The Interaction between Implicit and Explicit Strategies for Behaviour

Research Programme Psychology 2014-2019

Faculty of Psychology and Educational Sciences

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Part 1. Review of the institute and its research programme

1. *Brief description of the faculty, its vision, mission and objective(s), and its research activities*

In its earlier form the Faculty of Psychology existed since 2000. It was founded in 1985 as a "knowledge domain in the social sciences". Due to changes in the university's mission the former Faculty of Psychology developed a research programme in 2010, which was reviewed positively by two independent reviewers (Van Hezewijk & OU, 2010). Since January 1st 2014 the research programme is one of the (two) research programmes of the new **Faculty of Psychology and Educational Sciences**. This faculty develops and provides an academic education and courses in psychology (BSC, MSC) and educational science (MSc), collaborating with relevant partners, using a wide range of distance teaching methods for approximately 6000 students. On a yearly basis the volume of courses is 15000. The Faculty is a forerunner in the innovation of digital methods used for teaching psychology, and has an explicit mission in the innovation of higher education, focusing on technology enhanced learning and teaching. The Faculty's earlier psychology programme gained the E-xcellence certificate of the European Association of Distance Teaching Universities. In teaching the Faculty was judged to offer the best education according to its students, compared to the evaluation of students of other universities psychology programmes. The Faculty provides for a Bachelor of Science in Psychology, four specializations in the Master of Science Psychology, a Master of Science in Educational Sciences, and a preparatory programme for students converting from Higher Vocational Education (HBO) to the master programmes.

Until 2008, the mission of The Open University of the Netherlands has been distance teaching and innovation of (distance) teaching. This included the former Faculty of Psychology, and now is an important part of the new faculty's mission. It has been the former and new faculty's policy to stimulate research activities of its members. Consequently, before 2010, on an individual basis, research activities were relatively strong, although supported with few means and low available research capacity.

The institute's primary mission is to provide flexible, open, activating, academic teaching in psychology and educational sciences, primarily but not exclusively online, "blending" with synchronous teaching where necessary and/or possible. The research mission has only recently (2008) been added as far as psychology is concerned, and still is secondary to teaching (that is, 20% - 30% of the fte of academic staff). Research activities will be expanded in the future, in line with an agreement with the Ministry of Education, Culture and Science (Prestatieafspraken). Research is taking place in two research programmes. One of the research programmes is focussed on Learning and Teaching in Technology Enhanced Environments, the other one –

presented in this document – focuses on The Interaction between Implicit and Explicit Strategies for Behaviour.

The interaction between teaching and research is obligatory and self-evident for a university. Therefore the objectives are to emphasize and concentrate on research that is related to the four specializations in master teaching (psychology of psychopathology, health psychology, work and organisation psychology, and life span psychology) as well as a basic research theme focusing on the foundations of (the interaction between) implicit and explicit behavioural strategies. A relatively large number of research activities take place together with (master) students. Publishing in collaboration with students is stimulated and appreciated. Thesis themes are strongly related to research themes (and vice versa), and are redefined if necessary.

The aim of the faculty's research programme is to increase insight in the way implicit (or tacit) strategies for behaviour interact with explicit strategies and vice versa. We seldom are aware of all the relevant stimuli for and determinants of our behaviour. Conditions for behaviour may be recent (a stimulus received from a digital display or traffic event), social (rules, etiquette, life style), may go back to early youth, or even have an evolutionary background, without being aware of them. It is our shared presumption that in several, if not all, fields of psychology the interaction between explicit and implicit "causes" is essential in the explanation of (strategies for) behaviour.

A recent addition to the programme with a professorship in Antrozoology (0.2 fte, funded by AAIZOO) enhances the programme and brings in many opportunities for PhD research as well as strengthening the relevance of the programme. The chair of Antrozoology in a psychology faculty is unique in the world, and offers great opportunities for the growth of knowledge in the interaction between implicit and explicit strategies for human behaviour in their environment. Often "environment" has been interpreted as the physical and static environment, or as the strictly human environment. However, more than 60% of the households in modern societies have a pet, and much of human well-being seems at least supported by having and interacting with a pet.

2. *Reflection on the quality (academic reputation, quality of the PhD-training, financial and human resources and research facilities, organisation and internal processes, leadership, national and international positioning)*

The research committee realized the research programme after having several discussions with all members of the academic staff. The Dean has final responsibility. The research committee consists of Dean and Professors of the Faculty, and three to four senior staff members changing every two years.

Many of the academic researchers in the Faculty of Psychology and Educational Sciences, in past and present, had and have excellent academic reputations. There

are editorial memberships, there is participation in review procedures of international journals, there was and is mobility to and from other psychological research programs of universities, there is exchange with research institutes, there are board memberships, etc. For many subsequent years individual members of the academic staff had a remarkable high output in quantity and quality. Many of the individual members of the academic staff annually published one or two, sometimes even more, peer reviewed, international papers, often working together with other researchers inside and outside the university.

In the present phase of building and implementing the programme, output is, again, high, considering the relatively small amount of time available (one day a week for a full time appointment).

The PhD-training has developed into a mature supporting programme, the *Graduate School*[1]. The *Dean* of the Graduate School for the period of 1-9-2010 till 1-9-2014 is a member of the present programme. The Graduate School specializes in structuring the support of internal and external PhD students. The training programs of the PhD students of the psychology programme have been planned thoroughly.

Nationally and internationally the theme of the present program is unique, because the focus is on the *interaction* between implicit and explicit strategies for behaviour. The potential population for research is unique, as well. In contrast to what is usually the case in universities with students in their early adulthood, students of the Open University of the Netherlands are aged from 18 to 80, and geographically much more diffused than usual, often having a job, being in full career. Moreover, the different teaching method, using digital means of communication in distance teaching, offers the opportunity to focus on innovative methods and instruments of research. For instance, the *Virtual Laboratory* and the use of smartphone-like facilities (ESM or Experience Sampling Methods) offer great opportunities for alternative ways of studying strategies of behaviour, that – moreover – provide for converging evidence.

Resources since 2007 have increased. All Professors, Senior Associate Professors and Associate Professors in the programme have a PhD and are active in research. Currently, Psychology has an Academic staff of around 44 fte (an increase of about 10 fte in the last 10 years). Further, time for research for all academic staff has increased from 20% to 30% in 2014. Moreover, from only a few PhD candidates in 2007, Psychology now has around 35 PhD candidates, of which 10 are internal PhD candidates (9 AIO's, 1 internal employee). And 25 are external PhD candidates.

3. *A reflection on the productivity (publications, output) and productivity policy*

Productivity (publications per research fte) is high, taking into account the relatively low available research time (20-30% of staff time). An increase in quality can now be

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[1] The *Open Graduate School* started its activities 1 September 2010

observed. The policy of the Faculty is to require at least three peer reviewed publications in five years per 0.2 fte. (3 peer reviewed articles per fte per annum). Until now, no obligations in terms of rankings and impact score journals have been issued. If it is possible to take into account the different research traditions united in this programme, a next step will be to stimulate publishing in high grade journals. Conference visits are stimulated although there are budget restrictions.

4. *A reflection on the relevance (in research, in society, and with respect to valorisation)*

   The leadership of the programme as well as the research committee considers the programme highly relevant, in terms of research focus as well as in terms of relevance for society. The interaction between implicit and explicit strategies for behaviour has haunted psychology ever since William James (1890) pointed out that this was a major problem (although the problem was formulated in different words during psychology's history). In daily life implicit strategies for and causes of behaviour are more often the rule than an exception, and most people are unaware of their determining effects.
   In health psychology, organisational and work psychology, in clinical psychology, valorisation is obvious, in life span psychology the focus on, e.g., coaching is chosen with an eye on relevance and valorisation.

5. *A reflection on the vitality and feasibility, and vision for the future (based on the positioning and benchmarking, and our analysis of the strengths and weaknesses: strategy for future years, competitive strength, robustness and stability; earning capacity).*

   The research programme has several strengths:
   - The programme has both a strong theoretical foundation, focussing on a fundamental psychological problem, as well as research rooted in strong multidisciplinary practices.
   - The strength and expertise of the educational identity (distance learning university using online multimedia education) provides exceptional research opportunities that are independent of time and place (e.g. research using virtual research laboratories) using innovative multimedia options.
   - The student population (working professionals) facilitates access to relevant and diverse research populations. Our expertise in training and educating divergent categories of students makes the programme very accessible and suitable for external PhD-students who can combine their scientific research with work in relevant practice settings.
   - The academic staff involved in research is highly qualified (100% doctorates), ambitious and enthusiastic, having different psychological educational backgrounds, work in close collaboration with each other, as well as with other universities, NGO's and research institutes, resulting in a considerable number of high quality innovative, and theoretical as well as applied publications.

- Researchers of the programme use sophisticated research methods (e.g. ESM, online testing), resulting in relevant, innovative and state of the art research results.

Several weaknesses are apparent:
- There is limited time (20-30% research time in scientific staff), staff and resources available to realise our research plans. Research facilities have only recently become more available. Options for research incentives are very limited. The programme is highly ambitious given the constraints in resources.
- Although the broad educational background of the staff is beneficial for multi perspective research, it also entails a risk for fragmentation and limited convergence in the programme when the power of the programme to concentrate or focus fails.
- Research areas in the programme still differ in their degree of articulation and implementation. Although this provides opportunities for transfer of good practices between research areas, further attention is needed to prevent differences becoming larger.
- Compared to other Dutch Psychology departments the research history and expansion of the programme still is limited; clearly, the programme is developing in the right direction.

There are several opportunities and threats that the programme can encounter in the years to come. The vitality of the programme depends on two main factors. One is the relevance and fruitfulness of its *content*, the other is the motivation and capacity of the *human resources* needed to fulfil its aims and ambitions. Qua content the programme is strong and has great opportunities for fruitful research and relevant results. Qua human resources the programme can be considered to be small. Although the ambitions and enthusiasm of the staff are very high, the reward structure for success in the Open University is open for improvement. Moreover, the capacity for research activities is a risk, as it is dependent on the volume of students and courses sold, while meanwhile options for funded research have become increasingly difficult. However, it is our strong conviction that interesting and successful research stimulates the interest of potential students and researchers, especially when the interlacing of teaching and research remains our focus as it is now.
Therefore the strategy for the future is:
- To reinforce the competitive strength by improving quality of publications and quantity of funded research (stream 2),
- To make the programme more robust by increasing the capacity available via research funding and expanding the number of students (using digital means to process large numbers)
- To expand available time for research, and optimally make use of the increased research facilities made available by the university.
- To enhance stability by integrating with the Graduate School and cooperating with related research in the programmes in the present faculty (e.g. Welten Intitute), the university and other university's psychology programmes.

Part 2. Description of the programme, its objective(s) and its research activities

1. Objectives and research area

MISSION
The mission of the programme is to study the *interaction between explicit and implicit strategies for behaviour* in some of the key fields of human behaviour. In psychology we observe a discrepancy between explicit explanations (and consequent interventions) that persons have, with their own reasons, plans, strategies, regulations etc., versus explanations (and consequent interventions) that suppose humans to have no insight in motives, causes, strategies for behaviour. This might reflect theoretical gaps or controversies in psychology; it might also reflect a fundamental feature of human beings, leading to complementary or conflicting sources for behaviour regulation. More specifically, the programme aims to address (1) which explicit and implicit strategies for behaviour people use across a diversity of situations, (2) how people deal with the interaction between the explicit and implicit action strategies involved, (3) how much room there is for change of behaviour strategies in the diversity of situations that people come across, and (4) how human environments can be (re)designed to resolve discrepancies if necessary.

OBJECTIVES
Started in 2010, the programme now is growing to maturity. The output is substantial, there is convergence toward its main themes, and the quality of research output as well as funding increases every year. Quantitatively speaking, in the past most individual members of staff have contributed substantially to the department's research output. This period, the department aims at three international publications per research-fte per year. It will concentrate on a small number of research themes.

RESEARCH AREAS
The programme is designed to stimulate research in concordance with the aims of the Open University's agreements on research (prestatieafspraken), the domain specific focus of psychology in the world, the needs of society and its members, and the expertise in the department's teaching programme:
- Nature and culture: evolution and development of implicit and explicit behaviour strategies, especially in partner selection and the consequences of aging
- Health psychology, especially prevention and coping with (chronic) disease
- Clinical psychology, especially early detection, prevention, and treatment of severe psychological problems, including e-mental health applications
- Work and organisational psychology, especially the employee adaptation at work
- Lifespan psychology, especially revision and change of implicit strategies in professional and personal development towards self-development and well-being.

2. Composition

STARTING DATE AND COMPOSITION OF THE PROGRAMME
The present programme started in 2010, two years after the moment the Open University's research mission changed from innovation oriented, educational research to basic and applied research as conducted at the other, regular Dutch universities, that is, at January 1, 2008. To a limited degree this was accompanied by a change in financial support of the Open University. Although the staff of the psychology department had been doing research on an individual basis (cf publications 2002-2009), the importance of joining forces in a coherent programme is clear.
The result of the first years period of programme development was a programme ready to be evaluated by an external party, and considered to offer a valuable contribution to the growth of psychological knowledge in the areas mentioned above and discussed in following sections. The current version of the programme provides an update of the research programme, which can be considered as the guiding programme for the period 2014-2019.

MANAGEMENT
Prof. dr. R. van Hezewijk (dean)
Prof. dr. L. Lechner (research coordinator)
and the Research Committee
        Prof. dr. Karen van Dam
        Dr. N. Jacobs
        Prof. dr. Jacques van Lankveld
        Dr. Aart Mudde
        Dr. Peter Verboon

National and international position
At present several faculty members are affiliated with national research schools. The national situation concerning research schools, however, is no longer uniform. Some schools are local, some are national; some only support cooperation in PhD training, other have programmatic aims. Accordingly, the faculty has no policy regarding research school participation in psychology, and will not fund research schools. Therefore only some members of the present programme are affiliated with national research schools, according to their need or wish to use the opportunities offered by a research school, if present.

Depending on the topic, relevant cooperation partners for research teams of the faculty's research programme have been or will be established. Some are involved in research, others will be invited when relevant for the research theme of a team. Members of the programme lead or participate in Editorial Committees and Editorial Boards of international journals, Scientific Boards etc.
The faculty participates in the ethical committee of OUNL. The chair of the ethical committee is a member of the present programme. The Dean of the Graduate School is a member of our programme. A member of the programme participates in the university's committee for research integrity and data management.

3. Research Programme

CONTEXT OF THE PROGRAMME
Psychology offers a vast number of perspectives on persons as, on the one hand, the apparent "victims" of a necessity or urge to automatically act in a certain way; and on the other hand as persons capable of wilful, self-determined action – as the apparent "suspect" of his behaviour. Psychologists may point out how much of human behaviour complies with implicit – or automatic, unconscious, involuntary, unintentional – rules. Nevertheless, the profession has prospered thanks to counselling, advice, and other kinds of intervention in personal affairs as well as organisational contexts, parasitizing on the alleged intentionality of our actions. Moreover, most people will report strong convictions about the conscious decisions they made to act in certain ways. In sum, the paradox is that human behaviour is law-like yet volitional (e.g. G. Gigerenzer, 2008b; G Gigerenzer, Fiedler, & Olsson, 2012; G. Gigerenzer, Hertwig, & Pachur, 2011; G. Gigerenzer, Hoffrage, & Goldstein, 2008; Kahneman, Slovic, & Tversky, 1982; R. M. Ryan & Deci, 2004; Todd & Gigerenzer, 2012; Tversky & Kahneman, 1973, 1974; Wegner, 2002).

One way to deal with the paradox is to discard one of both views and retreat to the commitment of one of them, leading to the controversies of the discipline. In the history of psychology, we have seen many examples, the most significant of which where the research programmes of behaviourism and of phenomenological psychology. Another way to deal with the paradox is to suppose neither is wrong and to find out where and when these views are fruitful and how the supposed mechanisms interlace. Depending on background, context, level of analysis or domain the (self-)determination could be a matter of degree. Rules can contradict or reinforce each other, so there can be tension, indifference, mutual support, and reinforcement between implicit and explicit strategies for behaviour (Evans & Frankish, 2009; Strack & Deutsch, 2004).

The paradox, and the way it often is dealt with in psychology, can be confusing for professionals focussing on sustainable interventions. On an abstract level, the fields of interest mentioned above offer instances of domains of behaviour in which the questions emerge that need to be answered: How do human beings adapt their behaviour in specific situations, how can behaviour change be evoked, and in what way can human environments be (re)designed to promote change. For instance, some people constantly feel the tension between (explicit) advice to eat low fat food and to engage in frequent physical activity on the one hand, and the (implicit, perhaps innate) urge for gathering high-calorie resources and saving energy. Mutual reinforcement can be found in tying up the implicit strategy for competition with the (explicit) advice to exercise bodily motion, i.e. by introducing sports matches in school.

Whether much of our behaviour is automatic or not, daily experience suggests that there is always room for intentions and interventions. We intend to walk the dog in a minute or two; we decide to stop smoking (in a year or two). However, daily experience is not sufficient as evidence. In the present programme, we want to examine how explicit and implicit strategies relate, how they are experienced and how they may help or impede the improvement of *la condition humaine.*

THEORETICAL FRAMEWORK

Niko Tinbergen expressed the basic interest in the subject of the present programme very well: "*Because we human beings like to believe that our own behavior is entirely guided by insight or knowledge … –a widespread fallacy due to overestimation of reason – the spectacle of behavior going wrong impresses and puzzles us.*" (Tinbergen, 1952, p. p. 1)

In psychology, and with regard to the present programme, the terms implicit-explicit were chosen after ample discussion and considerations. Reber (1989, p. 219) already observed that *"the term implicit learning was first used to characterize how one develops intuitive knowledge about the underlying structure of a complex stimulus environment (Reber, 1965, 1967). In those early writings, [Reber] argued that implicit learning is characterized by two critical features: (a) It is an unconscious process and (b) it yields abstract knowledge. Implicit knowledge results from the induction of an abstract representation of the structure that the stimulus environment displays, and this knowledge is acquired in the absence of conscious, reflective strategies to learn (p. 219). …The kinds of operations identified under the rubric of implicit learning represent the epistemic core of intuition. Intuitions are those processes that have emerged in the studies of implicit acquisition of complex knowledge. Perhaps the most compelling aspect of intuition, and the one most often cited in the various definitions that have been given … is that the individual has a sense of what is right or wrong, a sense of what is the appropriate or inappropriate response to make in a given set of circumstances, but is largely ignorant of the reasons for that mental state*" (p.232).

Greenwald and Banaji, discussing implicit social cognition suggest that (1995, pp. 4-5) *"the terms implicit-explicit capture a set of overlapping distinctions that are sometimes labelled as unaware-aware, unconscious-conscious, intuitive-analytic, direct-indirect, procedural-declarative, and automatic-controlled. These dichotomies vary in the amount and nature of implied theoretical interpretation. … The signature of implicit cognition is that traces of past experience affect some performance, even though the influential earlier experience is not remembered in the usual sense – that is, it is unavailable to self-report or introspection".*

Together with the *"standard heuristic in evolutionary biology that older primitive systems are more robust and resistant to insult than are newer, more complex systems [and] "that the implicit cognitive processes are the functional components of [...]evolutionarily older, primitive system[s] that [...] show greater resistance than [...] explicit processes*" (Arthur S. Reber, 1989, p. 232) it can be predicted that these unremembered implicit processes and explicit processes have complex interrelations.

In the present programme, the implicit-explicit terminology is used because of the fruitfulness in bringing together several perspectives on strategies humans apply in regulating their behaviour, and because of the flexibility with which the terms can be applied in different aggregation levels. Researchers make use of the above-mentioned theoretical notions and concepts, as well as other theories that are relevant to improve the explanations of behaviour regulation in the contexts of health, psychopathology, adaptability, and learning. They apply various psychological methods (experimental and quasi-experimental designs as well as survey designs, observation studies or theoretical analyses) to test the effectiveness of hypotheses and interventions, in order to help understand and define the

relation between implicit and explicit behaviour strategies. Quoting Greenwald and Banji again, there is explicit awareness that "[t]*o the extent that implicit cognition differs from self-reportable (conscious or explicit) cognition, direct measures – that is, measures that presume accurate introspection – are necessarily inadequate for its study. Rather, investigations of implicit cognition require indirect measures, which neither inform the subject of what is being assessed nor request self-report concerning it. [...] When used ... to minimize reactivity, indirect measures are empirically desirable but not theoretically essential. By contrast, in studying implicit cognition, indirect measures are theoretically essential.*" (Greenwald & Banaji, 1995, p. 5).

Thus, for a first approximation, we consider a certain strategy for behaviour as *explicit* when the subject (the actor) can produce or understand in one way or another his/her strategy as text, as a rule that has been or can be expressed in his/her own words. A strategy is *implicit* when it is shown to influence a person's action without the person being able to express the rule, or even to report that there is a rule regulating behaviour (that is, without the help of reading about it in a scientific analysis).
The programme focuses on applications of psychological knowledge in a number of areas, including health, psychopathology, social and lifespan psychology, as well as tries to find the "deeper" foundations of (the interaction between) explicit and implicit strategies and regulations of behaviour. Provisionally, for the sake of clarity, the following characterization is used: an implicit strategy, cognition, rule, attitude, memory etc. is the "... *introspectively unidentified, unidentifiable, or inaccurately identified trace of past experience"* [or evolution] that mediates or determines actions (categories of responses such as judgments, decisions, actual behaviour) (Greenwald & Banaji, 1995, p. 5).

A *strategy* to regulate behaviour is a set of rules an individual uses to act, that is, to continue or change his/her own behaviour. Rules can be implicit (or explicit) as personal rules or social rules (i.e. in organisations, ad hoc groups) or even rules that characterize behaviour of a species (i.c. the human species). In this sense, aggregation levels are involved. The perspectives from which we view human behaviour may be broader than usual in psychology. We explicitly are interested in the view of human behaviour and its regulation in light of its evolution[2].

The research programme for the next five years focuses on the *interaction between explicit and implicit behaviour regulation and strategies of behaviour*. The hard core of the programme is:
- Behaviour is initiated and regulated by implicit and explicit strategies for action

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[2] To prevent misunderstanding: whenever in the programme we speak of "strategy" (or "strategies") what we imply is "strategy for behaviour"; when appropriate we will use the phrase "intervention strategy" when we intend to mean a programme of policies by political, therapeutic, or other institutions to stimulate or change behaviour. Thus, an "explicit strategy to regulate health related behaviour" is a set of rules an individual uses to change his/her own behaviour. An "intervention strategy to regulate health related behaviour" is a policy an institution has to change the environment in order to reduce illness and improve general health (e.g. by changing one of the important determinants of health, income and social status, in relevant groups). Although the use of "implicit" in combination with "strategy" may sound strange for some psychologists, we nevertheless persevere in using strategy for any guideline for behaviour, implicit or explicit. The life sciences abound with this use of "strategy", even for organisms as diverse as ants and viruses.

- A strategy is a determination of *and* choice between alternative actions that an individual usually takes in certain situations. An implicit strategy is a strategy that one is not aware of; an explicit strategy is a strategy that one is aware of.
- Implicit and explicit strategies can overlap and contradict or enhance each other
- When explicit strategies are chosen that conflict with alternative implicit strategies this creates tension
- Implicit and explicit strategies can reinforce each other, and therefore enhance opportunities to attain explicit goals, or impede opportunities to attain explicit goals
- Implicit and explicit strategies can be observed on several aggregation levels: intrapersonal, interpersonal, group, organisation, biological (i.e. species level there by feeding forward to intrapersonal level)
  - If strategies are observed to be on the interpersonal, group or organisational level they are to be observed as implicit or explicit strategies (or rules) in two or more persons at the intrapersonal level[3]
- Implicit strategies of behaviour may
  - have phylogenetic origins and thus be the result of innate causes
  - have ontogenetic origins and thus be the result of learning, habits, conditioning, etc.
  - be the product of the interaction with the environment
  - be the result of the interaction with other persons (with the same implicit or explicit behaviour strategies)
  - have implicit functions on personal, social and biological levels
- Explicit strategies of behaviour
  - are the result of rational considerations
  - or are prescribed courses of actions based on rules or regulations, laws etc.
  - or are based on accepted external advise, counselling, evidence etc.
  - or are educated guesses and evidence based prescriptions
  - or have explicit aims on personal or group levels
  - or result from education and pedagogical measures

  and have implicit functions on personal, social and biological levels
- Strategies can be explicit for one person and implicit for another person
- Strategies can be explicit at one time and (become) implicit at another time (e.g. habits)

RELEVANCE OF THE PROGRAMME

The present programme was designed to contribute to the solution of the paradox sketched above. At present, in psychology we see approaches suggesting humans are rational beings that explicitly decide to behave in a certain way, based on explicit plans, intentions, reasons and other cognitive elements. Perhaps this is the most fruitful approach *in certain areas of human action*. We also see approaches that point out (often experimentally) how inadequate humans are in planning their behaviour and acting accordingly, in knowing the causes or motives for their behaviour (and why they did *not* comply with their own intentions). With our studies we want to suggest that to a certain degree the paradox can be solved, for

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[3] What this means is that implicit and explicit strategies for behaviour can emerge or have emerged in a group such that the members of the group all follow them when in the presence (virtual or real) of members of the group ($\geq$ 2), and not outside the group (Douglas, 1999).

instance by taking into account the context and the nature (first or second nature, for instance) of the behaviour needed or wanted. This might help professionals and researchers to deal with the apparent paradox discussed above.

More concretely, we aim to study the relation between explicit and implicit strategies for behaviour for a number of relevant research fields. The fields reflect urgent matters in daily life: sex, health, work, psychopathology, well-being. For every field of interest research is directed by a number of basic questions that conclude every of the subsections now to be discussed briefly[4].

Evolutionary and cultural foundations of behaviour[5]
A research programme focusing on explicit and implicit behaviour strategies and the interaction between them is aided by a focus on evolutionary foundations of behaviour. As any other species, humans are, after all, the product of a long evolutionary history. The results of this phylogenetic process is a set of adaptive, but mostly implicit behaviour strategies and predispositions, anchored in the genes waiting for environmental cues to come to an expression that matches the environmental demands.

During ontogeny these predispositions are transformed into specific dispositions as we interact with our environment. With regard to human behaviour, these dispositions can be described as strategies for behaviour, both on a biological and a psychological level. That is, some Evolutionary Stable Strategies on the phylogenetic level result, because of tuning during ontogeny, in behaviour strategies that result in higher probabilities of survival on an individual level. Because of this, the tuning of human behaviour has become more and more flexible, enabling regulation of behaviour in widely differing circumstances, that evolutionary speaking are often "unforeseen". Especially social interactions are the dynamic aspects of human environments and development, resulting in what often is called "culture" (Voestermans & Verheggen, 2013).

Our research in this field has a twofold focus. We explore, first, the four biological "why's" Niko Tinbergen formulated that biologists use to explain animal behaviour (Tinbergen, 1952). However, we try to formulate a (more) general model of human behaviour that is grounded in his theory, and expand it to allow for the emergence of socially tuned behaviour to be able to ask about the *interaction* between implicit and explicit strategies for behaviour. This facilitates, secondly, focusing on the explanation of behaviour in some of the most important areas of life. The areas are the biological, social and cultural aspects of sexual behaviour, prevention in health related issues, the continuity view of psychopathological symptoms in issues of mental health, explicit and implicit guides in work and organisations, and the lifestyle that lead to habits, routines and implicit normativity we may like to change (but did not succeed in yet). We try to discern explicit and implicit strategies that people use in these areas. Our aim is to have the approaches mutually capitalize on each other, with the theoretical approach plotting possible courses for research and the empirical work being a critical check on the theoretical work. A good illustration is provided by sexual behaviour

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[4] In the supplement every field is discussed in details, and provided with all the relevant references.
[5] For more details, see the supplement.

(Bartelet, Waterink, & van Hooren, 2014). On the one hand, there seems to be a very strong and obvious relation with the biological function of sex; on the other hand, human beings have explored a diversity of cultural expressions of the biological foundation of sex. Especially in the second half of life (as projected), this leads to interesting interactions, if not tensions. This demands for more attention, not only because of the proportional increase of the ageing population.

With respect to *evolutionary and cultural foundations of behaviour* the questions addressed here are:

- What "sources" for implicit and explicit strategies are there? For instance, how do implicit, biologically originating strategies in partner selection interact with cultural, sometimes more explicit, norms for behaviour in the relation between the sexes? How do implicit, biologically originating strategies in social relations take shape in human-animal interaction?
- Depending on their "sources", how do implicit and explicit strategies affect each other? More precisely for sexual behaviour: how do implicit drives, and explicit and implicit social norms for court making relate to each other? Can the second ones be deduced form the first? Do the second ones stimulate the first? Do explicit norms derive or develop from implicit "consensual coordination"?
- How do implicit behaviour strategies formed during ontogeny relate to "older" strategies acquired during evolution? Focused on sexual behaviour: are the strategies involved in (e.g.) jealousy "old" or "new". Are they first or second nature?
- Can implicit and explicit strategies complement each other in behavioural change interventions, and if so, how? Especially: how can explicit cultural, social, dyadic, or individual norms be consolidated by exploiting "older" (implicit) rules?

Health[6]

A second field of studies concerns health promotion and the primary prevention of illness, secondary prevention by improving health behaviour leading to early detection of health problems, tertiary prevention in coping with disease and promoting recovery, and patient education and communication. In most theories in health psychology, so-called determinants play a role. Determinants are all those factors that influence health. We consider implicit and explicit strategies to be special cases of determinants. Obviously, intervention strategies often aim at shifting a person's attention to a more explicit orientation on health related behaviour. In our approach, we focus on the role of both explicit and implicit strategies and – more generally -- on determinants (and the interaction between them) related to behaviour with an intended or non-intended effect on health. This includes strategies that for the person involved are apparently not related to health issues, yet do affect health in the short or long run.

For the explanation of behaviour and behaviour change we, firstly, focus on testing theories emphasizing explicit strategies, and comparing and combining them with theories emphasizing implicit strategies. However, we also study how these strategies actually or potentially interact with each other and with other non-psychological determinants. As far as health behaviour is age related or phase dependent, we consider for each phase how determinants, especially implicit and explicit strategies, vary. Note that some implicit strategy can aim at or function at quite another domain of behaviour than it has effect. For instance starting to smoke can be part of the implicit strategy of gaining popularity in the group of one's peers, whereas it eventually has effects on health that are unknown or are implicitly taken for granted. Especially in health communication, the results of the cognitive approach based on planning and intentions, is at the limits of explanatory power. Much behaviour

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[6] For more details, see the supplement.

remains to be explored that is only indirectly related to health in their functions and intentions (and therefore are cognitively implicit) while they do affect health directly, or in the long run. While making aware how one's implicit strategies (such as habits) are thought to be effective, another approach using non-cognitive strategies might be fruitful. The approaches can vary between changing administrative and general reward systems, and changing implicit associations.

One of the intervention methods often used recently is tailored advice by computer. Especially the recent opportunities for online and synchronic intervention and research using smartphones are promising in bridging the gap between accessibility and mobility. Another approach combining implicit and explicit strategies is entertainment-education (or "edutainment") and "serious gaming".

In conclusion, in *health psychology*, especially where primary, secondary and tertiary prevention are concerned, the following general questions are addressed that provide sufficient guidance for future research and, at the same time, offers continuation with past performance:

- o Which determinants, especially implicit and/or explicit strategies for behaviour, are associated with health related behaviour? In addition, are these strategies and their mechanisms different or the same across the continuum of health related behaviour?
- o To what extent are these implicit and/or explicit strategies associated with health related behaviour modifiable? Do they reflect "that older primitive systems are more robust and resistant to insult than are newer, more complex systems" (Arthur S. Reber, 1989, p. 232)?
- o To what extent are interventions effective in modifying implicit and/or explicit strategies associated with health related behaviour?

Mental Health[7]

Research in the field of clinical psychology is gradually shifting from a purely categorical syndrome-oriented approach to a dimensional, and even more specific, symptom-oriented approach (e.g. Bentall, 2004). Traditionally, psychopathological symptoms have been considered as features of "mental illness", which are either present or absent. The dichotomy is inherent in former categorical diagnostic systems, such as DSM-IV and ICD-10. The change in focus is clearly reflected in the shift towards a dimensional view of psychopathology in DSM-5 (2013). The recently developed symptom-oriented approach has the advantage that it offers a way to investigate the clinical concept without accepting the traditional Kraepelinian model. Evidence increases that psychiatric symptoms are not only present in individuals diagnosed with a psychiatric disorder, but also occur in a significant proportion of individuals from the general population. These individuals display symptoms that are quantitatively, but not qualitatively, different from symptoms displayed by individuals diagnosed with a psychiatric disorder. Symptoms of a psychiatric disorder are now seen as lying on a continuum with normal functioning. Over the last two decades, this approach has facilitated greater theoretical understanding of the implicit psychological mechanisms associated with psychopathology.

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[7] For more details, see the supplement.

Much of the research oriented at psychopathological behaviour now investigates the implicit and explicit behaviour strategies in samples of the general population by using the symptom-oriented approach. The 'normal', subclinical, and clinical levels of symptomatology differ primarily in severity and amount of life interference. However, the risk profiles for subclinical and clinical symptoms are similar. Therefore, it is suggested that implicit psychological mechanisms underlying the clinical disorder may also operate in subclinical manifestations. Consistent with both the symptom-oriented approach and the distance-based strategies for teaching and learning that are central to the educational model of the Open University, the development and validation of distance-based *interventions* for psychopathological conditions is an important focus in our research into mental health. The E-Mental Health focus is pursued in both prevention and treatment approaches, and may consist of exclusive online contact, blended types including online and face-to-face contact, and fully-automatized programs. We are developing and validating innovative interventions (e.g., internet-based cognitive bias modification) that are unparallelled in existing face-to-face interventions, and also adapt existing interventions for online application. Another line of investigation addresses the use of virtual reality methodology in the treatment of psychopathology.

Investigating symptoms in individuals who do not meet the criteria for a clinical disorder is an attractive approach to elucidate the underlying mechanisms of risk. As it has been suggested that individuals with subclinical symptoms are at increased risk of making the transition to a diagnosable disorder, attention is given to early detection and intervention in order to prevent individuals from making transitions from non-clinical to clinical states. We find it important to understand what actually causes individuals on some position at the continuum to become a clinical 'case'. From a mental health point of view, investigating individuals at a lower level of the continuum is advantageous as it avoids potential confounds inherent to clinical patients, such as institutionalisation and side effects of medication (Claridge, 1994). In addition, since the prevalence of subclinical symptoms is much higher than the prevalence of the clinical disorder, it is easier to discover variability in subtle processes underlying the phenotype of the clinical disorder. Although the study of psychopathological mechanisms in healthy and subclinical individuals continues to be important, investigation of clinical groups has become more important and is more viable due to the increased collaboration with clinical research partners.

In conclusion, in the field of *clinical psychology* we aim to study the implications of the relation between implicit and explicit strategies for behaviour. By considering psychopathology no longer as a dichotomous, but rather as a continuous variable, a fruitful approach has developed. Given this perspective the discrepancy between explicit and implicit strategies not only is manifest (voices 'in the head' governing behaviour versus explicit assignments of the cognitive-behavioural therapists) but also subject to different interpretations of client, therapist and social environment. Questions addressed are:

- o What are the implicit and/or explicit strategies for behaviour associated with psychopathology?
- o To what extent are these implicit and/or explicit strategies associated with (subclinical) psychopathological behaviour modifiable? Do they reflect "that older

primitive systems are more robust and resistant to insult than are newer, more complex systems" (Arthur S. Reber, 1989, p. 232)?

o   To what extent are therapies effective in modifying implicit and/or explicit strategies associated with psychopathology?

Dynamic work contexts[8]

Work & Organisational psychology is the study of people and their behaviour, cognitions, emotions, and motivation at work. Nowadays, most organisations operate in dynamic, competitive, and/or uncertain environments and therefore need to be flexible and adaptive in order to survive. As a consequence, todays' employees are facing dynamic work contexts that are defined by continuous change and uncertainty. This implies new requirements regarding employee adaptation, on the explicit and implicit level. Especially in dynamic work contexts, employee learning, proactive adaptation, motivation, well-being, and career management are important issues to be addressed in research.

In line with the positive psychology framework that focuses on conditions and processes contributing to optimal functioning (Seligman & Csikszentmihalyi, 2000), our research program emphasizes the positive side of change. Previous research on change has generally stressed negative aspects of change, such as employee resistance to the change, increased turnover intention, and possible detrimental effects of change for employee well-being. While recognizing that change can have negative effects, the present research program takes a positive stance. Given that change is an ever-present feature of organisational life, the program sets out to investigate the explicit and implicit factors and processes contributing to positive outcomes of change, such as learning, motivation, effective emotion regulation, sustainable careers, and well-being. As such, the program aims to contribute to the new and rapidly developing field of positive organisational behaviour that is defined as "the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today's workplace" (Luthans, 2002, p. 698). This field emphasizes that individual characteristics and work context aspects can facilitate - explicitly or implicitly – important positive outcomes, such as learning, adaptation and well-being.

Recognizing the importance of ever-changing and uncertain work environments for employee behaviour and well-being, we focus on five topics:

(i)   Adaptation, emotion regulation & well-being
(ii)   Adapting the work environment
(iii)   Change, workplace learning & reflection
(iv)   Motivation and goals in dynamic organisations
(v)   Sustainable employability & adaptive career management

Despite the prevalence of uncertainty, change and innovation at work, researchers have only started to address employee adaptation. Integrating different fields, Van Dam (2013) has

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[8] For more details see supplement.

developed a model for individual adaptability at work that emphasizes the importance of employees' cognitive, affective, and behavioural resources. Different explicit and implicit processes might relate these resources to employee adaptation, behaviour, and well-being. For instance, how employees regulate their emotions, either explicitly or implicitly, might determine how they respond to change and how the change affects their well-being.

Adaptation to the work situation involves more than merely adjustments of the person: it can also involve adjustment of the work environment. Employees can either adapt their own work situation (i.e., job crafting), or try to adjust the work situation of their colleagues, for instance intervening in case of workplace bullying. Research on employees' efforts to adapt the work situation is still scarce; therefore one line of research probes into the explicit and implicit processes underlying employees' self-initiated changes to the work situation.

Very few studies have considered the role of employee learning during organisational change. Yet, change is often related to learning processes, for instance when the change involves task restructuring requiring new competencies. In this case, employees can engage in explicit learning activities such as training or reflection, or can learn more implicitly, through workplace learning. Organisational change might increase employees' implicit learning opportunities and as such counterbalance possible negative effects of change.

Motivating employees is especially important in dynamic work contexts. An important framework that has guided motivation research relates to goals. The goals employees are trying to obtain at work are considered crucial for energizing, directing, and guiding behavior in achievement situations (DeShon & Gillespie, 2005). Goals can affect motivation and behavior both explicitly, through goal setting or leadership, and more implicitly, through the effect of subconscious goals, work climate, or personal goal orientations. More insight is needed in the explicit and implicit strategies involved in goal striving.

Given the costs involved in baby-boom retirement and early drop-out, sustainable employability has become an important issue. Sustainable employability refers to a workforce that participates in work in a healthy, motivated and competent way until retirement. Effective adaptation is considered a prerequisite for sustainable employability, implying that employees should develop personal entrepreneurship and proactively manage their careers. More research is needed on the explicit and implicit processes involved in sustainable employability and adaptive career management.

Common themes of these research topics are: 1) employees' (adaptive) behaviour is guided by psychological processes and factors that are present in both the individual and the (work) context; (2) these psychological factors and processes are partly explicit (i.e. conscious, and controlled) and partly implicit (i.e. subconscious and automatic); (3) how employees face a changing and uncertain (work) environment has important consequences for their personal well-being (health, job satisfaction), development, motivation, performance and careers, and for the prosperity of the work group, the organisation, and society at large; (4) accordingly, more insight is needed in the explicit and implicit strategies involved in employee adaptation to dynamic work contexts.

Some of the questions adressed are:

- o Which explicit and implicit strategies are important for employee adaptation to changing and uncertain work contexts, and how will these affect effective adaptation (e.g., well-being, performance)?
- o Which explicit and implicit (personal and organisational) factors and processes are involved in employees' efforts to adapt (e.g., craft) the work environment?
- o Which explicit and implicit strategies are involved in workplace learning in dynamic work contexts, and how do these relate to learning outcomes and well-being?
- o How can organisations support employee motivation and goals; which explicit and implicit strategies can they use?
- o Which explicit and implicit (personal and organisational) factors are involved in sustainable employability, and adaptive career management?

Large-scale surveys, laboratory experiments, diary studies, and scenario studies are used to investigate these questions.

Lifespan Psychology

Human development is central to the field of lifespan psychology, referring to the qualitative and/or quantitative changes that reveal themselves during the lifespan. Human development is conceived as a dynamic system – a perpetually ongoing process, extending from conception to death, which is moulded by a complex network of biological, psychological and social forces (Lerner, Leonard, Fay, & Isaac, 2011).

As insight in the strategies individuals implicitly and/or explicitly select to regulate their behaviour is a crucial element in understanding human development, research of a number of faculty staff members is focused at examining

a) the implicit and explicit strategies individuals draw on to deal with determinants of human development that express themselves during the lifespan.

Each life period is associated with changes in major developmental domains such as the physical, neurological, physiological, cognitive and the affective/social domain, influencing the further course of life (Berk, 2014). Change in one domain is likely to be associated with changes in other domains of development. These biological, psychological and social forces can exert their influences in various ways: they can be subtle, gradual or impose themselves in a direct and brutal way. Individuals have to cope with these forces by making use of implicit and/or explicit strategies for behaviour regulation. Moreover, individuals differ in strategies they use to handle these biological, psychological and social forces, resulting in inter-individual differences in development that lead to idosyncratic life paths.

b) the implicit and explicit strategies individuals use to interact with the environment.

Human development reveals itself in interaction with the environment defined in a broad sense, entailing e.g. interaction with other individuals and interaction with the physical environment (e.g. living in the city versus living in a rural area). These interactions are regulated by implicit and explicit strategies for behaviour. In some cases, these strategies work together in strengthening behaviour. In some cases, they do not, leading to tension. Given that the environment in which human development expresses itself is dynamic and

constantly changing, individuals have to continuously adjust their strategies to preserve the fuelling interaction with the environment. Individuals of all ages have both the capacity and opportunity to change their strategies. However, the capacity to learn and the opportunities to experience diminish during the lifespan. Additionally, people differ in their capacity to learn to adapt their strategies.

Individuals implicitly and/or explicitly select strategies to regulate their behaviour when dealing with determinants of human development and environmental influences. These strategies can be disruptive, or even destructive, or constructive. Destructive strategies lead to dysfunctional, non-adaptive behaviour and can induce psychopathological symptoms, causing stagnation or even decline in the individual development. Constructive strategies, however, lead to functional, adaptive behaviour and can induce well-being and optimal functioning, fuelling constructive growth. Our research in the area of lifespan psychology is particularly directed towards the implicit and explicit strategies individuals employ to generate and retain well-being and optimal functioning.

Research focussing on the lifespan use traditional research methods such as (online) cross-sectional and longitudinal surveys, (laboratory) experiments. Researchers in the present programme also use innovative methods such as the ESM (see below), which is especially interesting in the area of life span research. Lifespan research addresses the following questions (N. Jacobs, Leontjevas, & Lataster, 2014):
- Which implicit and explicit strategies for behaviour are associated with lifespan development and with optimal functioning in particular?
- To what extent are these implicit and explicit strategies modifiable? Do they reflect "that older primitive systems are more robust and resistant to insult than are newer, more complex systems" (A.S. Reber, 1989)?
- To what extent are inventions such as coaching effective in modifying implicit and/or explicit strategies associated with lifespan development and with optimal functioning in particular?

Methods[9]
Traditional methods in the programme, not needing an introduction, are qualitative methods, including interview, surveys and questionnaires. A tool the faculty has developed for research into implicit and explicit strategies for behaviour is the Virtual Laboratory (VL) (Zamani & van Dijke, 2007), a web-based tool developed for online experimentation and data-collection in general population samples such as students (N. Jacobs, van Dijk, & Mudde, 2011). VL is used for several studies in the present programme but seems especially appropriate for studies testing hypotheses relating to the implicit and explicit processes in the flow of everyday life. Presently, VL is being updated and replaced by more, and other, online research facilities that are especially useful in distance research. Some studies use participant or non-obtrusive observation, e.g. to study the long-term dynamics of group processes "in the wild". By using these methods, we aim to bring to the surface the many hidden, implicit processes in groups and individuals.

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[9] The methods discussed in this section are used in many studies in the present programme.

Resources have been invested in tools used for the Experience Sampling Method (ESM). ESM is a validated random signal-contingent sampling technique that allows assessment of moment-to-moment changes in emotions and behaviours as well as the environment in which they naturally occur (Hektner, Schmidt, & Csikszentmihalyi, 2007; N. Jacobs et al., 2005b; Myin-Germeys et al., 2009a; Stone, Shiffman, Atienza, & Nebeling, 2007). Participants receive a signal (either through smartphone, or in case of web-based app through tablet or laptop computer) 10 times a day over the course of several consecutive days. At the moment of signalling, participants answer short questions on current thoughts and emotions (e.g. I feel lonely; I feel bored; I feel stressed), activities (e.g. I like this activity), the context (e.g. whom are you with; where are you; what are you doing) and the appraisal of the context (e.g. I like this company; I'm not feeling at ease in this environment). ESM is a internationally used method, validated in clinical as well as in general populations (Hektner et al., 2007; N. Jacobs et al., 2005b; Myin-Germeys et al., 2009a). ESM has several unique advantages (Myin-Germeys et al., 2009a; Stone et al., 2007): (1) ESM allows to study behaviour in its dynamic interaction with the environment and to discover behavioural patterns, (2) implicit processes can be made explicit, (3) assessments are made in the participants' natural everyday environment, which improves ecological validity of the reports, (4) assessments are made in the moment, which avoids memory bias of the reports and (5) multiple assessments over time offer great statistical power with small respondent samples. Current research employs this naturalistic research method to examines the role of daily life, implicit, affective processes in relation to psychopathology, life span developments, health, and other implicit strategies for behaviour with a dynamic aspect. Since, e.g. psychopathology, is viewed as a continuous, rather than a dichotomous variable, a further step is to examine to what extend (therapeutical) interventions can be effective in modifying implicit and/or explicit strategies associated with psychopathology in an early, non-clinical stage by using active versions of ESM. Research using the ESM method has also been set up in health psychological issues to investigate the implicit, contextual daily life determinants associated with addictive behaviour such as emotional eating and smoking. Yet another promising line of research involves the use of ESM resembling, data driven intervention strategies in online therapy and prevention.

Supplements and addenda

Supplement: Detailed Overview of the Research Areas

Explicit and implicit strategies for health

A substantial part of the research interests in the present programme is related to health, especially health promotion and prevention, and patient education and communication. Keeping in mind the need for knowledge in society we focus on:

- Primary prevention: how to prevent health problems from emerging due to unhealthy lifestyles, targeting to changing unhealthy behaviours such as smoking, physical inactivity, unhealthy nutrition behaviours (e.g. too little fruit and vegetables, too much high saturated fatty foods), excessive alcohol consumption, excessive UV-exposure, including the maintenance of behavioural change (relapse prevention). How explicit or implicit are the strategies executing these behaviours, and how are lifestyle behaviours influenced by implicit and explicit strategies and determinants?
- Secondary prevention of health problems: early detection of health problems (e.g. distress) and illness (cancer, cardiovascular diseases), screening for health problems and early symptoms of illness (e.g. distress in cancer patients, early detection of risk groups (families, e.g. cancer/cardiovascular risks)), early intervening to prevent further escalation of health problems (e.g. decrease (cyber)bullying, relapse prevention): How is detection and intervening by patients and caregivers influenced by implicit and explicit determinants? And how do (potential) patients deal with the (explicit) knowledge and prescriptions, or implicit heuristics for healthy action?
- Tertiary prevention of health problems: strategies for coping with health problems, self-management and self-regulation in and after illness, optimization of recovery, adjustment and adherence to medical and psychological advice (e.g. in terms of coping with chronic disease), optimization or clarification in physician-patient communication. How does quality of patient care influence Quality of Life in patients? How do implicit and explicit strategies influence patients' and physicians' behaviour? How do professionals implicitly or explicitly deal with their tasks and relate to their (former) patients?

The focus is on the role of explicit and implicit strategies and on determinants (and the interaction between them) that are related to these behaviours with an intended or non-intended effect on health. More particular, it is our mission to find answers to the following questions:

Which determinants and explicit and implicit strategies result in health related behaviours, in a diversity of target groups, situations and across situations?
In testing health psychological theories and models for the explanation of behaviour and behaviour change we focus on testing, comparing, and combining theories emphasizing explicit strategies and determinants with theories emphasizing implicit strategies and determinants (Lechner, Kremers, Meertens, & De Vries, 2007).

In relation to health we focus on finding determinants and strategies for explaining health behaviour and behavioural change for the general population (e.g. who display lifestyle and risk behaviours), as well as for specific risk groups (e.g. adolescents who are being (cyber)bullied), and (former) patient groups (e.g, who are coping with their disease and its treatment, perform self-management, etc) and caregivers groups (e.g. who we want to perform certain health care behaviours, like provide smoking cessation support).

We do this by studying the aforementioned implicit and explicit determinants/behavioural strategies people use. We also study how these determinants and strategies interact with each other. Health related behaviour and behavioural change is assumed to be a dynamic process in which three phases can be distinguished: a pre-motivational phase, a motivational phase and a post-motivational phase (Lechner, Bolman, Van Stralen, & Mudde, 2007; Sutton, 2005; Van Stralen, Lechner, Mudde, De Vries, & Bolman, 2008). Each of these phases are characterized by determinants, implying that for health related behaviour and behavioural change in every phase it is necessary to specify the determinants of each phase and to take its' determinants into account (Lechner, Kremers, et al., 2007; Van Stralen, Kok, et al., 2008). Further, some health related behaviour is displayed without a clear motivational foundation, as it is driven by implicit determinants or existing habits (van Bree et al., 2013); (Janssen, van Osch, Lechner, Candel, & de Vries, 2012); (C. Bolman, Arwert, & Vollink, 2011; I. Elfeddali, de Vries, H, Bolman, C, Pronk, T, Wiers, R, submitted). The individual contribution of determinants and, consequently, the implicit and explicit strategies varies among motivational phases, different health related behaviours, and different target groups (e.g. general public, specific risk groups, or (former) patient groups).

Below, we emphasize the implicit and explicit determinants and strategies that form the scope of our research and how they relate to each other. We also make clear in which phases of behavioural change they are important.

Explicit determinants and strategies
One group of determinants are considered to be explicit since they represent cognitions that are conscious and under volitional control. Social Cognitive Theory (Bandura, 1986), Theory of Planned Behaviour (and its latest successor, the Reasoned Action Approach (Fishbein & Ajzen, 2010), the Health Belief Model (Harrison, Mullen, & Green, 1992), the ASE Model and its successor the I-Change Model (De Vries, Mudde et al, 2003 (de Vries et al., 2003)), the Protection Motivation Theory (Norman, Boer, & Seydel, 2005), and the recently increasing popular Self Determination Theory (W. L. Ryan & Deci, 2000) are examples of theories that are based on motivational determinants. In the field of patient education there are additional models, specifically developed for patient behaviour, such as the Chronic Disease Coping Model (Maes & Van Elderen, 2000) or the Common Sense Model of Illness Representation (Leventhal, Brissette, & Leventhal, 2003) (Rozema, Vollink, & Lechner, 2009). The fundamental nature of these theories and models is based on the premise that people's behaviour is to a large degree determined by explicit, mostly cognition based determinants, resulting in the above described predominantly controlled responses. In essence these models are based on the assumption that we behave in certain ways because we intended to do so, that the intentions are based on decisions that in turn are based on a combination of beliefs and perceptions about the behaviour. These perception concerning a behaviour are often

subdivided into the perceived consequences of the behaviour (attitude), our perception of the our social environment and our estimation of our control and skills (self-efficacy) (Lechner, Bolman, et al., 2007; Van Stralen, De Vries, Mudde, Bolman, & Lechner, 2009a) (Berndt, Bolman, Mudde, et al., 2012); (N. C. Berndt et al., 2013) (C. Bolman et al., 2011); (I. Elfeddali, Bolman, Candel, Wiers, & De Vries, 2012); (Prenger et al., 2013)).

A second group of explicit strategies for behaviour concerns self-regulatory planning factors such as action planning and the formation of implementation intentions, which are just as the first group under volitional control. Self-regulatory planning is characterized as a cognitive process in which persons specify a sequence of behavioural and cognitive strategies to achieve and maintain behavioural change. When people do not make plans on how to change their behaviour (action plans) and on how to maintain their behavioural change (coping plans) and enact on these plans, their chance of successfully changing behaviour and maintaining that change decrease dramatically. Studies of others (e.g. Armitage & Arden, 2008; Sullivan & Rothman, 2008) but also our own studies (Van Osch et al., 2009; Van Osch, Lechner, Reubsaet, & De Vries, 2008; Van Osch, Reubsaet, Lechner, Candel, et al., 2008; Van Osch, Reubsaet, Lechner, & De Vries, 2008) suggest the importance of these self-regulation techniques in changing health behaviours. Furthermore, our studies revealed that these planning concepts are important moderating and mediating variables on the relation between traditional motivational determinants (e.g. intention, self-efficacy) and health behaviour (Van Osch et al., 2009; Van Osch, Lechner, et al., 2008; Van Osch, Lechner, Reubsaet, & De Vries, 2010). In the process of behavioural change (in the post-motivational phase), this process of action control is initially applied consciously (explicit). The ultimate goal is that these strategies become automatised as habits over time, becoming implicit (see e.g. Gollwitzer, 1999), but still proving a very strong behavioural determinant (van Bree et al., 2013).

Implicit determinants and strategies
One important determinant of resistance to behavioural change is lack of awareness. Before people can be explicitly *motivated* to change their behaviour, they have to explicitly become aware of the fact that they themselves are behaving in a risky way (and therefore have a problem). Because people often implicitly suppose there is no need to change their own behaviour, contemplating behavioural change will not be initiated (Weinstein, 1988). As Weinsteins Precaution Adoption Process Model suggests, there are several stages of awareness. In the first stage people lack knowledge of the relation between risky behaviour and a health risk, in the second stage they do know about this relation (so explicitly they are aware of their own risk), but they do not explicitly apply this knowledge to their own behaviour. Hence, making people aware of their own personal actual risk (making knowledge explicitly relevant) is an important prerequisite (but no guarantee) for people to be motivated to change their behaviour (De Ridder & Lechner, 2004; Lechner, Bolman, & Van Dijke, 2006; Van Stralen et al., 2009a; Van Stralen, Kok, et al., 2008; Van Stralen, Lechner, et al., 2008). A lack of awareness of the risk of one's health behaviour presumes that a person is still in a pre-motivational phase of change, i.e. not motivated to change. Only after a lack of awareness is eliminated, motivational factors such as attitude can become relevant and can make persons willing to change and to shift to the motivational phase of change.

With regard to risk perception and health it is important to get insight into the constraints on cognitive performance influencing the perception and awareness of risk and the interpretation of probabilities, both in health related behaviour and in the interpretation of health and illness related tests (G. Gigerenzer, 2002; Lazarus, 1966; Weinstein, 1988), leading to more sophisticated approaches in health promotion, patient-physician communication, coping and social support, etc.

Furthermore, risk perceptions are often more influenced by emotions than by cognitions, and the role of emotions and fear has revealed as a strong influence of health related behaviour, in the general population (Janssen, van Osch, de Vries, & Lechner, 2013a, 2013b; Janssen et al., 2012; Janssen, Waters, van Osch, Lechner, & de Vries, 2014), and especially in health related behaviour among patient groups (van Esch, Nijkamp, Cornel, & Snoek, 2012).

A second important implicit determinant is habit. As stated above, much of our behaviour is automatic, based on habits we have acquired throughout time. Although these behaviours may have been determined by explicit motivational determinants at one stage, they have become implicit and unintentional over time (Aarts, Verplanken, & Knippenberg, 1998). The role of habits in explaining behaviour has been our focus in several studies (C. Bolman et al., 2011) (van Bree et al., 2013)), for example to find out how physical activity habits influence future physical activity behaviour (C. Bolman et al., 2011), (Lechner, 2007). Further, currently research is done to detect implicit affective determinants that influence snacking habitual behaviour and smoking behaviour using Experienced Sampling Method (ESM; also referred to as EMA (ecological momentary assessment) (S. Wouters, V. Thewissen, K. Zamani, L. Lechner, & N. Jacobs, 2013a) (C. Bolman, Jacobs, N, Thewissen, V, Boonen, V, Soons, K, Verboon, P, 2012) and using computer tasks (Visual Probe task and Stimulus Response Compatibility task) (I. Elfeddali, de Vries, H, Bolman, C, Pronk, T, Wiers, R, submitted).

Strategies for changing unhealthy implicit habits would be to make people aware of their existence and of the processes that initiate these habits, combined with providing tools for alternative and healthier responses. In other words, make implicit automatic processes more explicit and provide people with options for explicit and controlled responses. In time these new explicitly produced behaviours have to become new habits again, ensuing implicit automatic new behaviour.

Third, much of our behaviour is – often implicitly - directed by environmental factors (Green & Kreuter, 2006; Swinburn, Egger, & Raza, 1999). This results in implicit cues that often we are unaware of. This environmental influence could be physical (e.g. the build environment), sociocultural (e.g influence from peers or families/parents), and even economic and political (e.g. prices of healthy alternatives) (Lechner, Bolman, et al., 2007; Lechner, Kremers, et al., 2007; Van Stralen et al., 2009a; Van Stralen, Lechner, et al., 2008; Voestermans & Verheggen, 2007a). Political and organizational factors can influence behaviour strategies in an unintended way. For example, political strategies influence the organ donor availability in the Netherlands (Nijkamp, Hollestelle, Zeegers, Van den Borne, & Reubsaet, 2008). But also, quality of provided patient care can influence information needs and Quality of Life in patients and their relatives (Brunings, Klar, Butt, Nijkamp, & Buxton, 2013; Charlier et al., 2012; Oldenbroek, 2013; E. Pauwels, De Bourdeaudhuij, Charlier, Lechner, & Van Hoof, 2012;

E. E. Pauwels, Charlier, De Bourdeaudhuij, Lechner, & Van Hoof, 2013; van Esch, Nijkamp, Cornel, & Snoek, 2014); (van Mol et al., 2014).

Next to studying if these environmental influences exist, it is major relevance to study the processes through which environmental factors influence individuals health related behaviour (van Stralen, de Vries, Mudde, Bolman, & Lechner, 2009b). Next to influencing cognitive factors (e.g. attitudes), these influences are often more implicit, as they can influence emotions, mood and affect, which in turn influences health related behaviours or health related outcomes (distress, depressive feelings). For example, adolescents reacting emotionally to (cyber)bullying more often display counter-effective coping behaviours (N. C. Jacobs, Dehue, Vollink, & Lechner, 2014; N. C. Jacobs, Vollink, Dehue, & Lechner, 2014), and show more depressive feelings (Dehue, Bolman, & Vollink, 2008)). Moreover, negative affect or mood induced by environmental influences might result in increased snacking behaviour (Wouters et al., 2013a) and lapse to smoking (I. Elfeddali, Bolman, & de Vries, 2013)). People are often unaware of these environmental influences; making people aware of these influences or changing the environment slightly to facilitate the healthier behaviour (e.g. Nudging (Thaler & Sunstein, 2008): using footprints on the floor to stimulate using the stairs instead of the elevator) could be relevant strategies to target environmental influences. Our own research revealed that making people aware of environmental influences (i.e. making them explicit) is effective for behaviours such as encouraging physical activity (van Stralen et al., 2009b; van Stralen, de Vries, Mudde, Bolman, & Lechner, 2011; van Stralen, Lechner, Mudde, de Vries, & Bolman, 2010). Currently, several studies are directed at either analysing these environmental influences on health related behaviours, or on explicitly making people aware of these influences and targeting them (Peels, Bolman, et al., 2012; Peels et al., 2013; Peels, van Stralen, et al., 2012); (Springvloet, Lechner, & Oenema, 2014) (Wouters et al., 2013a) (I. Elfeddali et al., 2013).

How do people deal with the discrepancies between these explicit and implicit behavioural determinants and strategies for action? How much room is there for changing ineffective unhealthy strategies in the diversity of situations that people come across?
The above mentioned explicit and implicit strategies can either intensify or decline each other's influence on health related behaviours. Several of our studies on this issue revealed that awareness of risks is one important prerequisite in changing motivation and behaviour for physical activity (Van Stralen, Kok, et al., 2008) (van Stralen, Lechner, et al., 2010). Further, within risk perceptions, especially affective and more implicit components proved relevant for explaining health related behaviours (Janssen et al., 2013a, 2013b; Janssen et al., 2012; Janssen et al., 2014). Additionally, studies show that self-regulatory planning, habit, and perceptions of the environment influence the relation between motivational determinants and health behaviours, either as moderators or mediators (van Bree et al., 2013; Van Osch, Lechner, et al., 2008; Van Osch et al., 2010; Van Osch, Reubsaet, Lechner, Candel, et al., 2008; Van Osch, Reubsaet, Lechner, & De Vries, 2008; van Stralen, de Vries, Bolman, Mudde, & Lechner, 2010; van Stralen et al., 2009b, 2011).

Changing health behaviour through changing implicit and explicit strategies of behaviour regulation is and remains an important target of our research. Changing behaviour strategies requires a specific approach and we recently pointed out a number of guidelines for

research into the effectiveness of methods for behaviour change (Peters, De Bruin, & Crutzen, 2013). Often, stimulating change is targeted at making determinants and implicit strategies explicit to the target population. Health educators especially pay attention to controlled or controllable processes. Even where certain behaviours are carried out more or less automatically, health educators will often try to make this behaviour become more explicitly motivated and intentional (Van Osch, Lechner, et al., 2008; Van Osch et al., 2010; Van Osch, Reubsaet, Lechner, Candel, et al., 2008; Van Osch, Reubsaet, Lechner, & De Vries, 2008). This is usually based on the implicit assumption that intentional behaviour brings about the most sustainable behaviour change, and that interventions to promote healthy behaviour are more ethically responsible when they stimulate autonomous choices. This ethical aspect reflects, of course, one of the sources for the discrepancies between explicit and implicit behavioural strategies. Even though interventions try to influence explicit determinants and strategies, this can still be a method to change existing determinants and implicit strategies, as the ultimate goal in health psychology is to create new healthy automatic behaviours and habits.

Another question regards the assumption that habits are automatically activated behaviours (as mentioned above). It is suggested that the vulnerability, if not sensitivity, for changing automatic behaviours depends on the way a habit has been acquired. Some habits are "first nature", that is are part of our evolutionary make-up, and/or genetically ingrained. For example, primary responses to stressful situations (fight or flight) may not be very functional in our modern world, and can be hard to change "Second nature" habits, such as fetching a beer at ten o'clock in front of the TV, can be hard to break as well, nevertheless may be trained to unlearn. From the latter example it also may be clear that changing habits is not a yes-or-no matter depending on the genetic or other nature of a habit. Learned habits may have consequences that are interwoven with "built-in" mechanisms, even mechanisms of an apparently non-related nature. Smoking, drinking and other addictions are clear examples. For instance "(t)he observation that merely smelling a preload is sufficient to produce counterregulation in dieters but not in non-dieters challenges the widely held cognitive explanation of experimental counterregulation in preloaded dieters" (Jansen & Van den Hout, 1991). However, it is here that the room for change can be diverse, depending on the nature of the habit.

With respect to health related behaviours in the fields of primary prevention (e.g. healthy nutrition, in between meal snacking, physical activity, smoking), secondary prevention (changing ineffective coping among cyberbully victims) and tertiary prevention (e.g. changing (former) patient groups to better self-manage their disease and improve their lifestyles) we are currently looking for the mechanisms that can be targeted in order to change health related behaviours.

Target groups for interventions
Currently our intervention research is targeted at a broad range of target groups and health related behaviours.
- Among (subgroups of) the general public several lifestyle interventions are being tested in PhD-projects, targeted at a broad array of lifestyle behaviours: nutrition (Springvloet et

al., 2014; Walthouwer, Oenema, Soetens, Lechner, & De Vries, 2013)), smoking (I. Elfeddali et al., 2013); (de Vries, Eggers, & Bolman, 2013; Stanczyk et al., 2014), and physical activity, based on both the traditional social cognitive theories (Peels, Bolman, et al., 2012; Peels et al., 2013; Peels, van Stralen, et al., 2012) (Walthouwer et al., 2013), as well as on the Self Determination Theory with Motivational Interviewing as the methods that is transferred to an online eHealth intervention (S. Friederichs, Bolman, Oenema, Guyaux, & Lechner, 2014; S. A. Friederichs et al., 2013, 2014).

- Among specific risk groups, intervention research projects are directed at screening for distress in cancer patients (Braeken et al., 2011; Braeken, Kempen, et al., 2013; Braeken, Lechner, et al., 2013; A. P. Braeken et al., 2009), and screening and helping (cyber)bullying victims to better cope with being bullied (N. C. Jacobs, T. Vollink, et al., 2014).

- Among several (patient) groups we are developing and testing interventions that help patient groups to 1) change their lifestyle, like quit smoking in CHD patients (N. Berndt et al., 2013; Berndt, Bolman, Lechner, et al., 2012; N. C. Berndt et al., 2013), increase physical activity in (former) cancer patients (Golsteijn, 2013; Willems, 2013), and 2), help former cancer patients to better cope with the broad consequences of their disease and its treatment (Charlier et al., 2012; E. Pauwels, Van Hoof, Charlier, Lechner, & De Bourdeaudhuij, 2012; Willems, 2013). Especially self-regulation and self-management are of major importance for these patient groups, but then related to practical help in subjects such as fear for recurrence of cancer, returning to work and dealing with remaining health complaints.

eHealth interventions
One of the strong themes in much of our current intervention research is eHealth. An important intervention method used within our eHealth interventions is computer tailored advice, or Computer Tailoring (CT) (De Nooijer, Lechner, Candel, & De Vries, 2004; Van Stralen et al., 2009a) (Oenema, Brug, & Lechner, 2001); (Willems, 2013) (Golsteijn, 2013). Tailored personal advice can be directed at all previously mentioned determinants and implicit and explicit behavioural strategies. Further, CT interventions can be directed at the general public, but also as a method to help patient groups to improve their lifestyle or to better cope with the consequences of their (former) disease. One of the methods in CT is to make determinants and implicit strategies explicit to the participant by confronting them with the influence of determinants on behaviour, and with discrepancies between their own (explicit) beliefs and their behaviour. Once these determinants and implicit strategies are made explicit to the participant, they can be influenced, and directed towards healthier behaviour. For example: making people aware of the unhealthy habits they have, and of the environmental cues that result in automatic response, can be completed by providing them with the opportunity to learn explicit self-regulatory planning skills. These self-regulation skills can help people to break with old automatic behaviours, for example by learning persons to make self-regulatory action plans and coping plans with regard to the new behaviour, by facilitating automatisation of actions and associating actions with environmental cues (De Nooijer et al., 2004; Oenema et al., 2001; Van Stralen, Lechner, et al., 2008).

Currently our eHealth interventions are developed for online use through computers and tablets, in the coming years we are planning to develop these interventions further for other field, including apps and smartphones.

Other intervention projects
An intervention strategy which is now under study consists of modifying the implicit associations between environmental or affective cues and behaviour (through which craving occurs) by attentional retraining. This has already been shown to be effective in heavy alcohol drinkers (Schoenmakers et al., in press; Schoenmakers, Wiers, Jones, Bruce, & Jansen, 2007) and is currently under study within the scope of the research programme for smoking. First results show promising effects of attentional retraining. It decreases attentional bias for smoking and continued smoking abstinence though only for regular smokers (I. Elfeddali, de Vries, H, Bolman, C, Pronk, T, Wiers, R, submitted).

Of special concern are questions regarding the explicit and implicit handling of health related interventions and diagnostics by professionals (for example (A. M. Braeken et al., 2009; Braeken et al., 2011). How do they deal with the canons of their professions and to what extent do they adhere to professional and evidence based good practice guidelines? (Wegwarth, Gaissmaier, & Gigerenzer, 2009). If the professional discipline stresses "evidence based" intervention, how do professionals match their intuitions (or 'gut feeling') to the evidence in the (very large) databases of the discipline and factors relate to this matching (Nijkamp, 2010)?

Discrepancies between explicit and implicit behavioural strategies are also apparent for health professionals. Especially in service jobs employees are often required to show certain emotions because they function to please the customer or are more helpful for a patient. Arlie Hochschild subsumed the implicit and explicit strategies that workers use to regulate their emotions under the header emotional labor (Hochschild, 1983), which can result in a discrepancy between the emotional demeanor that an individual displays and the emotions that are felt (Mann, 1999) (Briët, Näring, Brouwers, & Van Droffelaar, 2005). Emotional labor is studied in various professions in experienced workers and novices to gather knowledge about how employees learn to apply emotional labor in such a way that it will not affect their health (Lechner, Steinvoorte, & Näring, 2008).

The importance of evaluating interventions
Evaluating effectiveness of innovative interventions (e.g. tailored digital advise, counselling, etc) aimed at changing strategies of health (threatening) behaviour and lifestyles, focusing on determinants related to different settings (e.g. school, community, workplace, health care), different target groups (e.g. general public, risk groups, (former) patient groups) and different levels (individual, group, organization), remains an important instrument for testing hypotheses about the way explicit and implicit behaviour strategies operate and how behaviour regulation takes place. Further, from a health costs and societal perspective, an increased emphasis on cost-effectiveness of these interventions is also of great importance (Berndt N et al., 2012; Peels DA et al., 2012; Stanczyk NE et al., submitted).

Explicit and implicit strategies in clinical psychological issues

Considering explicit and implicit strategies in clinical psychological issues, our focus is on psychopathological symptoms across a continuum ranging from a symptom free, a subclinical to a clinical level.

Research in the field of clinical psychology is gradually shifting from a purely categorical syndrome-oriented approach to a dimensional, and even more specific, symptom-oriented approach (e.g. Bentall, 2004). This symptom-oriented approach has the advantage that it offers a way to investigate the clinical concept without accepting the traditional Kraepelinian model. Over the last two decades, this approach has facilitated greater theoretical understanding of implicit psychological mechanisms. Therefore, much of the research oriented at psychopathological behaviour investigates the implicit and explicit behaviour strategies in samples of the general population by using a symptom-oriented approach.

Traditionally, psychopathological symptoms have been considered as features of "mental illness", which are either present or absent. This dichotomy is inherent in current categorical diagnostic systems, such as DSM-IV and ICD-10. Although this dichotomous, categorical representation of psychiatric disorders is convenient for professional communication and clinical decision-making, it may not be an accurate reflection of the phenotype of the disorders as they occur in daily life. There is mounting evidence that psychiatric symptoms are not only present in individuals diagnosed with a psychiatric disorder, but also occur in a significant proportion of individuals from the general population. These individuals display symptoms that are quantitatively, but not qualitatively, different from symptoms displayed by individuals diagnosed with a psychiatric disorder. Symptoms of a psychiatric disorder are therefore on a continuum with normal experience. Such a continuum view is already well accepted in the field of medicine, for example blood pressure is known to be continuously distributed in the general population.

In the field of clinical psychology, the continuum view is increasingly accepted as a promising approach (Myin-Germeys et al., 2003). For example, recent research consistently shows that cognitive dysfunctions in old age, depressive symptoms, and psychotic experiences (hallucinations, delusions), and are situated on a continuum of symptoms, ranging from 'normal', symptom-free individuals and individuals with sub-clinical symptoms to individuals diagnosed with a psychiatric disorder (Thewissen et al., 2005; Van Hooren et al., 2008). The 'normal', subclinical and clinical levels of symptomatology differ primarily in severity and amount of life interference (Van Hooren, Valentijn, Bosma, Ponds, Van Boxtel, & Jolles, 2007; Van Hooren, Valentijn, Bosma, Ponds, Van Boxtel, Levine, et al., 2007). However, the risk profiles for subclinical and clinical symptoms are similar. Therefore, implicit psychological mechanisms underlying the clinical disorder may also operate in subclinical manifestations (Thewissen et al., 2007). Investigating symptoms in individuals who do not meet the criteria for a clinical disorder is an attractive approach to elucidate the underlying mechanisms of risk. As it has been suggested that individuals with subclinical symptoms are at increased risk of making the transition to a diagnosable disorder, increasing attention has been given to early detection and intervention in order to prevent individuals from making

transitions from non-clinical to clinical states. It is important to understand what actually causes individuals on some position at the continuum to become a clinical 'case'.

From a mental health point of view, it is also important to focus on non-clinical and sub-clinical populations. Early detection of mental disorders is pivotal, because it can prevent the development of more severe mental disorders. For example, global and contingent self-esteem are related to a variety of psychological symptoms among children and adolescents (see (A. E. R. Bos, Huijding, Muris, Vogel, & Biesheuvel, 2010). Self-esteem interventions can be used to prevent the development of mental health problems in children and adolescents (A. E. R. Bos, Muris, & Huijding, 2011). Furthermore, screening for mental health disorders, such as anxiety disorders, can be cost-effective (Simon, Dirksen, Bogels, & Bodden, 2012). There are effective prevention programs available to prevent anxiety disorders in children (Simon, Bogels, & Voncken, 2011). Persons with a mental illness not only have to deal with their mental health condition, but also receive stigmatizeding reactions (A. E. Bos, Kanner, Muris, Janssen, & Mayer, 2009; van der Sanden, Bos, Stutterheim, Pryor, & Kok, 2013). Mental illness stigma has severe consequences for social relations, but also for self-esteem, quality of life and recovery. Both implicit and explicit factors are involved in the process of stigmatization (Pryor, Reeder, Yeadon, & Hesson-McLnnis, 2004) and it is important to develop interventions to reduce mental illness stigma (Corrigan, Kosyluk, & Rusch, 2013).

Explicit and implicit strategies to improve mental health

Which explicit and implicit strategies do people use in behaviour that have an effect on mental health, in diversity of situations and across situations? Which methods are used to measure behaviour strategies and their effects?

Ever since Freud introduced the concept of the unconscious in psychology, explicit and implicit strategies underlying human behaviour have been central to the field of clinical psychology. According to Freud, the continuous tension between the instinctual desires and the explicit rules of culture and society might find its relief through the development and persistence of psychopathological symptoms. However, according to Beck, psychological well-being is more likely to be determined by the way in which humans perceive, interpret, and attribute meaning in their everyday lives, a process known as cognition. In the last decade, new ideas emerged in which these points of view seem to coincide. In these new ideas, mental and cognitive processes are divided in two levels. At a lower level, there are fast and inflexible routines that are largely automatic and may occur without awareness. At a higher level, there are slow flexible routines that are explicit and require the expenditure of mental effort (Frith & Frith, 2008). Psychopathological symptoms can be explained by dysfunctions at the implicit level, for example people diagnosed with a psychosis lack implicit mentalizing, which impairs the ability to read the desires, intentions and beliefs of other people, resulting in explicit behavioral symptoms. On the other hand, it has also been demonstrated that symptoms originate from difficulties at the explicit level. For example, among older adults having mild cognitive impairment or persons with a traumatic brain injury may experience difficulties with using explicit strategies, such as planning their behavior and organizing leisure time activities (Van Hooren, Valentijn, Bosma, Ponds, Van

Boxtel, Levine, et al., 2007) . These patients have the tendency to rely on automatic behavior and routines, while it is essential that explicit strategies are used, e.g. that the proper goal is selected and maintained in memory while performing a task. Recent dual-process models may serve to integrate the influence on behavior of both explicit and implicit cognitive processes, while acknowledging the role of contextual factors (e.g., fatigue, alcohol, drugs, sexual arousal) that modulate access to both processes through the constraints these factors impose on processing capacity (Roefs et al., 2011; Strack & Deutsch, 2004).

Among the research the present programme focuses at, are the implicit determinants associated with persistent maladaptive, deviant or 'abnormal' behaviour that is considered as problematic for an individual or his/her environment, especially in everyday life. After all, the majority of psychological and psychiatric symptoms are internal mental phenomena that are embedded in the context of everyday life. They occur during everyday activities, while individuals are interacting with the persons and the world around them. Symptoms might be triggered by experiences of events in the environment: they might be implicit or explicit, cognitive, or social strategies elicited by contextual determinants. Nowadays, it is well acknowledged that the study of these implicit processes in the flow of everyday life may provide a powerful and necessary addition to the more traditional research traditions in psychopathology (Myin-Germeys et al., 2009). Therefore, this approach demands the use of different research methods.

How do people deal with the effects of the interaction between explicit and implicit strategies for action?

As described earlier, the tension between implicit and explicit strategies for behaviour is part of the '*condition humaine'.* However, it is clear that this tension sometimes goes beyond the individual's resources, resulting in psychopathology. Several theoretical frameworks are used in order to explain how people cope with the discrepancies. A prominent model in the field of clinical psychology is the vulnerability-stress model of psychopathology (Hankin & Abela, 2005; Nuechterlein & Dawson, 1984; Zubin & Spring, 1977). This model integrates theoretical and empirical perspectives from several areas such as genetics, neurobiology, psychology and behavioural sciences. According to this model, psychological and/or psychiatric symptoms will emerge whenever a threshold of stressors exceeds the individual's vulnerability level. The model of the International Classification of Functioning, Disability and Health (ICF) classifies health and health related domains that describe body functions and structures, activities and participation. As mentioned above, the individual's (dys)functioning occurs in a context, therefore, environmental factors are also integrated in this ICF-model (WHO, 2001). Other theoretical models underlying clinical research are the biopsychosocial model (Sperry, 2008), the model of self-definition and relatedness (Luyten, 2006), and the (dual-process) impulsive-reflective cognitive model of behavior (Roefs et al., 2011; Strack & Deutsch, 2004; Wolfs, Bos, & Van Lankveld, submitted).

The strategy of investigating individuals at a lower level of the continuum turns out to be advantageous as it avoids potential confounds inherent to clinical patients, such as institutionalisation and side effects of medication (Claridge, 1994). In addition, since the prevalence of subclinical symptoms is much higher than the prevalence of the clinical disorder, it is easier to discover variability in subtle processes underlying the phenotype of

the clinical disorder. Most promising is the convergence of the "continuum model" with the implicit – explicit dimension. This offers more room for an interpretation in which "normal" strategies can lead to pathological behaviour (subclinical or clinical) due to problematic interactions. In other words it can be rational to react abnormally in abnormal situations

Thus, research in the field of clinical psychology is gradually shifting from a purely categorical syndrome-oriented approach to a dimensional, and even more specific, symptom-oriented approach (e.g. Bentall, 2004). This symptom-oriented approach has the advantage that it offers a way to investigate the clinical concept without accepting the traditional Kraepelinian model. Over the last two decades, this approach has facilitated greater theoretical understanding of implicit psychological mechanisms.

Therefore, much of the research oriented at psychopathological behaviour investigates the implicit and explicit behaviour strategies in samples of the general population by using a symptom-oriented approach (Scholtissen, Verhey, Adam, Weber, & Leentjens, 2006).

Modification of explicit and implicit strategies for mental health
How much room is there for changing these strategies in the diversity of situations that people come across? How can human environments be (re)designed to release this tension? The nature-nurture question in the field of clinical psychology is an old debate with changing positions. During the last decade of the previous century, much effort was dedicated to estimate the heritability of psychiatric disorders and to try to identify the associated genes (Jacobs, 2005; Jacobs et al., 2007; Jacobs et al., 2002; Jacobs, Rijsdijk, et al., 2006; Jacobs et al., 2001; Simons, Jacobs, Jolles, Van Os, & Krabbendam, 2007). However, instead of 'finding the holy grail', which was believed to be found in the mapping and sequencing of the whole human genome, this quest led to a conclusion far beyond the nature-nurture dichotomy. It has been realized that genes or broader defined as 'biology', (nature), and environment (nurture) are not two separate and independent causal factors of psychopathology, but that they can correlate and interact (Jacobs, 2005).
Part of the research questions in the present programme are aimed at bringing these two points of view together, with explicit attention to the biological foundations of both behaviour in general (see below) and psychopathology in particular. For example, there is a good and growing body of research focusing at the pathological aging of the brain. Older people are confronted with a decline in various cognitive and bodily functions. In particular, the cognitive control functions that inhibit automatic, implicit processes become less efficient (Phillips & Henry, 2008; Van Hooren, Valentijn, Bosma, Ponds, Van Boxtel, Levine, et al., 2007) and this is even more pronounced in patients with degenerative psychopathological diseases, such as Alzheimer's disease. These control functions enable independent, purposive, self-serving behaviours and therefore are crucial when confronted with new situations in daily life (e.g learning to deal with new electronic devices). Moreover the decline of control leads to situations susceptible to stigmatization, thereby enhancing isolation and stress. Behavioural support for the age related cognitive decline is supported by neurobiological evidence. Brain regions responsible for the control functions are more sensitive to the aging process than other regions (e.g. (Tisserand et al., 2002).

Human environments may be redesigned to release tensions between implicit and explicit strategies, or to support mutually enhancing interactions. Recent studies have shown that older adults reporting cognitive complaints benefit from interventions directed at the control processes (e.g (Ball et al., 2002; Van Hooren, Valentijn, Bosma, Ponds, Van Boxtel, & Jolles, 2007). During these interventions participants learn to use explicit strategies such as being aware of their current state of affairs, selecting the appropriate goal and checking their behaviour with the goal state. Mindfulness interventions also focus on the use of explicit strategies, by redirecting routines and automatic behaviour to conscious mental processes.

Mindfulness-Based Stress Reduction (MBSR) is an example of an intervention programme that aims to improve psychological well-being. The MBSR programme is a training course focusing on learning how to relax attentively and to accept things as they are (Kabat-Zinn, 1990). Although the MBSR programme was originally developed for patients suffering from the stress and pain of physical complaints, it was later also examined and used among patients in all kinds of other medical settings. The MBSR programme was reported to be effective in treating chronic pain, anxiety and panic disorders, fibromyalgia, psoriasis, and several cancer-related psychosomatic complaints (Carmody, 2009). In a recent study among persons who stutter, De Veer, Brouwers, Evers and Tomic (2009) found that immediately after participating in the MBSR programme and four weeks later, stutterers appeared to suffer less from stress and related complaints, showed less anxiety about speech situations, displayed more confidence in approaching speech situations, felt more in control of life events, and increasingly used a decisive problem-oriented coping style. This is a challenging notion, because it also may have implications for the transition of individual cases on the continuum of psychopathology.

Another example of research that profits from the explicit-implicit approach is the study of traumatic brain injury. In line with the ICF model, functional outcome or recovery after traumatic brain injury is a multilayered concept that is determined by a variety of biological, sociodemographic, and environmental factors. Investigating determinants of long-term outcome or recovery is pivotal in providing a global perspective of possible outcomes that may help patients and their families to cope with the new situation and anticipate the future. In this respect a variety of possible prognostic factors were systematically reviewed, including socio-demographic factors, pre-morbid co-morbidity, injury characteristics, neuro-psychological factors, treatment factors, and post-acute functionings (Willemse-van Son, Ribbers, Verhagen, & Stam, 2007).In addition, mechanisms remaining implicit for patients like genetics are considered relevant for the recovery after traumatic brain injury; the polymorphic Apolipoprotein E gene might be a contributing factor for predicting outcome after traumatic brain injury (Teasdale, Nicoll, Murray, & Fiddes, 1997; Willemse-van Son, Ribbers, Hop, van Duijn, & Stam, 2008; Zhou et al., 2008). Also implicit strategies, like previous habits, seem to play a role; the amount of pre-injury participation in the community was found to be related to the level of post-injury community integration (Willemse-van Son, Ribbers, Hop, & Stam, 2009). More precise information about what the future may bring may help patients and relatives in the adaptation process and will enhance efficacy of the rehabilitation process. Because of the acute character of the injury, patients tend to underestimate the consequences of the injury and expect a full recovery. Patients might therefore cling on to old cognitive interpretations that can be unrealistic or even counterproductive.

For instance, due to lack of sickness insight, or lack of awareness of possible care facilities, patients did not recognize all their healthcare needs (Pickelsimer et al., 2007). Learning about the nature of the injury and possible treatments, may stimulate patients to learn new explicit strategies to enhance their recovery. The utilisation of health care facilities was also related to implicit or explicit health beliefs. Patients with a high locus of control with the physician were more likely to visit medical specialists than other patients, despite comparable health-related factors and patients with a high internal locus of control were more likely to use supportive care than other patients, despite comparable health-related factors (Willemse-van Son, Ribbers, Stam, & van den Bos, 2009). In the future, professionals might pay more attention to the influence of implicit health beliefs on healthcare utilisation, which might prevent some patients failing to receive the care they need because of their health beliefs.

Using ESM (see above) a number of studies have documented that daily life stress is associated with increased negative affect (NA) and decreased positive affect, as well as with increased cortisol levels (Jacobs et al., 2007; Jacobs, Rijsdijk, et al., 2006) Even more, implicit affective processes in daily life such as stress reactivity, have been linked to depression as well as psychosis (Lataster et al., 2009; Wichers, Geschwind, et al., 2009; Wichers, Jacobs, Derom, Thiery, & Van Os, 2007; Wichers, Myin-Germeys, et al., 2008; Wichers, Myin-Germeys, et al., 2007b; Wichers, Peeters, et al., 2009). Neuroticism, one of the most important risk factors for psychopathology, was found to index an environmental risk for decreased daily life positive affect levels and a genetic as well as an environmental risk for increased NA variability in daily life (Jacobs et al., 2011). Recently, scientific attention has been drawn to the concept of resilience in the field of psychopathology. Wichers et al found that positive emotions buffer against NA reactivity. In addition, positive emotions are found to reduce the expression of the genetic vulnerability for negative mood bias in daily life (Wichers, Aguilera, et al., 2008). A recent study using ESM showed that reward experience, or the ability to generate positive affect boosts from pleasant daily life events, preserves mental health, but only in case of high childhood adversity or recent stressful life events. High daily life reward experience may thus represent a mechanism of resilience in subjects at risk for affective(Geschwind et al., 2010). In addition to affect, stress reactivity and reward experience, also self-esteem has been studied in the context of daily life. Instability and fluctuations in daily life self-esteem were found to related to subclinical paranoia (Thewissen et al., 2010; Thewissen, Bentall, Lecomte, Van Os, & Myin-Germeys, 2008; Thewissen et al., 2005; Udachina et al., 2009).

In our faculty, the ESM method is currently being applied to study the effect of implicit processes such as affect, stress reactivity and self-esteem in relation to psychological well-being in young families. Recently, research based on the ESM method has been set up to investigate the implicit, contextual daily life determinants associated with addictive behavior such as emotional eating and smoking. In addition, this method is applied to study the effect of implicit processes such as affect, stress reactivity and self-esteem in relation to psychological well-being in non-clinical populations, such as parents of young families. Getting insight into the relation between daily hassles, stress reactivity and affect in a non-clinical population helps understanding the implicit and explicit processes that may contribute to the development of mental disorders such as depression. Furthermore, the

associations between affective responses, perceived intimacy, attachment styles, and various aspects of sexual functioning are currently being investigated using ESM (Hiemstra, Jansen-Breukelman, Jacobs, Thewissen, & van Lankveld, under review).

And furthermore, there is a well-established line of research (in cooperation with Maastricht University) focusing at gene-environment interactions in psychopathology (Jacobs, Kenis, et al., 2006; Schreurs et al., under review; Wichers, Aguilera, et al., 2008; Wichers, Kenis, et al., 2008; Wichers, Myin-Germeys, et al., 2007a, 2007b; Wichers, Schrijvers, et al., 2009).

In addition, research in which the ESM (see above) is investigated as an intervention tool in the field of emotional eating, smoking cessation, and relational difficulties has been initiated in cooperation with health psychology staff members.

Explicit and implicit strategies for employee adaptation: Dynamic work contexts

Today's organisations are facing dynamic and changing environments that emphasize the importance of enhanced organisational flexibility and adaptation (van Dam, 2013b). Forces, such as economic crises, increased competition, and technological advances, require organisations to continuously change and develop. In turn, this fast pace of environmental and organisational change implies heightened pressure for employees to be increasingly adaptable, versatile, and tolerant of uncertainty in order to perform effectively in new or changing work situations. Accordingly, the ability to deal with dynamic work contexts is considered a key quality for today's employee, and has even been proposed as a third type of job performance in addition to task and contextual performance (Griffin, Neal, & Parker, 2007).

Given the prevalence of dynamic work contexts, and the importance of employee adaptation, an important question is: what explicit and/or implicit processes are involved in employee adaptation in dynamic work contexts? Which personal and environmental factors serve as antecedents for effective adaptation, including learning, job crafting, motivation, and sustainable employability? And through which (explicit and implicit) processes are these antecedents related to important outcomes, such as performance and well-being?

These questions are central to the W&O psychology research sub-program. This innovative research program emphasizes both theoretical and practical aspects of employee adaptation and behavior in dynamic work contexts. Moreover, this program connects with the other sub-programs, by cooperating in research and by including predictors (e.g., personality), behaviors (e.g., goal setting, emotion regulation), and outcomes (e.g., well-being, burnout) that are shared with these programs. When addressing these questions, different research methods are used, such as large-scale surveys, laboratory experiments, diary studies, and scenario studies.

Five topics are central to the W&O psychology sub-program:
- (i)   Adaptation, emotion regulation & well-being
- (ii)   Adapting the work environment
- (iii) Change, workplace learning & reflection

(iv)   Motivation and goals in dynamic organisations
(v)   Sustainable employability & adaptive career management

Adaptation, emotion regulation and well-being

Recently, a model for individual adaptability has been developed (K. van Dam, 2013b) that serves as a research agenda for this topic. The model emphasizes the importance of individual resources, such as emotion regulation, for effective adaptation. Emotion regulation can focus on the perception (e.g. through reappraisal, or rumination), experience (e.g. through mindfulness) and expression (e.g. through suppression) of emotions. Since change and uncertainty can trigger strong emotions, employees' responses might – partly - depend on emotion regulation (van Dam, Kleine, & Struijs, 2013). Similarly, emotion regulation is important in customer interaction (Näring, Vlerick, & van de Ven, 2012). Within this line of research, we try to better understand the explicit and implicit factors and processes involved in adaptation and emotion regulation, and the effectiveness of interventions such as recovery (van Dam, Kleine, & Struijs, 2013) and mindfulness (Soons, Brouwers, & Tomic, 2010).

Adapting the work environment

Adaptive behaviour also includes employees' initiatives to change the work environment (van Dam, Nikolova, & van Ruysseveldt, 2013). Nowadays, employees are considered active 'job crafters' who change the task or relational boundaries of their job in order to adapt this job to personal needs and resources (Wrzesniewski & Dutton, 2001). One line of research investigates the explicit and implicit determinants of such job crafting (Bipp & Demerouti, 2013; van Dam et al., 2013), and as such focuses on efforts to improve the own work situation. A second line of research emphasizes employees' interventions directed at improving the work situation of colleagues, especially those who are a victim of workplace bullying. These studies focus on the role of explicit (rational) attribution processes as well as implicit processes affecting these interventions (Mulder, Pouwelse, Lodewijkx, & Bolman, 2013).

Change, workplace learning and reflection

How does organisational change affect workplace learning processes, and how does – implicit and explicit – workplace learning affect employees' (adaptive) behaviour, motivation, and well-being? Our research already indicates that specific workplace characteristics can advance or impede implicit workplace learning (van Ruysseveldt & van Dijke, 2011), and has demonstrated the importance of implicit learning for employee well-being (van Ruysseveldt, Verboon, & Smulders, 2011). New research investigates how individual, work environment and organisational factors can optimize (explicitly or implicitly) the potential of organisational change processes for enhancing implicit workplace learning and employees' adaptive capacities (Nikolova, van Ruysseveldt, De Witte, & Syroit, 2013). Another research line focuses on an explicit type of learning, i.e. self-reflection, and investigates the implicit and explicit factors and processes involved in reflection at work (van Seggelen & van Dam, 2013).

Motivation and goals in dynamic organisations

In dynamic organisations, employee motivation and goal striving are crucial conditions for personal and organisational performance. This line of research investigates the effects of

goals on employee behaviour on the state (being consciously chosen or subconsciously activated) and trait level. Whereas goal-setting research (Locke & Latham, 2002) outlines how conscious goals affect work motivation and performance, priming studies indicate that goals can also be activated and pursued outside a person's awareness (Bargh & Chartrand, 1999; Dijksterhuis, Chartrand, & Aarts, 2007). Our research investigates the combined effects of explicit (conscious) and implicit (subconscious) goals in achievement situations (Bipp & Kleingeld, 2013). How can goals be effectively used to enhance adaption and work outcomes? What happens when implicit personal goal orientations conflict with the implicit or explicit goals that are emphasized within the work environment (van Dam, 2014)?

Sustainable employability and adaptive career management
Sustainable employability has received much attention in the Netherlands owing to an aging working population. The concept of sustainable employability emphasizes the importance of a workforce that participates in work in a healthy, motivated and competent way until – and even beyond – retirement. In our studies, we investigate the personal and work context factors that (explicitly and implicitly) contribute to sustainable employability of workers of all ages (van Dam, Kemps, & van Vuuren, 2013). Moreover, we have started to explore the role of adaptive career management. Especially in change situations, employees are inclined to be reactive instead of proactively trying to attain their personal goals. Yet, the attainment of personal career goals might be an important precondition for effective adaptation and sustainable employability.

Which explicit and implicit determinants and processes are relevant in employee adaptation to dynamic work contexts?
Research has only started to explore the conditions and processes involved in employee adaptation to dynamic work contexts. In general, adaptation is supposed to help organisms adjust to a changing and/or demanding environment and, as such, to contribute to the survival of the species (King, Stansfield, & Mulligan, 2006). A distinction can be made between (i) adaptation as a process; (ii) adaptedness as the state of being adapted; and (iii) an adaptive trait as an aspect of the organism that enhances the probability that the organism will survive and reproduce (Orr, 2005). All three aspects of adaptation are considered subject to change (van Dam, 2013), and therefore can be affected by implicit and explicit determinants and processes that reside in the individual as well as the (work) context.

For example, organisational change can serve as a strong trigger of affective responses in employees, such as feelings of anxiety, uncertainty, distrust (van Dam, Verboon, & Oreg, 2013). How employees react to the change depends on both explicit and implicit strategies. When supervisors explicitly communicate with employees about the change, providing them with relevant information and opportunities to participate, employees are more open to the change then when these explicit strategies are lacking (Van Dam, Oreg, & Schyns, 2008). Employees responses to change might also be affected by implicit factors, such as workplace climate, aspects of leadership and emotion regulation.
Similarly, employees' efforts to adapt (or craft) the work context can be explained through explicit and implicit processes. Readjusting the work load might be the result of an implicit, subconscious notion of exhaustion, or the outcome of an explicit notion to better watch ones' health. Individual differences, aspects of leadership (e.g., LMX) and climate perceptions

(e.g., learning vs performance climate) have also been noticed as precursors of job crafting (Bipp & Demerouti, 2013; van Dam et al., 2013).

Moreover, bystander interventions at work are affected by explicit, rational attributions of responsibility and by intervening implicit processes, such as the implicitly perceived threat of contagion (i.e., helping a victim could stigmatize the helper "by association") (Mulder et al., 2013).

How do people deal with discrepancies between explicit and implicit determinants and strategies for action?
Essentially, adaptation refers to the fit between the organism / individual and the environment. Consequently, discrepancies are generally considered important levers for initiating adaptation processes. Findings in several fields suggest that discrepancies between aspects of the individual and the environment can have severe, negative consequences, while individuals fare better when personal and environmental aspects are well-matched. For example, employees might experience strain, and eventually burnout, when their work load exceeds their capacities (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Conversely, person-job fit and person-organisation fit are strongly related to employees' job satisfaction and attachment to the organisation (Kristof-Brown, Zimmerman, & Johnson, 2005). Similarly, employees fare better when their basic needs, i.e. autonomy, competency, psychological relatedness, are fulfilled through work (Deci & Ryan, 2000).

Discrepancies can trigger adaptive responses, such as engagement in learning activities, socialization, and job crafting. The occurrence of these behaviours partly depends on employees' personal initiative. Our research tries to specify which implicit and explicit processes determine whether employees will exhibit personal initiative aimed at increasing fit. Additionally, we have started to explore the impact of discrepancies between goals on self-regulatory behavior. Workplaces are generally considered multi-goal environments (Vancouver, Weinhardt, & Schmidt, 2010), where different goals might be emphasized at different levels. Accordingly, discrepancies can occur among personal and work context goals (van Dam, 2014), task and social goals (Chong & DeShon, 2013), and conscious and subconscious goals or feedback (Bipp & Kleingeld, 2013). More research is needed regarding employees responses in these multi-goal environments; how will explicit and implicit goal-discrepancies affect employee motivation, behaviour, and well-being?

How much room is there for changing these strategies? How can work environments be (re)designed to reduce discrepancies?
Work environments can be changed, or redesigned, in many different ways and at different levels in order to reduce discrepancies and increase adaptation. Interventions are generally placed at three different levels: the individual, work environment, and organisational level. At the individual level, fit can be enhanced by attracting the right applicants through recruitment; by carefully selecting those employees who match the job, team, and organisation; by developing socialization programs for new entrants; and by providing employees with ample opportunities for implicit and explicit learning. Mentoring, coaching and career counseling are additional interventions that can decrease discrepancies and improve fit, for instance through strengthening personal resources (e.g., self-efficacy) and

enhancing self-reflection. Moreover, employees should be stimulated to show personal initiative and come forward when disturbing discrepancies are noticed, or to proactively craft their own jobs (Bipp & Demerouti, 2013; van Dam et al., 2013).

At workplace level, interventions can focus on the task environment. Theory and research (Demerouti et al., 2001) indicate that interventions aimed at increasing job resources (i.e., autonomy, meaningful work, and challenging assignments), and decreasing job demands (e.g., quantitative and emotional work load) will have positive effects in terms of increased motivation, job satisfaction, learning, performance and well-being. Interventions could also focus on the social work environment, and aim at, for instance, increasing social support from peers and the supervisor, improving the (LMX) relationship with the supervisor, developing adequate management competencies, and team building. Such interventions do not only refer to management driven approaches, but also take to the proactive employee into account. Additionally, research suggests the importance of job security (De Witte, 2005), and fulfilling the psychological contract (Dabos & Rousseau, 2004).

Interventions at the organisational level should ideally be focused at supporting interventions at the personal and workplace level. Organisations can contribute greatly by institutionalize some of these interventions into their human resources (HR) policies. Whereas organisations often use a short-term, financial framework, they can increase their strategic success through developing HR policies that aim at long-term adaptation, well-being, and productivity. Previous research has already shown the importance of HR policies for workers' sustainable employability (Kooij, 2010).

Explicit and implicit strategies: The lifespan

Human development is a central element in the field of lifespan psychology, referring to the qualitative and/or quantitative changes that reveal themselves during the lifespan. Human development is conceived as a dynamic system – a perpetually on-going process, extending from conception to death, that is moulded by a complex network of biological, psychological and social forces (Lerner et al., 2011). As insight in the strategies individuals implicitly and/or explicitly select to regulate their behaviour is a crucial element in understanding human development, research of a number of faculty staff members (N. Jacobs et al., 2014) is focused at examining
  a) the implicit and explicit strategies individuals draw on to deal with determinants of human development that express themselves during the lifespan.
  b) the implicit and explicit strategies individuals use to interact with the environment.

Their research is particularly directed towards the strategies individuals employ to generate and retain well-being and optimal functioning and tries to formulate answers to the following questions:

Which explicit and implicit strategies do people use in behaviour which has an effect on human development in diversity of situations and across situations?
Multiple, interacting forces such as biological, social and historical forces influence Lifespan development. Although lifespan researchers recognize that these forces work together,

combining in unique ways to fashion each life course, they traditionally organize these influences in three categories (Berk, 2014):

Age-graded influences are events that are strongly related to age and therefor fairly predictable in when they occur and how long they last (Berk, 2014). Age-graded influences can be biological (for example puberty around age 12 to 14, increasing memory failures during older age) or can be influenced by social customs (for example getting a drivers' license at age 18).

Individuals employ implicit and/or explicit strategies to deal with these age-related influences. For example, older adults can face their memory loss by explicitly looking for compensatory techniques or strategies such as relying more on external aids like calendars and to-do lists.

History-graded influences are forces that are unique to a historical era or to a specific social situation. These influences explain why individuals born around the same time tend to be alike in ways that set them apart from people born at other times (Berk, 2014). Each generation is characterized by different experiences that implicitly or explicitly shape their perspectives and behaviour. For example, individuals born between the mid 1990s and 2010 are also known as 'digital natives' as they grew up with the widespread use of digital technologies like the Internet and social networking sites. They are characterized as tech-savvy and globally connected (in the virtual world). Individuals of this era rely on implicit and/or explicit strategies to interact with these digital possibilities, for example, most Facebook users implicitly understand the unspoken rules on how to behave on Facebook and regulate their behaviour based on this implicit understanding.

Non-normative influences are events that are individual-specific. They happen to just one person or a few people and do not follow a predictable timetable (Berk, 2014) such as for example divorce, a traumatic event or winning a large amount of money. These influences may change an individual's course of life in an unexpected way. When faced with these events, individuals have to rely on their implicit and explicit strategies.

In short, biological, social and historical forces interact to influence lifespan development. Individuals deal with these forces using implicit and explicit strategies. Research of faculty staff members within the area of lifespan psychology is directed at identifying these strategies and their effect on mental health and well-being in particular. Studies, based on the naturalistic Experience Sampling Method ((N. Jacobs et al., 2005a; Myin-Germeys et al., 2009b) see elsewhere for detailed description)), investigate the role of daily life, implicit affective processes (such as stress reactivity, reward experience and hedonic capacity) in relation to mental well-being (e.g. (Collip, Wigman, et al., 2013; Geschwind et al., 2010a; N. Jacobs et al., 2013; Menne-Lothmann et al., 2012; Wichers et al., 2010; Wichers et al., 2012; Wigman et al., 2013)) and health-related behaviours such as smoking and snacking (S. Wouters, V. Thewissen, K. Zamani, L. Lechner, & N. Jacobs, 2013b). In addition, studies conducted by staff members examine the effect of the implicit and explicit strategies used to cope with adversity and life stress such as trauma on mental health and how this effect is expressed at the level of the brain (Collip, Myin-Germeys, et al., 2013; Hernaus et al., 2013; Hernaus et al., submitted; J. Lataster et al., 2014; J. Lataster, Myin-Germeys, Lieb, Wittchen, &

van Os, 2012). Another area of research within the lifespan department is directed at identifying and intervening in the implicit and explicit strategies used by older adults and their formal and informal caregivers to deal with the (pathological) effects of age-related influences (Leontjevas, Gerritsen, Koopmans, Smalbrugge, & Vernooij-Dassen, 2012; Leontjevas, Gerritsen, et al., 2013; Leontjevas, Teerenstra, et al., 2013).

How do people deal with effects of the interaction between explicit and implicit strategies for behaviour?

Individuals handle the interacting biological, social, historical forces using implicit and explicit strategies. It is clear that these strategies do not always have the expected outcomes in terms of constructive growth, optimal functioning, well-being or even happiness. Tension is experienced when implicit and explicit strategies clash and counteract in their effect on human development and on optimal self-realisation in particular. This tension between implicit and explicit strategies for behaviour reveals itself during daily life, when individuals are interacting with the persons and the world around them (Myin-Germeys et al., 2009b). Current research conducted by faculty members consists therefore of ecological valid, daily life studies investigating the effect of the (implicit) strategies used to deal with the context of everyday life as expressed for example in the case of stress-sensitivity. It has been shown that an increased negative affective response to daily life stressors is associated with decreased psychological well-being (Collip, Wigman, et al., 2013; Kramer et al., 2014; T. Lataster et al., 2009a; van Winkel et al., 2014; Wichers, Geschwind, et al., 2009a; Wichers, Schrijvers, et al., 2009a; Wigman et al., 2013), whereas the introduction of day structure and pleasant events in daily routine can improve mental well-being (Leontjevas, Gerritsen, et al., 2013). Even more, studies showed that reactivity to (daily life) stress could be observed at the level of the brain (Hernaus et al., 2013; Hernaus et al., submitted; J. Lataster et al., 2014; J. Lataster et al., 2012; J. Lataster et al., 2011).

As research in the area of lifespan psychology is particularly directed towards the implicit and explicit strategies individuals employ to generate and retain optimal functioning, daily life studies are conducted investigating the effect of the (implicit) strategies used to generate positive affect. The broaden-and-build theory posits that experiences of positive affect broaden the momentary thought-action-repertoire of the individual, which in turn serves to build enduring individual resources such as intellectual and social resources. The broaden-and-build theory suggests that the capacity to generate and to experience positive affect can be considered to be a fundamental element to the study of human optimal functioning and well-being (Fredrickson, 2001). Indeed, studies showed that positive emotions and psychological processes such as reward experience (increased positive affect in response to positively appraised activities, company and events) preserve mental health (Collip et al., 2014; Geschwind et al., 2010a; Hohn et al., 2013; Menne-Lothmann et al., 2012; van Winkel et al., 2014; Wichers et al., 2012).

How much room is there for changing these strategies in the diversity of situations that people come across? How can human environments be (re)designed to release this tension?

Individuals implicitly and/or explicitly select strategies to regulate their behaviour when dealing with determinants of human development and environmental influences. These strategies can be destructive (or at least disruptive) or constructive. Destructive strategies

lead to dysfunctional, non-adaptive behaviour and can induce psychopathological symptoms, causing stagnation or even more decline in the individual development. Constructive strategies, however, lead to functional, adaptive behaviour and can induce well-being and optimal functioning, fuelling constructive growth. Evidence-based interventions may strengthen these strategies. Studies showed for example that positive affect, a central element to the study of human optimal functioning, can be generated through daily life physical activity (Wichers et al., 2012) and through pleasant daily life activities, company and events (Collip et al., 2014; Geschwind et al., 2010a; Leontjevas, Gerritsen, et al., 2013; Menne-Lothmann et al., 2012; Wichers et al., 2010). Spirituality and religion are also known to contribute to health and well-being (Diener, Tay, & Myers, 2011; Hackney & Sanders, 2003). Resilience, traditionally defined as the individual's capacity to bounce back from stress, is associated with positive outcomes such as positive affect and optimism (Leontjevas, Lataster, Op de Beek, & Jacobs, submitted).

Interventions aimed at generating well-being and positive outcomes such as positive affect in particular should therefore 1) give individuals more insight into their daily life behavioural patterns, especially these behavioural patterns associated with positive outcomes (promotion of awareness: implicit becomes explicit) and 2) strengthen the (implicit and explicit) strategies that regulates towards these behavioural patterns and weaken or even fade out the (implicit and explicit) strategies that regulates towards behavioural patterns associated with negative outcomes (promotion of change) and 3) if necessary stimulate the development of new explicit strategies regulating behaviour towards the desired positive outcomes (promotion of change) and the transition towards a habitual or implicit application of these strategies (promotion of maintenance of change).

The recent rise in new mobile health interventions makes it possible to translate the 'film' of daily life – as assessed with ecological research methods such as ESM (N. Jacobs et al., 2005a; Myin-Germeys et al., 2009b); see elsewhere for detailed description) – into (real-time) person-tailored feedback on relevant patterns of emotions and behaviour in daily life (Wichers et al., 2011), helping individuals to select a strategy that regulates behaviour towards the desired positive outcomes.

Research in the area of lifespan psychology also shows the effectiveness of specially designed multifaceted programs aimed at intervening in environmental, psychological and social factors. For example, the multidisciplinary care program Act In case of Depression (AID), showed to be effective in helping individuals (in casu: residents of nursing homes and their formal caregivers) to develop new implicit and explicit strategies in order to enhance well-being (Gerritsen et al., 2011; Leontjevas et al., 2012; Leontjevas, Gerritsen, et al., 2013; Leontjevas, Teerenstra, et al., 2013).

Implicit and explicit strategies: Evolutionary and cultural origins of behaviour

A research programme focusing on explicit and implicit behaviour strategies and the interaction between them is aided by a focus on evolutionary foundations of behaviour. As any other species, humans are, after all, the product of a long evolutionary history. The

results of this phylogenetic process is a set of adaptive, but mostly implicit behaviour strategies and predispositions, anchored in the genes waiting for environmental cues to come to an expression that matches the environmental demands.

During ontogeny these predispositions are transformed into specific dispositions as we interact with our environment. With regard to human behaviour, these dispositions can be described as strategies for behaviour, both on a biological and a psychological and social level. Some Evolutionary Stable Strategies on the phylogenetic level result, because of tuning during ontogeny, in behaviour strategies that result in higher probabilities of survival on an individual level. Because of this, the tuning of human behaviour has become more and more flexible, enabling regulation of behaviour in widely differing circumstances, that evolutionary speaking are often "unforeseen".

Tinbergen's "Four Why's"

The idea of human evolved behaviour strategies as implicit can be traced back to the work on human instinct by Charles Darwin (1859, 1871, 1872) and William James (1887, 1890, 1892). However, pronounced attention for the ontogenic development of such strategies during life, only more recently arose with the work of Niko Tinbergen (1951, 1963). Tinbergen pointed out that when biologists, psychologists, or ethologists ask about the "causes of behaviour" there are really four types of causes of behaviour to be distinguished (Tinbergen, 1952). Explanations focus either on:

1. The immediate **causation** of behaviour: the cause of behaviour as traditionally understood in the sense of the initial condition, immediately preceding the behaviour. Such an explanation should also include a description of the mechanisms that transpose the specific stimulus condition into a specific behavioural response.
2. The **ontogeny** of behaviour: to understand the interaction between stimulus (as part of the environment) and organism one needs to understand how the organism has become what it is. Therefore, one needs to study its ontogeny, i.e. the development of the organism and it's behavioural mechanisms and behavioural patterns. There are good reasons to assume that the boundaries of this development often have a deeper ground. Examples suggest that such development can be under epigenetic (in stead of purely genetic) control, implying that certain environmental conditions must be present in order for genes to express themselves in certain traits or features (Barendregt, 2004; Barendregt & Van Hezewijk, 2005).
3. The **phylogeny** of behaviour: an organism is not only the result of its ontogeny but also of its species' evolution. The phylogenetic origins of an organism offer the framework of opportunities and constraints for the development of the body and its organs, as well as the behavioural patterns that members of a certain species can express. Knowing the evolutionary precursors of a species' behaviour helps to answer the question what kind of behaviors are at all possible or impossible to find in a member of the species, or what behaviours are hard to erase or avoid.
4. The **function** of behaviour: in order to know why an individual member of a species performs as it does, one could analyse it's phylogenetic or ontogenetic *origins*, and the immediate *causes* of its behaviour, but also what *functions* these evolved mechanisms have -- and have had -- for increasing the spread of it's genes. Many cognitive mechanisms reduce uncertainty, or help to control motivation, and several

of the social heuristics and mechanisms we take for granted, have an important function in that they directly help to maintain social networks, thereby help members of the species to survive and eventually procreate.

According to Tinbergen, each of these four explanations is complementary to the others, and an answer to each is necessary to fully understand behaviour. However, it is questionable whether these four explanations are sufficient when it comes to human behaviour. Tinbergen already aptly remarked that during ontogeny, two processes could be distinguished. First, we point to the physical, including physiological and endocrinological process of individual maturation, under pressure of the environment. This process is largely epigenetic in nature and has profound influence on the adaptation of behaviour to local environments. The second, ontogenetic process is the largely psychological process of the implicit tuning of evolved predispositions to the local environment through learning processes and implicit development of behavioural strategies. The social environment is an important, if not the most important part of an individual's "ecology".
Additional "Why"

In this last respect, an understanding of human behaviour becomes much more complicated than straightforward evolutionary explanations. Especially during ontogeny, much more is at hand than an epigenetic unfolding of evolved dispositions. Therefore, a more fine-grained conception is needed of the several ontogenic functions that are related to human behaviour, apart from the plain phylogenic function of reproductive success. Of course, humans do implicitly strive towards sexual reproduction, but people also adhere to group norms, simply for the sake of the feeling of belonging, they strive after hedonistic pleasures simply because it feels good, and they do set themselves explicit targets for behaviour, or at least they claim to do so. These strivings need not necessarily all point in the same direction. Reproductive effort might conflict with group norms or hedonism, and explicit behaviour strategies sometimes are directly opposed to any of the mentioned implicit strategies (Eshuis & Van Hezewijk, 2008).

For instance, the initially averse response to strangers seems to reflect implicit strategies for behaviour that are hard to avoid and unlearn, or even natural (Sober & Wilson, 1998; Wilson & Sober, 1994) even though our explicit principles of correctness object to that. Simple heuristics may prevent people from behaving morally in, e.g., deciding to become an organ donor (G. Gigerenzer, 2008a; G. Gigerenzer & Todd, 1999). On the surface, addictions may be learned responses (i.e. ontogenetically caused). However, they may very well reflect strong preferences with a background in the evolution of the species, and meanwhile have consequences for health and for influencing unhealthy behaviour such as eating fat or smoking. Note that the implicit strategies themselves need not be (im)moral, or (un)healthy, or (ir)rational, or (un)fair, to have consequences in these areas.
Although explanations inspired by psychological, biological or evolutionary theories tend to be interpreted as deterministic and without the need for any hypothesis of free will, it nevertheless *appears* that humans sometimes have a choice. To a certain degree, in some circumstances and at certain moments, humans can be autonomous; that is, they are, or at least feel, free from internal heteronomy (e.g. hypnosis) or from external heteronomy (control from outside, power) or disonomy (self-control is lost, broken or impossible)

(Watkins, 1999). So, e.g. in sexual behaviour, in fairness, in health and unhealthy behaviour, in pathological behaviour: "we feel that we consciously cause what we do; and yet, our actions happen to us." (Wegner, 2002, p. ix). The most interesting question then becomes: how do conscious will and psychological determinism -- in the words of Wegner (2002) - sometimes become "friends"? In other words: how do these explicit and implicit behaviour strategies interact?

Our research in this field has a twofold focus. On the one hand, given the principles above, we try to formulate a general model of human behaviour that is grounded in evolutionary theory but also allows for the emergence of socially tuned behaviour (Eshuis & Van Hezewijk, 2008; Eshuis, Van Hezewijk, & Verheggen, 2009; Van Hezewijk, Eshuis, & Verheggen, 2011) and asks about the space that is left for genuine volition. On the other hand, we focus on behaviour in some of the most important areas of life: health, mental health, work, sexual behaviour and everyday life (Eshuis & Van Hezewijk, 2008; Van Hooren, Waterink, & Eshuis, 2009). We try to discern explicit and implicit strategies that people use in these areas. Our aim is to have the approaches mutually capitalize on each other, with the theoretical approach plotting possible courses for research and the empirical work being a critical check on the theoretical work.

Consequently, the basic questions of the present programme were formulated as:

> *Which strategies regulate behaviour in diverse situations? How do people deal with their implicit biological "forces" and their explicit cultural (cognitive, rational, consensual, coordinated, etc.) demands for conformity, compliance, and rational life style? To what degree are humans free from biological constraints and forces in behaviour that is allegedly, if not obviously biologically inspired? How can human environments be (re)designed to release the apparent, if not real tension? Which intervention strategies are appropriate? How do human (social) environments change as a result of implicit strategies to coordinate behaviour, and how do people deal with explicit regulation of behaviour?*

Interestingly these questions can be put in a different way: if many behaviour strategies and regulation mechanisms have biological functions, or ultimate or proximate causes, they may very well be (have remained) *implicit*. That is, humans have propensities to act in ways that have phylogenetic origins, or even ontogenetical sources, but that are or have become automatic and of which, or of their origins, they are not aware. Nevertheless, they leave room for choices. Preferences may not need inferences (Zajonc, 1980), but actions may need explanations (stories) on the personal level that refer to inferences, even if sometimes the explanations (inferences) can only be provided for *after* the fact. In other words: for every person's act there is in daily life one or another story; in a research programme we want the story, and we want the story tested: is there a story before the act. Culture is a great provider of stories, but this doesn't mean I is the explanation of all behaviour

SEXUAL BEHAVIOUR

The way human beings deal with the implicit strategies we inherited interacts with the (often explicit) strategies that apparently belong to "culture". This leads to the following question that *mutatis mutandis* returns in every of our more domain specific research activities:

Which explicit and implicit strategies do people use in behaviours in a diversity of situations and across situations, and in particular in respect with sexual behaviour? In other words, are there general characterisations for the implicit strategies that people use? To what cues do individuals initially react? How are these cues selected out of the seemingly endless amount of information that impinge on the individual? How do basic motivational or energetical processes modulate human behaviour? How do individuals learn which cues are the most relevant? How do they learn appropriate reactions to those cues?

These questions are investigated from a multidisciplinary perspective. Using insights from biological, social, clinical, and theoretical psychology, the focus lies on sexual behaviour as the most obvious domain on which evolution has endowed us with such implicit behaviour strategies. Interestingly it also often is in need of (explicit) self-explanations, excuses, stories, or rules of behaviour (etiquette) denying the biological drives we inherited.

With regard to the last two questions directly above, it is not only investigated what implicit strategies are used, but also to what degree these are made explicit during ontogeny and maybe even deflected to other goals.

The next of the central questions in a research programme like the present one follows from this:

How do people deal with the differences between these explicit and implicit strategies for action, and how do explicit and implicit strategies interact?

Not all implicit and explicit strategies conflict in a logical sense. Some may, in a way, even enhance each other; but unless the implicit and the explicit regulation strategies are incommensurable to each other, they may very well lead to the question how to deal with them when they lead to different actions. An example shedding light on this question, involves the sex drive, or the drive toward sexual selection.

Part of our research is the development of an instrument to measure this sex drive, and to answer questions how people deal with the tension between implicit mechanisms generating sex drive, and explicit behaviour regulating influences from the environment. Obviously most of the strategies in sexual behaviour are implicit. Although their bodily effects often are measurable and could be described as explicit behaviour, their mechanisms are automatic, not or only partially under conscious control, unintentional and they work efficiently (to repeat criteria given by (Friese, Hofmann, & Schmitt, 2008). Sex drive is considered as the evolutionary engine for specific male and female conduct. However, environmental, i.e. cultural influences moderate the strength of the drive. The evolved sex drive supposedly is strong, yet explicitly (culturally) canalized. How do people deal with the tension this situation creates? Even more so, what happens when cultural tunings of sexual impulses suddenly cease to function properly when, for instance, sexual inhibitions deteriorate because of ageing (Bartelet et al., 2014; Van Hooren et al., 2009; Waterink & Van Hooren, in prep.)?

In a similar way, the "relations between the sexes" may be *presented* as the result of explicitly justified, rational choices, e.g. in partner selection; however there may be very stable explanations of behaviour in terms of implicit strategies, preferences, obsessions, regularities that we are unaware of. Within this context, our research focuses on jealousy. Jealousy can be defined as the negative emotional response to the actual, imagined or expected emotional or sexual involvement of the partner with a rival (e.g. Bringle & Buunk, 1991). According to evolutionary psychologists, jealousy alerts the individual to take action when the pair bond is (perceived to be) threatened by a rival. By preventing a partner's extra-dyadic involvement (and thus a potential loss of reproductive resources), jealousy enhances individuals´ fitness and chances of survival (e.g. Buss, 2000).

Because, in our evolutionary past, for long periods of time, humans lived in relatively small groups or tribes of maximally 150 individuals of which about 20% was kin (Hill & Dunbar, 2003), jealousy evolved in an environment characterized by a limited number of potential rivals. Nowadays, by means of television and internet, individuals are, on a daily basis, exposed to numerous highly attractive same-sex individuals that may all be perceived as potential rivals for their partner's attention. Moreover, since the introduction of the mobile phone and internet, the possibilities of, secretly, approaching and communicating with opposite-sex individuals have increased enormously, possibilities that may all activate the mechanism of jealousy. Research has indeed begun to show that individuals consider infidelity through the Internet to be as real as offline infidelity (Schneider, 2003; Whitty, 2005) and may, indeed, evoke considerable amounts of jealousy (Dijkstra, Barelds, & Groothof, 2010, 2013).

For several reasons it is important to examine the extent to which modern forms of potentially unfaithful partner behaviour evokes jealousy, and how they affect individuals' wellbeing and relationships. From a theoretical point of view it is relevant to know how the experience of such an evolutionary old mechanism as jealousy is affected by our modern, technologically enhanced environment. For instance, do 'modern' potentially jealousy-evoking partner behaviours evoke qualitatively and quantitatively similar jealousy responses than more traditional, i.e. physically verbal and non-verbal, behaviours? Research of Groothof, Dijkstra and Barelds (Groothof, Dijkstra, & Barelds, 2009) has already set one step in this direction by showing that similar sex differences are found in the jealousy responses to online emotional and sexual forms of infidelity as were previously found following offline forms of emotional and sexual infidelity. From a practical point of view this knowledge is important to help develop more effective therapies to adequately deal with (maladaptive forms of) jealousy in response to a partner's involvement with potential rivals by means of modern communication devices. A growing number of couples struggle with this issue, whereas, in the mean time, therapists do not yet have the right tools to help these couples (Dijkstra et al., 2010, 2013).

Future research on jealousy will focus on further specifying the jealousy responses to different 'modern', potentially jealousy-evoking partner behaviours. For example, relevant questions are what forms of modern infidelity evoke the strongest feelings of jealousy in men and women, and what type of jealousy is evoked by modern forms of infidelity (e.g. anxious or angry jealousy, cf. (Buunk & Dijkstra, 2004). In addition, future research will study

the behavioural and motivational strategies that feelings of jealousy may evoke to protect the pair bond. For example, are jealous people motivated to make themselves more attractive to their partner, or are they motivated to derogate their rival? In all these studies, relevant individual differences will be considered, such as social comparison orientation and neuroticism.

ONTOGENETICAL AND VOLITIONAL ADAPTABILITY
Tinbergen's analysis of the four ways to explain behaviour, as discussed above, also guides research activities of a more conceptual nature. By tradition psychology is mainly concerned with the first and second types of Tinbergen's causes. When more attention is given to the third and fourth of Tinbergen's causes it becomes more clear how and why many implicit behaviour strategies have come into existence. It could also be helpful in clarifying how these have led to the emergence of the human capability to form explicit behaviour strategies in certain domains as well.

Taken together, the phylogenetic and ontogenetic backgrounds of the individual constitute constraints on behaviour, on behavioural change, on habit formation, on sensibilities and susceptibilities for opportunities and risks, which largely can be interpreted as implicit behaviour strategies. Eshuis & Van Hezewijk (2008) and Van Hezewijk & Verheggen (2007) suggested that, by expanding Tinbergen's analysis with some relatively simple additions, a sufficiently rich framework emerges for explaining properties of organisms, including human behaviour strategies. This includes the "social organs", the cognitive equipment, the outfit of emotions and feelings that are typical for the human species, and the so-called "determinants" of psychopathological and health related behaviour. One could see them as the result of both the first and second nature of the species. That is, they are the result of implicit, explicit or habitual dispositions to react to e.g. (un)healthy stimuli, (un)fairness, social dilemmas, and ways of dealing with others that have developed in small and large groups by way of consensual coordination. (See also Eshuis, 2013; Van Hezewijk, 1998, 1999, 2001, 2002, 2003, 2005).

As discussed earlier an expanded evolutionary model is being developed that is thought to be appropriate to understand these processes (Eshuis & Van Hezewijk, 2008; Eshuis et al., 2009). If the emergence and existence of 'culture' can be explained as the result of implicitly and consensually coordinated actions (Verheggen, 2005; Verheggen & Baerveldt, 2001, 2007; Voestermans & Verheggen, 2007a, 2013) the core question is: What are the evolutionary precursors of behaviour with an *apparently, allegedly* cultural origin? The expanded evolutionary model that is being developed addresses this question primarily with the aid of the theory of sexual selection (Darwin, 1871; Miller, 1998, 1999, 2000). Related to the concept of culture of Verheggen (2005) and Tomasello (1999, 2006) on intentionality, new insights are explored in which 'culture' is analysed as explicit and – mostly – implicit strategies for sexual behaviour. In other words: to what extent do implicit strategies for behaviour that result from the interaction of individuals in groups reflect, conflict with, or support systems of partner selection at several ages? And, posing the question the other way around: Can the often explicit cooperative strategies that lie at the foundation of cultural behaviour be explained as an outcome of the mainly implicit competitive process that occurs during sexual selection?

Consequently, the said model primarily offers a framework to answer the first two questions of our programme:

1) *which explicit and implicit strategies do people use,* and *2) how do these strategies interact?*

However, by addressing these questions by means of a theoretically grounded model, we also offer a structured framework for the approach of the third and fourth question. Biological determinants are a source of implicit behaviour regulating mechanisms. Especially where the opportunities, capacities and constraints for successful interventions are concerned, they cannot be underestimated. They have consequences for what can be easily influenced by learning, or by negotiating, or in consensual coordination, in "willful" behaviour change, in "reasoned action", etc., and what cannot be easily changed – e.g. in health related behaviour, moral behaviour (fairness). In other words: to understand which interventions might work, and which might not, the interaction of both phylogenetical and ontogenetical, including social factors, must be studied. That is, not only *that*, but also *how* explicit and implicit strategies work and interact, and to what degree they influence behaviour. If human evolution has led to a restricted number of evolved predispositions, there must be differences in the degree that explicit regulation of behaviour will succeed. This leads to the third of our central questions:

How much room is there for changing these strategies in the diversity of situations that people come across?

From a theoretical angle it can be suggested that the third and fourth of Tinbergen's determinants play a role in answering this third of our central questions. For instance in the evolutionary utterly relevant categories of 'sex' and 'age' implicit behaviour strategies can be found that are differentially hard to change and that are differentially vulnerable for cultural "redesign". Building on aforementioned primary implicit behaviour strategies, mankind has, over the course of evolution, developed the capacity for cultural, behavioural change, but this capacity could very well depend on the "domain" of behaviour. It is on this level that behaviour strategies can become explicit (i.e. through rules that are instated in a specific social group). Room for changing these strategies thus lies in changes that can be made to the physical and social ontogenic environment. Understanding how specific cues from this environment lead to actions in a specific behavioural domain, allows us to wilfully change this environment with the object of directed behavioural change. Thus the fourth question to be asked stems from a theoretical analysis but has consequences in a diversity of practical domains: *How can human environments be (re)designed to influence this multitude of strategies?*

In other words, again, the question is which intervention strategies are adequate? Can environments be (re)designed such that they become richer in terms of learning opportunities?
Seen from the perspective of rational change and intervention, the latter questions are appropriate. From a perspective of culture as dynamic, yet unplanned tuning of behaviour in a group, the question should be rephrased into *How do human environments change to release this tension?*

In a number of studies (Stam & Van Hezewijk, 2007; Van Hezewijk & Verheggen, 2007; Verheggen, 2005; Verheggen & Baerveldt, 2001; Voestermans & Verheggen, 2007a) it was suggested that "culture" can be understood as the ever-changing and short-term evolving result of adapting behaviour to environmental challenges -- including the consensual coordination or mutual adapting of social behaviour (Verheggen, 2005) -- and perhaps also the result of attempts to consciously deal with implicit dispositions having phylogenetic origins, in order to resolve the tension with explicit social demands. Work is now in progress to study the consensual coordination of actions in newly formed groups of adolescents, using observation techniques to establish coalition formation and power relations (De Bil & Verheggen, in preparation). Another interesting approach still to be explored is how professionals learn (their lives long) to deal with the explicit rules and regulations of their trade, and the implicit strategies to solve actual problems, e.g. in the domain of professionals in the legal system. Elsewhere remarkable results have already been found (G. Gigerenzer & Engel, 2006).

CONSENSUAL COORDINATION: IMPLICIT LEARNING IN DAILY LIFE
Reber (1993) defined implicit learning as "the acquisition of knowledge independently of conscious attempts to learn and in the absence of explicit knowledge about what was learned". Sometimes, this situation is referred to as tacit, episodic, non-formal or non-deliberative learning. It may include the instant remembering and evaluation of earlier experiences in actual events, routine-like enactment of behaviour (habits), non-conscious norm or rule following, intuitive or heuristic decision-making, and so on. Although such patterns in the behaviour of individuals can often be observed, the difficult question to be answered is how these regularities were acquired. People may find it hard or impossible to account for their behaviour, or they are even unaware of their patterned conduct. In contrast to explicit or deliberative learning, then, implicit learning typically lacks prescribed learning contexts, methods, teachers, goals, and assessments.

The problems studying implicit knowledge and learning are rather obvious: how to recognize what is implicit? How to make the implicit visible? Can implicit learning and implicit knowledge be made explicit at all, without losing their defining features and functions? Whatever logical it may seem to search for verbal or written accounts in order to reveal implicit knowledge structures and unobtrusive learning strategies, much of what is searched for is in fact non-propositional or non-semantic in nature. It is one thing to theorize about one's actions or the actions of others, it is often another thing to establish how those actions really came about. Tomlinson (1999) argues that as a result of many years of experience, professionals may just know the right thing to do. The intuitions and feelings they have developed may not even become part of their own perception of the facts.

To simply rely, then, on accounts by respondents who try to introspect into their motives for behaviour and thoughts about what they will do, is questionable indeed. Without some training, they may altogether lack the skills to accurately reflect on their actions. Respondents' accounts can quickly become ad-hoc rationalizations or wishful representations of how they learned and how they acted as they did. A similar idea is refracted in Argyris and Schön's (1974) distinction between theories in use and espoused theories. The latter

refer to the ideal way of perceiving and rationalizing the situation while the former entail experientially developed heuristics and maxims that are on the verge of being made explicit.

Moreover, accounting serves more social functions than just the internal representation of a true state of affairs in the world. Respondents may convey all sorts of meanings in their accounting, such as making sure they will be liked, showing who is in charge, expressing their moods, or revealing their underlying intentions. Interview and observation techniques in discursive psychology or conversation analysis sometimes reflect awareness of these different social functions. Their methods help to turn implicit meanings and strategies in accounting into the very theme of research. Discursive and narrative approaches may therefore provide a valuable framework for studying implicit learning and implicit knowledge, thus supplementing research using approaches that assume explicit strategies for behaviour. In addition, biological processes and states, such as hormone and blood sugar levels, clinical pathology, and genetic endowment may unwittingly affect people's perceptions, cognitions, decisions and accounting. We will return to these research issues below.

Eraut (2000) has cogently summarized the perspectives on the wishful and actual descriptions of a state of affairs, adding that "[k]nowledge of contexts and organisations is often acquired through a process of socialization through observation, induction and increasing participation rather than formal inquiry. Thus norms, local discourse and other aspects of an organisational or occupational culture are acquired over a significant period of time by processes which implicitly add meaning to what are explicitly interpreted as routine activities."

For our purposes, this contention is important in two respects:
- o First, it orients our attention to implicit learning as part of the everyday cultural settings in which people partake.
- o Second, it sensitizes us to not confuse perceived regularities in behaviour (such as routines and norm-following conduct) with the mechanism that actually led to those regularities in behaviour (such as observing, imitating, and participating).

Patterns in behaviour (habits, routines) and implicit normativity
These two observations are the central concern in theories of behaviour and cognition that attempt to account for the production of patterns in the behaviour, feelings, and cognitions of people as members of an intrinsic social group[10] (Baerveldt & Verheggen, 1999b, 2012, in press; Greenwood, 1994; Voestermans & Verheggen, 2007a, 2013). One of the key notions in such a framework is mutual coordination of actions (Baerveldt & Verheggen, 1999a; Fogel, 1993; Maturana & Varela, 1987). This entails the ongoing tuning of one's behaviour to that of others, which is an immanent task for every member of the group – hence 'mutual' coordination or tuning. The proper metaphor would be a dance, not necessarily instruction or explicit command. People usually do not coerce one another into a course of actions, but

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[10] Intrinsic social groups (Greenwood, 1994) are real operative groups in the sense that their members communicate, have different roles, share agreements, conventions and arrangements. A family, colleagues at the work place or a soccer team are examples of intrinsic social groups. They are contrasted with aggregate groups which are constructed by people –often researchers – on the basis of a common feature that people share, e.g. being women or Catholics. Most often, such ' groups' have no significance in daily life. Many similar distinctions occur in the literature under different names.

'invite' or 'accompany' one another into a conversation or into a chain of actions (cf. Merleau-Ponty, 1963). The notion of ongoing mutual coordination of actions tries to capture the implicit manners in which most everyday social interactions unfold. In the research programme of psychology this is considered as an alternative approach that might help in finding other ways of explaining and intervening behaviour in daily life, especially in matters of health, mental health, social exchange.

It is an important assertion in such an approach that, in the eyes of observers, behavioural patterns result from the ongoing mutual coordination of actions between people. People's patterns in behaviour, then, are primarily the consequence of their embodied coordinated actions within a community of actors, instead of being the result of individual motor programs that run from shared mental instructions or cultural prescriptions.

In popular discourse, in politics, but usually also in the social sciences, it is argued that people become members of a cultural group when they internalize the prevailing norms and values of their society. It is thereby tacitly assumed that these norms are somehow present in the collective and that they can be (predominantly) mentally appropriated. In the recent re-evaluation of phenomenological accounts of experience and normativity in biology, cognitive and social science, and philosophy (Dreyfuss, 1992; Gallagher & Zahavi, 2008; Maturana & Varela, 1987; Noë, 2009; Thompson, 2007), often referred to as 'enactive theory' or 'enactivism', the dominant metaphor is seriously challenged, arguing instead that norms cannot be pre-given to the people in a community. Instead, people already behave and feel in group-typical ways, such that regularities or norm-like patterns can be *derived* from observing their behaviours.

The question that remains is how these typical ways of behaving and feeling came about. As stated above, we look for answers in the embodied, mutually coordinated actions in which people are continually involved. This will involve, among others, imitation and emulation of behaviour (Tomasello, 1999), trying, practicing, making mistakes, thinking things over, receiving feedback and being corrected, trying again, refining, and so on. It is important to understand, however, that the resulting patterns in behaviour cannot account for the behaviour from which they were derived in the first place. This rather counterintuitive argument is also addressed by Eraut (2000): "[Implicit theories] are seldom explicitly stated by the knower but used by psychologists to explain his or her behaviour. *Those observed behave as if they believed the implicit theory imputed to them*" (p. 122, our emphasis).

It can of course be argued that surely humans do have norms or rules that determine how people behave, as members of a group to which these norms and rules apply. That statement is only metaphorically apt, however. Even in the case of explicit rule following, what remains to be understood is where the 'normativity' of the rule stems from. After all, its incentive cannot simply stem from a line of ink on a paper, nor can it stem from the mere power of spoken words. As already Wittgenstein argued, we can only understand a rule as the explication of an underlying social practice. Normativity, then, has to do with the way people's behaviours and feelings became structured in accordance with the behaviours and feelings of their parents, peers, and other significant others. In addition, the structuring

principle is not to be found outside of people (for instance in 'culture'), but precisely in the on-going process of what is often referred to as 'socialization'.

Social constructionism (e.g. Berger & Luckman, 1967) as well as social constructivist thinkers such as Vygotsky dealt with similar issues, and both frameworks entail significant learning theories about the individual in a social context. In both cases, however, the significant meanings are supposed to be already present socially, and they subsequently need to be internalized, shared, or otherwise appropriated by novices. When the focus is on implicit learning, as is currently the case, the often non-propositional nature of what needs to be learned or acquired poses a problem to constructivist or constructionist theory. An enactive approach to cognition and meaning making (see Varela, Thompson, & Rosch, 1991) is sometimes close to social constructivist/constructionist theme's and thought, yet appears to be better equipped to emphasize the implicit learning of skills, practices, as well as their inherent normativity.

On the basis of the aforementioned developments, Voestermans and Verheggen (Voestermans & Verheggen, 2007b, 2013) have argued how the ill understood notion of socialization –or the equally ill understood notion of culture– can be dissected in a number of concepts. According to the authors, socialization (or culture) is basically the implicit acquisition (learning) of a patterned behavioural repertoire (including knowledge and skills) within a group. Moreover, they have argued how there is an intrinsic, implicit, and situated normativity to those behavioural patterns (see also Baerveldt, 2007; Rietveld, 2008). Thirdly, these concepts are liable to research.

In order, then, to come to grips with the implicit learning and implicit knowledge entailed in (the acquisition of) everyday practices, whether in a private or professional context, research should aim for the following:

1. Individual behaviour largely depends on common practices in a group, rather than on conscious individual motives that are propelled by some interior motivating system. Therefore, the focus needs to be on what goes on between people, in terms of the ongoing mutual coordination of their actions.

2. This ongoing tuning can acquire a rather stable character for the participants, recognizable as patterns in their behaviour. These patterns manifest themselves as routines, habits, or automaticities in the behaviour of a person. These routines have to be understood as embodied practices or skills. It implies a focus on the unobtrusive training, by means of which these skills are adopted and refined.

3. Not only outward behaviour, but also feelings, cognitions, and in part even the senses become socially tuned within local communities of already skilled practitioners. Learning to play golf, to taste and discriminate wines, to make jokes, or to develop a feeling for the proper thing to say or do; they are all examples of behaviours, feelings, and cognitions that were practiced (trained) and refined in the community of already skilled practitioners.

4. Embodied practices are normative practices, precisely because they involve attuned feelings of right and wrong, proper and misplaced. Explaining why a joke was funny or why it was not, is often beside the point. The crux is to be found in the socially coordinated feelings of appropriateness and surprise. Because feelings too become attuned to what already experienced practitioners (members) of the group do, the 'ways of the group' become both a matter-of-course and, in a sense, compelling to the novice. People's accents are a good example of the obviousness and naturalness of characteristic patterns in the group, which –through sometimes explicit but largely implicit training– become part and parcel of people's embodiment and identity. At the same time, it is difficult (though not impossible) to change or get rid of the once acquired accent, revealing how persistent, authentic, and compelling these practices can be; again, precisely because they are embodied practices. The same is true for the other embodied practices that social life is chock-full of.

5. The acquisition of embodied normative practices always occurs in a social and physical setting. Apart from understanding the explicit rules and the implicit conventions of a social group, it is important to understand how the physical environment facilitates, shapes or obstructs the behaviour of individual learners. The classroom is an obvious example, but architecture (think of the implicit routing in airports or supermarkets) or physical arrangements in a house or an office may also contribute to the acquisition and prolonging of behavioural patterns. For instance, in their new homes immigrants often tend to reconstruct the living situation as it was in their countries of origin, and in some formal organisations the positions of the desks or the (in)accessibility of the chiefs offices reveal how the social relations are organized. Such arrangements are important in understanding how behavioural styles become shaped and regenerated.

ANTROZOOLOGY

The question whether strategies for behaviour are implicit, explicit or a certain blend of explicit and implicit, presupposes that there are explicit strategies to look at. In a sense most of the research in our programme and many others has a metaphysical core (Watkins, 1957, 1958, 1975, 1978) suggesting that for every behaviour there is some explicit or implicit strategy dealing with the array of distal and proximal cues the person has to deal with. Often it is hard to distinguish between implicit strategies and explicit strategies. Therefore it is interesting to see a development in psychology that may help to understand the way implicit and explicit strategies interact – apart from the added value in therapy and prevention. Antrozoology, the study of human-animal interaction, provides us with a means to study the "social" relation between organisms that are void of explicit rules, regulations and instructions. The focus is on the mutual tuning of behaviour between the actors, which is both expressive and affective (Fogel, 1993; Rochat et al., 2013; Voestermans & Verheggen, 2013) and leads to bonding, attunement, attachment and changes in the embodiment and physiology of the actors involved. The physiological base of their alignment may be located in ancient subcortical brain regions. In cross-species affective neuro-scientific research Paksepp (2011) decoded the primal affective experiences of humans and related animals. He found robust evidence that "raw primary processes (i.e. instinctual, unconditioned) emotional behaviours and feelings emanate in homologous brain functions in all mammals, which are

regulated by higher brain regions." This suggests that humans and mammals are able to experience similar emotions, and it is assumed that they recognize each other's emotions and tune in on each other's emotions and behaviour. By definition animals use implicit strategies, and human beings interacting with animals therefore can only use implicit strategies as well. Moreover, on the human side there is, apart from the "need to belong" and the sex drive perhaps yet another need that can be studied very well in the human-animal relation. That is the need for affection and the need to give affection. It is suggested that the hormone oxytocine – the hormone involved in affection and care – plays an important role (J. M. P. Enders-Slegers, 2013; M.-J. Enders-Slegers, 2000; Julius, Beetz, Kotrschal, Turner, & Unvnäs-Moberg, 2013)

The present part of the programme focuses on three themes.

1. Research into the fundamentals of bonding behaviour and attachment
2. Effects of human-animal interactions on human and animal well-being
3. The alarming correlation between animal abuse and domestic violence

Ad 1.

Attachment and Social Support are common theoretical constructs in psychology that are also applied in antrozoology. However, Similar to Fogel (1993) in development psychology, one can ask what patterns in social behaviour precede the ontological stages in which forms of attachment or social support are established. As Fogel argues, since the very first interactions between a child and a caregiver, relatively stable patterns of interaction occur that already frame how further interactions will develop –most importantly including those that comprise attachment styles. For Fogel, studying these very early forms of "co-regulation" or mutual attunement has been an important blind spot in developmental psychology. Dynamic systems approaches in developmental psychology and enactive approaches in cultural psychology have taken up that challenge (Baerveldt & Verheggen, 1999b, 2012; Fischer & van Geert, 2013; Van Der Steen, Steenbeek, Van Dijk, & Van Geert, 2013; Van der Steen, Steenbeek, & Van Geert, 2012; Van Geert, 1994, 2011) and they appear to provide a means par excellence for also studying co-regulation between man and animal; precisely because verbal communication is virtually impossible in this case. Adding new and powerful constructs to the conceptual toolkit of antrozoology is one main objective of the current research program. They should provide a solid theoretical base for notions of Attachment and Social Support in both psychology and antrozoology.

Ad. 2

Interactions with (companion) animals have proven to be beneficial for humans in important domains of Life Span Psychology, including children, elderly people, and people with special needs. Sometimes explicitly (as in Animal Assisted Interventions) and sometimes implicitly (as in taking care for animals and enjoying their company), animals invite people into a healthier life style and/or they help to enhance the perceived quality of life of people. Moreover, some animals can empower people with all sorts of physical disabilities or psychological challenges (e.g. blind people, traumatized persons, people with Down Syndrom or Autism Spectrum Disorder). Finally, in psychological interventions and therapy, as well as in periods of recovery after illness or being hospitalized, the presence of animals has proven to enhance the therapeutic process and to facilitate recovery. Profound scientific research is needed, however, to establish sound results and to determine more precisely (a) how these

effects can be explained, and (b) how the intervention, therapy, or recovery can be further optimized. This is important for safeguarding the wellbeing of both humans and animals involved (De Bruin, Oosting, van der Zijpp, Enders-Slegers, & Schols, 2010; M.-J. Enders-Slegers, 2000; Julius et al., 2013).

Ad. 3
Sadly, dysfunctional interactions with animals occur also. In a number of studies (Ottema, 2008; Quinlisk, 1999; Stecker, 2004; Volant, Johnson, et al., 2008), researchers found that the abuse of animals is a strong predictor of domestic violence and deviant behaviour. Children that abuse animals are prone to become delinquent at a later age than other children. Moreover, abuse of the domestic animals is an important and explicit marker for the occurrence of domestic violence. Our research will further explore this negative correlation, as a means to detect and prevent further domestic violence (as well as animal abuse) at an early stage.

As stated above, in many respects the antrozoological questions in our research relate to psychopathology, health psychology and lifespan psychology. In that sense the conceptual backgrounds as investigated in this section – together with sexual selection and evolution[11], and the study of implicit and explicit strategies and cultural patterns in behaviour – are an important conjunctive activity in the present programme.

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[11] As has been elaborated by Julius et al (2013),the four why's of Tinbergen can also be studied in human-animal interaction.

Ph.D. tracks

Finished PhD tracks

Van Osch, L. (2009). Beyond motivation. Evaluatie van voorlichting primaire en secundaire preventie van kanker van de Nederlandse Kankerbestrijding; Promotor: H. de Vries (UM) & L. Lechner (OU); co-promotor: A. Reubsaat (UM).

Van Stralen, M. (2010). Development, implementation and evaluation of a tailored based physical activity intervention for the over fifties (ZonMw project 6100.0003).

Braeken, V. (2012). Vroegsignalering van psychosociale distress bij kankerpatiënten/ The effectiveness of the Screening Inventory of Psychosocial Problems (SIPP) in cancer patients (KWF/kankerbestrijding: project UM 2008-4008); Promotor L. Lechner & R. Kempen; co-promotor: F. van Gils.

Berndt, N. (2013). Effectiveness of two intensive counseling methods for smoking cessation and relapse prevention in persons with coronary heart disease (ZonMw 50-50110-96-524); Promotor L. Lechner & H. de Vries (UM); co-promotor, projectleider: C. Bolman.

Janssen, E. (2013). Voorlichting primaire en secundaire preventie van kanker van de Nederlandse Kankerbestrijding; Promotor: H. de Vries (UM) & L. Lechner (OU); co-promotor: L. van Osch (UM).

Charlier, C. (2013). Revalidatie kankerpatiënten nazorg en bewegen; Promotor: L. Lechner & I. de Bourshoudhuij (UGent) &; co-promotor: E. van Hoof (VU Brussel).

Langendijk, G. (2012). The role of procedural fairness in power dynamics; Promotor J. von Grumbkow; co-promotor M. van Dijke.

Geenen, B. (2012). Rechtvaardigheidsprocessen in selectiecontext; Promotor K. van Dam & J. von Grumbkow, co-promotor: K. Proost.

Taverniers, J. (2012). Learning reduces stress? Stress inhibits learning? It depends; Promotor J. von Grumbkow; co-promotor J. van Ruysseveldt.

Ongoing PhD tracks

Internal PhD candidates:
- Jannes Eshuis (promotor René van Hezewijk)
- Saskia Wouters (promotor Lilian Lechner/Nele Jacobs/Viviane Thewissen)
- Stijn Friederichs (promotor Lilian Lechner/Catherine Bolman)
- Niels Jacobs (promotor Lilian Lechner/Trijntje Völlink/Francine Dehue)
- Denise Peels (promotor Lilian Lechner/Catherine Bolman)
- Irina Nikolova (promotor Karen van Dam/Jef Syroit/Joris van Ruysseveldt)
- Roy Willems (promotor Lilian Lechner/Catherine Bolman)
- Iris Kanera (promotor Lilian Lechner/Catherine Bolman)
- Kenny Wolfs (promotor Jacques van Lankveld)
- Rianne Golsteijn (promotor Lilian Lechner/Catherine Bolman)

External PhD candidates:
- Petra de Bil (promotor René van Hezewijk/Theo Verheggen)
- Rob van Bree (promotor Lilian Lechner/Aart Mudde/Catherine Bolman)

- Eva Broomans (promotor Jacques van Lankveld)
- Bram Brouwer (promotor René van Hezewijk/Hein Lodewijkx)
- Wiel Frins (promotor Karen van Dam/Joris van Ruysseveldt)
- Karin Goebbels-Prak (promotor Lilian Lechner/Catherine Bolman)
- Richard Griffioen (promotor Marie-José Enders)
- Liesbeth Hobo (promotor René van Hezewijk)
- Cor Hotting (promotor Lilian Lechner/Catherine Bolman/Natascha de Hoog)
- Lisanne Hummel (promotor Jacques van Lankveld)
- Birgitta Kox (promotor Jacques van Lankveld)
- Geza Kovacs (promotor Marie-José Enders)
- Roelie Mulder (promotor Karen van Dam/Arjan Bos/Mieneke Pouwelse)
- Petra Neessen (promotor Marie-José Enders)
- Mechteld Noij (promotor Karen van Dam/Karin Proost)
- Tom Platteau (promotor Jacques van Lankveld)
- Lonneke Schuurmans (promotor Marie-José Enders)
- Jan Sparenberg (promotor René van Hezewijk)
- Carolien Wijker (promotor Marie-José Enders/J. Schols)
- Elja van der Wolf (promotor Lilian Lechner/Wim Waterink/Susan van Hooren)

Research 2010-2013

The publication lists from 2010 till 2013 are available on demand at the Faculty P&OW.

External evaluation

The programme will be ready for external evaluation within 5 years after the first start (2016). All new research projects, especially where Ph.D. students are involved, will be evaluated in advance by the research committee of the psychology department. The committee will solicit for the advice of two external reviewers. Both the advice of the committee and the advice of two external reviewers that can be considered as experts in the field of the proposal will be considered by the dean (programme leader). All reviewers will be asked to use a (slightly modified) version of the NWO criteria for individual research proposals.
The faculty stimulates as much as budget allows conference visits, publishing in English, the preparation of research funding proposals etc.

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Part 3. Comments of reviewers

The programme was reviewed by two reviewed who can be considered experts in the domain the programme claims to cover.

- Prof. Dr. E. Van Avermaet, holding the chair of social psychology of the Catholic University of Leuven, Belgium. Professor Van Avermaet has been a member of visitation committees, has a long and outstanding research career in social psychology
- Prof. Henderikus Stam, holding the chair of theoretical psychology of the University of Calgary, Canada. Prof. Stam is the Editor of *Theory and Psychology* and a widely acknowledged overview of the development and state of the art in psychology in general.

PROF. DR. E. VAN AVERMAET
Evaluatie van het Research Programme Psychology 2008-2013, Open University:
"The interaction between explicit and implicit strategies for behaviour"

Het voorliggende research programma beantwoordt perfect aan de wens van de OU dat het onderzoek binnen de respectieve faculteiten geen amalgaam zou zijn van totaal onafhankelijke onderzoekjes, maar integendeel zou getuigen van een geïntegreerde aanpak. De focus van het psychologie research programma op het kernthema 'de interactie tussen impliciete en expliciete gedragsstrategieën" voldoet zonder twijfel aan dit criterium. De integratie-oriëntatie van dit programma is veel meer dan een 'belijden met de mond' – papier is immers zeer geduldig – omdat de tekst heel duidelijk aantoont hoe in elk van de voorgestelde onderzoekslijnen dit algemene thema vorm krijgt.

Het algemene thema van de relatie en interactie tussen impliciete en expliciete processen vormt één van de core-issues in de discipline. Tezelfdertijd is onderzoek omtrent de interactie tussen beide ook echter één van de moeilijkste issues. De uitdaging voor de faculteit is dus bijzonder groot, maar gegeven de bewezen kwaliteit van de onderzoekers heb ik er alle vertrouwen in dat zij belangrijke delen van dit programma tot een goed einde zullen weten te brengen.

Het voorliggend programma is ambitieus, onder meer omdat het zo rijk is en zoveel perspectieven voor onderzoek opent. Het sluit weliswaar aan bij de nu al stevig verankerde onderzoekstraditie in deze faculteit (getuige daarvan de uitgebreide lijst degelijke publicaties), maar toch blijft het een hele opdracht. Persoonlijk zou ik de faculteit adviseren om enige bescheidenheid aan de dag te leggen en voor de periode die komt een verstandige selectie te maken tussen de vele mogelijke paden die men kan bewandelen qua concrete onderzoeksvragen. Hét selectiecriterium moet daarbij zijn: welk van de mogelijke onderzoekstopics sluit het nauwst aan bij de core-issue van de interactie tussen impliciete en expliciete processen en welke topic heeft in dit opzicht meest kans op succes (= inzichten die ertoe doen).

Naar mijn indruk is deze faculteit er klaar voor om op korte termijn deel te nemen aan de landelijke onderzoeksevaluaties. Afgaan zal deze faculteit zeker niet. Misschien zal de eerste evaluatie wel nog niet 'top' zijn, maar het leerproces en de feedback die zij oplevert zal voor de faculteit bijzonder belangrijk en nuttig zijn.

Ten slotte en niet in het minst, ik heb bijzonder veel bewondering voor de manier waarop deze faculteit, al lang vooraleer de OU in het takenpakket van zijn personeel een officiële onderzoeksopdracht inschreef, zelf steeds de politiek heeft gevoerd om een onderzoekscomponent in de opdracht van haar docenten in te bouwen. Om deze reden en omwille van de kwaliteit van het voorliggende programma durf ik bepleiten dat het bestuur van de OU aan de faculteit een soort onderzoeksbonus zou toekennen in de vorm van bijkomende financiële middelen. Deze faculteit verdient deze bonus, als beloning voor geleverd werk en als incentive om op dezelfde weg door te gaan.

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Comments on: The Interaction Between Explicit and Implicit Strategies for Behaviour

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The overall research program is impressive in its depth and scope. It covers a number of core features of psychology's continuing discrepant heritage and divisive orientation to mind, action and self-knowledge. Furthermore the program manages to open up a series of questions in a very sophisticated way and has the potential to generate new research. My view of both the orientation and overall intellectual content of the research program is extremely positive.

The Standard Evaluation Protocol suggests four main criteria for evaluating a research program: These are: quality, productivity, relevance, and vitality & feasibility. Although this is not an evaluation based on the SEP but an informal one as preparation for the Midterm Review (see document, "Midterm review facultair onderzoek"), I thought it might be useful to consider these criteria since they will come into play in potential future evaluations. Hence I will organize my comments throughout based on these four criteria.

Quality of the Research Program
The overall orientation of the research program is capable of producing high quality research. It is well focused and theoretically driven. It also takes up key questions in the discipline of psychology and organizes these according to broader criteria, namely those of explicit and implicit behavior strategies. In doing so it is able to collapse what are a range of more specialized research questions into a programmatic framework that is both clearer and more helpful in orienting the research of the faculty.

The Research Areas are usefully configured around the questions in the overall program. Questions associated with each of these areas, namely, evolution, health, clinical, social and life long learning, can easily be integrated under the umbrella of the program. Naturally they will also lead to what are probably some 'loose ends' in so far as not everything will fall neatly within the confines of the program but generally should be capable of addressing both the particular questions under investigation as well as the overall questions of the program.

The evolution of behavior is the more basic of the research programs but perhaps also more difficult to execute. Given the distance between the behavior to be explained and the categories of explanation, such programs must always confront the gap between finding explanations that are rigorous on the one hand and nontrivial on the other. In this case, the

solid theoretical program should prevent the drift into weaker accounts and will ensure the overall viability of the program. I would only add here that recent evolutionary biology is divided on evolution and development. Evolutionary-Developmental biology for example attempts to show that there are distinctive capacities of organisms that figure in emergent teleological explanations of the process of adaptive evolution. The implications for such a non-mechanistic account have barely reached psychology yet however.

In addition, the exclusive focus on heterosexual mate selection might benefit from broadening into issues of gay, lesbian, bisexual and transgendered sexualities. These provide some difficult but important issues for evolutionary approaches to sexual relations.

Health psychology is now a major field of contemporary psychology and the group has already made significant strides in health-related fields. The publications have been published in a number of recognized journals and this should bode well for the advances in this domain. Given the very large range of possible topics in health related fields, it is important that limits be placed on the issues to be investigated. The framing of questions around the notion of implicit and explicit strategies for health related behavior makes perfect sense, particularly when these are coupled with questions of their modifiability.

The early detection and prevention of psychiatric disorders would, in itself, be a considerable research enterprise but this too is neatly limited to implicit and explicit behaviour strategies in samples of the general population by using the symptom-oriented approach. Here too the faculty have made significant research contributions in both general and more specialized journals.

The social, organisational and human resources fields of psychology are also well represented in the faculty and constitute an important feature of the overall program. The implicit and explicit processes associated with this arm of the research are characterized by research traditions such as Lerner's Just World hypothesis and the bystander effect and will add an important feature to the overall project concerned with social psychological dimensions of behavior.

Finally, life-long learning appears to be an important component given the overall structure of the Open University and the coherence of the research program. Much if not most learning is implicit and our instructional institutions and strategies are often focussed on countering what are implicit learning strategies through overt instruction. Hence this aspect of the program has the potential to be highly innovative.

In short, the proposed program is well poised to produce high quality research and the current output of the faculty attests to their ability to do so.

Productivity
The faculty are very productive, publishing a considerable number of high quality innovative and theoretical as well as more parametric kinds of publications. This despite the relatively small amount of time dedicated to research.

Given the ambitions of this program, it is obvious that this could be increased and it is clear that management has already made efforts to increase research time in cases of exceptional output. The overall strategies of the research program however will need more intense input in terms of research time and personnel if it is to be more than a broad guideline. Management's aim to achieve more "convergence and focus" is highly laudable given the wide range of interests and expertise in the group. I expect a more coherent program will require the staff to concentrate more of their effort in the domains identified in the document before it reaches the stated goal of unifying "at least 90% of the department's publications output."

Relevance
This research program is intellectually compelling in that it cuts across numerous categories in contemporary psychology with obvious potentials for application. In this sense it must certainly pass muster as an applicable set of potential solutions. Its relevance is guaranteed by the fact that the program is focussed on key problems in psychology, not trivial or peripheral ones. In addition, much of the research is already focussed on obvious applied problems hence I see no concern about the relevance of the faculty's research.

Vitality & Feasibility
The vitality and feasibility are clearly dependent on the expertise and enthusiasm of the research group, their willingness to coordinate their research activities to some degree and the availability of resources. Allow me to address each of these in turn.

Expertise.
The faculty are clearly diverse in their interests but constitute sufficient mass to carry off a major research program. What may be a hindrance is the lack of time and resources, more of which below. Overall I would recommend that someone be brought in who, as an additional faculty member, can in addition to the Dean of Psychology contribute to the integrative functions and theoretical functions of the overall program.

Coordination of research activities.
Obviously the coordination of separate research topics is a complex administrative and institutional project. Researchers are often more motivated when conducting research that is curiosity driven and personally 'owned' and a research program must ultimately rest on the coordinated activity of a large group of researchers. One way in which it might be possible to achieve further integration is through consensus meetings, conferences organized on the campus of the OU or communal contributions organized for specific international conventions and conferences.

Resources.
Given the scope of the program, I suspect that the currently available resources are insufficient for the ambitions outlined. In addition to the limitations of the 20% research time criterion already identified, the creation of one or more positions (UHD, post-doc or post-graduate) that were specifically geared to this program would be laudable. Naturally, this is within the confines of recognizing the overall goal of the activities of the Open University and their unique place in the Dutch context.

In summary, the research program itself is of exceptional quality and originality. The faculty members are already productive and engaged in a wide set of topics of research. Further work will need to be done integrating some of this work. Additional resources will be required to ensure the success of the program.