

## Dr Arie Nouwen

Senior Lecturer in Clinical Psychology

### School of Psychology

#### Contact details

**Telephone** +44 (0)121 41 47203

**Email** [a.nouwen@bham.ac.uk](mailto:a.nouwen@bham.ac.uk)

University of Birmingham  
Edgbaston  
Birmingham  
B15 2TT  
UK



#### About

Dr Nouwen's main research interests focus on two areas: the motivational processes underlying dietary self-care in people with diabetes, and the Centre for Obesity Research. Dr Nouwen uses both applied clinical and social as well as experimental laboratory paradigms. He is Associate Editor of Diabetic Medicine and Consulting Editor of Health Psychology.

#### Qualifications

- Masters in Clinical psychology (Vrije Universiteit, Amsterdam)
- Ph.D. (Vrije Universiteit, Amsterdam, Netherlands)

#### Postgraduate supervision

##### Current students

###### PhD

- Margaret Amankwah-Poku, research topic: Dietary self-care and distress in people with type 2 diabetes: Role of rational and irrational beliefs

###### Clinical Doctorate

- Isabella Caramlau, research topic: Incidence, prevalence and risk factors for perinatal depression in women with gestational diabetes
- Tracey Jansen: research topic: Anxiety and gestational diabetes: prevalence and risk factors
- Aimee Poote: Early maladaptive cognitive schemas as predictors of depression in people with diabetes mellitus

###### MRes

- Jennifer Walsh: research topic: Depression and diabetes: is BDNF the missing link?

#### Research

##### **The motivational processes underlying dietary self-care in people with diabetes**

Of particular interest is how physiological, behavioural and socio-cognitive factors interrelate in their contribution to these motivational processes and play a role in long-term adaptation to the condition not only in terms of diabetes control and self-care activities but also in terms of maintaining adequate quality of life and well being. In particular, I am interested in the effects of living with type 2 diabetes on brain responses to food stimuli specifically in areas associated with motivation and emotion. This research is carried out in collaboration with Prof. Niels Birbaumer and Dr. Hubert Preissl at the The Institute of Medical Psychology and Behavioral Neurobiology, Tuebingen, Germany.

##### **Responsiveness to food cues in adolescents with type 2 diabetes**

Current Grants: EFSD - 2010-2012

Researchers: Arie Nouwen, Jackie Blissett, Timothy Barrett, Suzanne Higgs, Harriet Allen

Research Fellow: Dr Magda Chechacz

##### **Aim**

The first aim of the study is to measure food responsiveness in obese adolescents with and without type 2 diabetes and compare these responses to those of lean adolescents. The second aim is to assess the relationship between food reactivity and fMRI responses in brain regions of interest to elucidate the underlying neural mechanisms of such eating behaviour.

##### **Methodology**

Experimental psychological approaches will be used to measure eating behaviour in response to food cues in the three groups of interest (obese adolescents with type 2 diabetes, obese adolescents without type 2 diabetes, and lean adolescents). Children's responses to standard behavioural tasks concerning food selection and eating in the absence of hunger will be assessed. These experimental methods will be supplemented with questionnaire measures relating to parental feeding practices and parents' own eating behaviour, to determine how food responsiveness is moderated or mediated by children's experiences of food restriction at home. Assessing children's own perceptions and parental perceptions of their children's quality of life will also allow us to examine the potential impact of different dietary regimes and difficulties with adhering to those regimes, on the children's functional impairment as a result of their diabetes. Finally, functional Magnetic Resonance Imaging (fMRI) will be used to assess the underlying neural mechanisms of food reactivity and how these responses might be affected by parental control of food intake, adherence to dietary regime and medication type.

The use of fMRI, behavioural and questionnaire measures in a within subject design is unique. This approach will give us a unique understanding of the relationships



between the neural, social and behavioural aspects of food intake and dietary management in adolescents with type 2 diabetes. The project will also enable us to investigate the dietary predictors and correlates of quality of life in both groups of obese adolescents and diabetic control in those with type 2 diabetes. We will also be testing interactions of medical (effect of medication), behavioural (dietary self-care behaviours), developmental (age) and psychosocial (beliefs and social interactions with parents) aspects of food-related stimuli on blood glucose control. The added value of this interdisciplinary work is that the potential outcome of this research is a better understanding of the interactions between social and neural predictors of positive dietary behaviours, which may guide recommendations for best practice for dietary interventions in adolescent obesity and diabetes. Beneficiaries include children and adolescents with type 2 diabetes, children and adolescents who are obese without diabetes, their carers, medical and health professionals involved in the care of children and adolescents who are obese and who have diabetes.

### Facilities

The School of Psychology is one of the largest and most active psychology departments in Britain, with an excellent reputation for teaching and research. We gained a grade of 5\* in the 2001 Research Assessment Exercise (RAE) and ranked third in the UK in the 2008 RAE. We have regular meetings to allow students to present work in progress and discuss journal articles. The researchers on this project combine internationally recognised expertise in child eating behaviour (Dr. Jackie Blissett), motivational processes and dietary self-care in diabetes (Dr. Arie Nouwen), cognitive control of eating behaviour (Dr. Suzanne Higgs), paediatric endocrinology (Dr. Timothy Barrett) and functional MRI analysis (Dr. Harriet Allen). Adolescents will be recruited to the studies via already established links with local School and the Diabetes Clinic of the Birmingham Children's Hospital.

The School is housed in two buildings at the centre of the campus: Frankland and Hills. Specialist research laboratories are located in the Frankland building including psychophysiology, food and nutritional psychology, physiological psychology and child development. Facilities for research into eating behaviour include a fully equipped kitchen (supporting by a trained food handler) and laboratory space for experimental testing of participants. The School is also a major partner in the recently opened Birmingham University Imaging Centre (BUIC), which houses a research-based 3T fMRI scanner.

Post-graduate students currently researching in this area under Dr Nouwen's supervision:

- Nasser Alsaikh - Implicit and explicit associations with food stimuli in adolescents with type 1 diabetes
- Margaret Amankwah-Poku - Dietary self-care and distress in people with type 2 diabetes: Role of rational and irrational beliefs
- Victoria Queralt - Dietary self-care and distress in young people with type 1 diabetes

### Centre for Obesity Research - 2010

#### Does flexible eating patterns in patients with type 1 diabetes change cortical activation in brain regions associated with motivation and emotion?

Researchers: Arie Nouwen, Parth Narendran, Suzanne Higgs, Andrew Bagshaw

#### Aims and hypothesis

The aims of our study are: (1) to investigate whether people with type 1 diabetes (T1DM) who are prescribed a traditional insulin regime would show larger neural Blood Oxygenation Level Dependant (BOLD) responses to food-related stimuli in brain regions known to be involved in learnt food sensory motivation and in diet-related emotionality than control participants without diabetes; (2) to examine whether Dose Adjustment for Normal Eating (DAFNE) training will lead to changes in behavioural control that are reflected in changes in the BOLD response.

We hypothesise that (1) Adults with T1DM show a larger BOLD response to food-related stimuli than do adults without diabetes; (2) DAFNE (offering flexibility of lifestyle with insulin intake adjusted to suit food timing and choices) would reverse these changes in the BOLD signal compared to people with T1DM who do not self-adjust their insulin levels to their eating habits.

#### Design

To examine the first hypothesis, brain responses to food pictures of people with T1DM will be compared cross-sectionally to those of controls without diabetes. To test the second hypothesis, a 2 x 2 (groups x time points) repeated measures design will be used.

#### Population

Participants include adults with T1DM who follow a traditional insulin regimen and age- and weight matched control participants (adults without diabetes).

#### Depression in chronic illness

Recent literature has demonstrated that major depressive disorder (MDD) is at least twice as prevalent among people with diabetes as compared to the general population, has a higher recurrence rate and is associated with poorer self-care and metabolic control and a three-fold increased risk of diabetes-related complications, including heart disease and stroke. However, incidence levels (number of new cases) are substantially lower. To date, the underlying mechanisms whether biological, genetic or behavioural, are unknown. To further enhance our understanding of the demographic, bio-medical, psychosocial/behavioural and socio-cultural factors involved in the development, maintenance and recurrence rates of depression in diabetes, Dr. Frank Snoek (Vrije Universiteit, Amsterdam) and I have taken the initiative to found a pan European Depression in Diabetes (EDID) research group under the auspices of the Psychosocial Work Group of the European Association for the Study of Diabetes (EASD). currently, there are EDID research groups in the Netherlands, Germany, Slovenia, Croatia, and the UK. Within this European context, the EDID-UK study group plays a leading role.

Post-graduate students currently researching in this area under Dr Nouwen's supervision :

- Isabela Caramlau - Prevalence and risk factors of postnatal depression in women with gestational diabetes
- Tracey Jansen: research topic: Anxiety and gestational diabetes: prevalence and risk factors
- Aimee Poote: Early maladaptive cognitive schemas as predictors of depression in people with diabetes mellitus
- Jennifer Walsh: research topic: Depression and diabetes: is BDNF the missing link?

### Publications

Nouwen, A., Ford, T., Balan, A.T., Twisk, J., Ruggiero, L., & White, D. (in press). Longitudinal motivational predictors of dietary self-care and diabetes control in adults with newly diagnosed type 2 diabetes mellitus. *Health Psychology*.

Austin S, Senécal C, Guay F, Nouwen A. (2011). **Effects of gender, age, and diabetes duration on dietary self-care in adolescents with type 1 diabetes: A Self-Determination Theory perspective.** *Journal of Health Psychology*. 2011 Mar 23.

Richard, S., Dionne, C.E., & Nouwen, A. (2011). Self-efficacy and health locus of control: relationship to occupational disability among workers with back pain. *Journal of Occupational Rehabilitation*. Jan 29.

Nouwen, A., Nefs, G., Caramlau, I., Connock, M., Winkley, K., Lloyd, C.E., Peyrot, M., & Pouwer, F. (2011). The prevalence of depression in persons with impaired glucose metabolism or undiagnosed diabetes: a systematic review and meta-analysis of the European Depression in Diabetes (EDID) research consortium. *Diabetes Care*, 34, 752-762.

Booth, D.A., & Nouwen, A. (2010). Satiety – no way to slim. *Appetite*, 55, 718-721.

Nouwen, A., Winkley, K., Twisk, J., Lloyd, C.E., Peyrot, M., Ismail, K., & Pouwer, F. (2010). Type 2 diabetes mellitus as a risk factor for the onset of depression: a



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Closa-Leon, T, Nouwen, A. & Sheffield D. (2007). Social support and individual variability in patterns of hemodynamic reactivity and recovery. *Psychology and Health*, 22, 472-492.

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