Cognitive development

1. Full title
Cognitive development

2. Research group
Developmental Psychology
Program director: Richard Ridderinkhof

3. Members of the group

Senior staff
Eveline Crone, Birte Forstmann, Hilde Huizenga, Brenda Jansen, Marija Maric, Maurits van der Molen, Saskia van der Oord, Annemie Ploeger, Pier Prins, Maartje Raijmakers, Richard Ridderinkhof, Elske Salemink, Patrick Snellings, Ingmar Visser, Reinout Wiers, Wery van den Wildenberg

Postdoctoral fellows
Mike Cohen, Bernd Figner, Thomas Gladwin, Caroline Junge, Helle Larsen, Juliette Liber, Dorothy Mandell, Tessa van Schijndel

PhD’s

4. Membership Research School and other Research Institutes
Nearly all staff members participate in the Experimental Psychology Graduate School (EPOS), the Interuniversitary Graduate School for Psychometrics and Sociometrics (IOPS), or in the Research School of Experimental Psychopathology (EPP). The staff has close ties with the Cognitive Science Center Amsterdam (CSCA) of the University of Amsterdam.

5. Research topics
The major focus of the UvA-DP program is on normal and deviant cognitive development. The research program on normal development covers the entire
life-span: from infants and toddlers to the elementary school age to adolescence to senescence). The program on deviant development also covers much of the life-span, but focuses on a limited set of strongholds (detailed below).

**Normal Development.** This program has a three-fold focus.

- One cluster of related topics capitalizes on learning, decision-making, and cognitive control (including category learning, value-based decision-learning, risky decision-making, and the planning, selection, inhibition, and flexible coordination of action). This cluster is studied across the life span, in relation to neural maturation and deterioration.

- Another cluster of topics centers on the development of school and pre-school capabilities. This cluster studies fundamental mechanisms of cognitive development (prominently including language and mathematical abilities) as well as educational ramifications (prominently including the training and monitoring of such skills, and science learning).

- The program is traditionally characterized by a strong emphasis on methodological innovation that innervates the analysis approach entertained in the other clusters. Sophisticated methods are developed for the analysis of data arising in developmental psychology (including analysis of time series, reaction-time distributions, latent variables, EEG/fMRI data), and mathematical modeling of theories of neurocognitive development.

**Deviant Development.** Assessment and intervention present two separate yet essentially integrated outlooks. While converging on largely the same clusters of abilities, with similar methodological accents, as the normal development program, some domains are accentuated:

- One domain is addiction, centering on adolescence, and capitalizing on the balance between impulsive (implicit) versus control (executive) processes. Assessment focuses on the etiology of dysfunction in these (and related) processes, and on the prediction of substance abuse and addictive behaviors. Novel interventions (such as re-training) are developed aiming to directly influence these processes, with promising results, in patients as well as young heavy drinkers.

- Additional domains of deviant development related to the cluster of decision-making and cognitive control are biological psychopathology (mild to severe retardation; autism spectrum disorder), and neuropsychiatric disorders among elderly (in particular Parkinson’s disease).

- We focus on moderators and mediators of psychological interventions for children and adolescents with externalizing and internalizing problems, linking treatment outcome research with basic developmental psychopathology models to examine mechanisms of change. For instance, potential moderators are psychopathic traits and co-morbidity in aggressive boys, and working memory and reinforcement in ADHD. Innovative interventions are developed
for ADHD, using computer- and internet technology, to improve executive functions.

- A final domain pertains to the cluster of school-age capabilities (in particular reading- and other learning disabilities). Methodological innovations specific to deviant development include small-sample (including $N=1$) analysis, novel (neuro)psychological assessments, and techniques to assess treatment effectiveness.

**Transversal and translational perspectives.** A number of prominent perspectives, cutting across normal and deviant development, distinguish UvA-DP from other DP departments.
- Rather than focusing on social or emotional development per se, UvA-DP studies environmental, social, affective, and motivational modulations of cognitive development across its subprograms. This allows us to maintain a coherent focus yet include (structurally or incidentally) those variables that prove indispensible for a deeper appreciation of the processes and mechanisms of normal and deviant cognitive development.
- UvA-DP is well-renowned, within NL and internationally, for its pioneering work and long-standing traditions involving a strong focus on a) the relation between cognitive development and brain maturation; b) the theoretical, mathematical/computational, and statistical modeling of (neuro)cognitive development; and c) the development and application of innovative techniques for the statistical analysis of behavioral, neuropsychological, and neural developmental data.
- Across its normal/deviant subprograms, and across its experimental and analytical approaches, UvA-DP engages individual-differences techniques as starting points for analysis beyond traditional group analyses. Inter-individual variability *within* age/clinical groups, explored using various types of covariance-based and latent-class analyses, provides a basis for a deeper understanding of the nature of cognitive (dys)function, and allows a richer articulation of how and why individuals differ in the efficiency and maturation of these functions.
- Rooted firmly in our long-standing experimental approach, UvA-DP increasingly endeavors to combine its efforts in fundamental research efforts with practice-oriented work. As prominent examples, we develop science-education programs for very young children, and we train science/practitioners at PhD level to put clinical developmental research on a more solid footing.

6. Program Development
• We have focused on two broad but unified clusters of cognitive development (outlined above). This allowed for a coherent research program with abundant cross-links. We have recruited staff to complement and adequately balance UvA-DP’s competencies. Methodological and brain maturation perspectives are increasingly integrated with these clusters, cutting across age groups and normal and deviant development, which further enhances their relevance for the discipline. The number of publications has undergone a dramatic rise since 2010, and this rise has been consolidated in 2012.

• Our paradigmatic approach is largely embedded in the broad theoretical framework of decision-making and cognitive control. We have consolidated our outlook on cognitive development vis-à-vis brain maturation during childhood, adolescence and aging; our expertise for developmental neuroimaging research; and the societal exposure of our efforts in developmental cognitive neuroscience.

• We have consolidated our deviant development research, in terms of volume, funding, and scientific impact. This research program benefits from intensified collaboration with, a.o., de Bascule (one of the largest NL institutions in this field), and from intensified networks for research into the neurocognitive bases of Parkinson’s disease.

• Transversal perspectives, described above and so characteristic for UvA-DP, have been and will be amplified further, with special emphasis on the much-needed training of science/practitioners at the PhD level (in 2012: 2 staff members, 3 PhD-students), on the development of algorithms for informed clinical decisions during treatment/interventions, and on science education in the national Platform Betatechniek, to bridge the gap between the academy and applied clinical work. Our transversal focus on methods in development and on the development of methods has been and will be strengthened further through the recent acquisition of a VICI grant (Huizenga).
7. Composition of research input of academic staff in 2012

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<th>wp2</th>
<th>wp3</th>
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<td>Full professors (HL)</td>
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<td>Associate professors (UHD)</td>
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<td>Assistant professors (UD)</td>
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<td>Ph.D. students (AIO)</td>
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RESEARCH OUTPUT

1. Academic publications

1.a. Refereed articles


and Experimental Psychiatry, 43(1), 638-646.


Kleibeuker, S.W., Dreu, C.K.W. de & Crone, E.A. (2012). The development of


1.b. Non-refereed articles

1.c. Books


1.d. Book Chapters


1.e. Conference Papers.

1.f. Reports

2. Ph.D. Thesis
2.a. Internally prepared

2.b. Externally prepared

2.c. Doctorates at other faculties/universities, co-supervised by program members

3. Professional Publications

4. Publications aimed at the general public


Ridderinkhof, K.R. (31-08-2012). Doelbewust of op de automatische piloot. ADHD1 Nieuws en Evenementen


5. Other results

5.a Book editors

5.b Journal editorships

5.c Inaugural lectures


5.d Prizes


5.e Organisation of conferences and symposia


5.f Research grants
Forstmann, B.U. (2012). The project “Speeded Decision-Making in the Basal Ganglia: An Integrative Model- Based Approach" was awarded a five-year €1,500,000 Starting Grant from the European Research Council.
Forstmann, B.U. (2012). The project “When the Brain Takes a Break: A Model-Based Cognitive Neuroscience Account of Task-Unrelated Thoughts" was awarded a five–year € 800,000 “Vidi" grant from the Netherlands Organisation for Scientific Research (NWO).

5.g Keynote speeches at conferences
Organisatievaardigheden bij Adolescenten met ADHD. Veldhoven, Congres van de Vereniging van Gedrags en Cognitive Therapie.


Snellings, P. (2012, november 08). Should the tortoise become a hare? The importance of fluent reading for poor readers. Amsterdam, Scientific conference The halting reader past the finish (“De aarzelende lezer over de streep”) of the Dutch reading society (Stichting Lezen).