to sense one's own heartbeat. In addition we related real-time heartbeat-to-heartbeat intervals during stimulus presentation to correctness of the decision. Participants (60, 40 f, 20 m) also filled out an intuition questionnaire. Twenty (9 women) participants were classified as heartbeat detectors. Despite higher sensitivity to their own heartbeats, detectors did not differ significantly from non-detectors on the artificial grammar task nor on the intuition questionnaire. Interestingly, explorative analyses showed that 'detectors' agreed significantly more strongly with contra-indicative intuition statements like 'I believe my success is determined by how well I carry out procedures', suggesting a relationship between feeling your heartbeat and strategies for keeping fear in check. Heartbeat measurements during the implicit learning task suggest that an option is more likely to be chosen when the inter-heartbeat interval following that particular stimulus-option is shorter than the inter-heartbeat interval during which the stimulus is presented, indicating a relation between a specific heartrate response to the stimulus-option and the ensuing decision.