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Towards understanding successful ageing: patterned change in resources and goals

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ABSTRACT

In this paper it is argued that the problem of formulating a comprehensive theory of successful ageing – and thereby of finding good criteria for success – may be attributed to the lack of a suitable multidisciplinary framework that meets at least three basic theoretical requirements. These requirements are explicated, and some existing theories and approaches of successful ageing are discussed in the light of these requirements. An alternative theoretical framework is presented which can accommodate a number of existing insights, and which is used as the basis of a new theory of successful ageing, including theory-guided criteria for success.

KEY WORDS – successful ageing, behaviour, goals, criteria, social production function theory, substitution.

Introduction

In the last decade 'successful ageing' has been recognized as 'a guiding theme in gerontological research and as a challenge for the design of social policy' (Baltes and Baltes 1990: 4). The deficit approach to ageing has been modified and it has become common use to characterise the ageing process as a changing balance between gains and losses which becomes less positive with age (Baltes 1987, 1997). However, how to understand the mechanisms by which individuals successfully deal with this changing balance over the life course is still unclear (Abeles *et al*. 1994; Baltes and Baltes 1990; Baltes and Carstensen 1996; Birren *et al*. 1991; Bond *et al*. 1995; Marsiske *et al*. 1995; Rowe and Kahn 1987; Ryff 1982; Schulz and Heckhausen 1996). What mechanisms and processes make people age successfully? Under what circumstances will the process of ageing be more or less optimal? And, finally, by which criteria should successful ageing be evaluated?

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It is generally agreed that the process of ageing is a complex process of adaptation to physical, social and psychological changes that go together with increasing age. Investigating successful adaptation therefore should follow a multi-disciplinary approach, using indicators of multiple domains of life, on both micro- and macro-levels of analysis (Baltes and Baltes 1990; Heckhausen and Schulz 1995; Passuth and Bengtson 1988). However, as Birren (1988: 173) has stated, disciplines are still '…islands of densely packed information with few bridges'.

It is also widely recognised that there is a problem of finding good criteria for successful ageing (Baltes and Baltes 1990; Baltes and Carstensen 1996; Featherman *et al*. 1990; Marsiske *et al*. 1995; Ryff 1989; Schulz and Heckhausen 1996). The main points of discussion are benchmarks or standards, covering functional, ideal or statistical norms; subjective and/or objective indicators; multi-criteria, including the relative weights given to criteria; and process indicators that allow a flexible definition of success outcomes.

This article formulates a model of successful ageing based on the general theoretical framework of the theory of social production functions (SPF) (Lindenberg 1986, 1996; Lindenberg and Frey 1993; Ormel *et al*. 1997). This framework seems promising in offering both the rudiments of a multidisciplinary perspective, and a heuristic with which to find suitable criteria for success. The paper consists of five sections. First, the basic requirements for a theory of successful ageing will be examined. Second, some existing models of successful ageing will be reviewed and discussed in the light of these requirements. Third, the basic assumptions of the general framework will be explicated. Fourth, a new model of successful ageing, based on this framework, will be presented. Finally, the model will be evaluated and some future research directions will be discussed.

Basic requirements

It can, broadly speaking, be stated that a theory of successful ageing needs to be able to reconstruct and integrate the mechanisms that show how individual behaviour is organised in changing social, physical and psychological circumstances over the life span, and to specify when and why this behaviour may be labelled 'successful'. Therefore, there may be at least three basic requirements for such a theory:

Requirement 1: a theory of individual behaviour that accounts for changes in physical, social, cultural and psychological circumstances;

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Requirement 2: a theory of goals, connected to the theory of individual behaviour;

Requirement 3: criteria for success that relate to both theories.

Each of the three requirements will be explicated below.

A theory of individual behaviour

Why is a behavioural theory needed? For any theory of successful ageing it is necessary to have a theory of individual behaviour because the ageing individual is the starting point. The ageing individual is faced with, and is challenged to act and respond to, an ever-changing inner and outer environment, including a diminishing time horizon. Successful ageing is all about the way people *actively* face adverse circumstances. For a theory of successful ageing, it is therefore imperative to know by what mechanisms individual behaviour is guided, and especially how behaviour is organised in circumstances that reflect a changing balance between gains and losses.

An integrated theory of goals

Why is a theory of goals needed that is integrated with the behavioural theory? Changing circumstances affect behaviour and therefore the realisation of goals. Thus, the significance of changing circumstances can only be understood relative to given, and possibly changing, goals. Without a theory of goals a behavioural theory of ageing will fail to yield specific hypotheses, or will lead to ad hoc assumptions on goals. Such a theory of goals needs to be integrated with the behavioural theory. This is because taxonomies of goals alone do not lead to testable hypotheses about the relation of goals to the changing circumstances of the individual.

Theory-driven criteria for success

To solve the problem of how to identify success, theory-driven criteria are needed. These should not be purely normative, based on 'ideal' levels of functioning or performance (Baltes and Carstensen 1996). Nor should they be entirely subjective, because both are problematic for explaining and eventually modifying general mechanisms of behaviour (Baltes and Baltes 1990). The argument here is that, if it is possible to have a convincing theory of goals, it will also be possible to generate consensual criteria for success that are neither purely normative nor fully subjective. Furthermore, the theory of goals should be integrated

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with the theory of behaviour, and this would allow one to state under what conditions the criteria for success can be met.

How do existing models of successful ageing deal with these requirements? In the following section some recent approaches in the field will be discussed. Limitations of space mean that we cannot do full justice to each of the approaches. Besides, we will restrict ourselves here to models that explicitly aim at understanding *successful* ageing. These models are mostly found in the field of life-span developmental psychology.

Existing research

An important model of ageing is the SOC-model, Baltes' model of selective optimisation with compensation (Baltes 1997; Baltes and Baltes 1990; Baltes and Carstensen 1996; Marsiske *et al.* 1995). In this model three interacting subcomponents and processes are distinguished: selection, optimisation and compensation. The model describes a lifelong process of adaptation, reflecting the dynamic interplay between gains and losses, between development-oriented plasticity and age-related boundaries of such plasticity (Baltes and Baltes 1990). The process of selective optimisation with compensation is considered a lifelong phenomenon, but one that is amplified in old age because of the loss of biological, mental and social reserves. In our view, the model is essentially a theory of individual behaviour over the life course, and is very useful for understanding behavioural adaptive mechanisms in a life-span perspective. However, a theory of goals that is integrated with the behavioural mechanisms is not considered. A systematic specification of the objects and goals an individual seeks to optimise (by selection and compensation) is left open, which makes it difficult to derive testable hypotheses from the model and to use it for the specification of criteria for successful ageing. Therefore, it has been argued that, in principle, the model must be considered 'an integrative tool' (Marsiske *et al.* 1995: 36) and that 'specific theories are needed to understand individual manifestations of selective optimization with compensation, and to define criteria of success' (Marsiske *et al.* 1995: 41). Baltes and Baltes suggest adaptivity or behavioural plasticity as criteria for successful ageing: 'a measure of potential and preparedness for dealing with a variety of demands' (Baltes and Baltes 1990: 7). Such concepts do not imply a single outcome or a state, but focus on the efficacy of a system. Baltes and Carstensen (1996) state that in the SOC-model success is defined as goal attainment. Although both

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adaptivity and goal attainment are attempts to formulate criteria for success, both are nevertheless 'empty' in that no specification is given of *what* one will be adaptive to, and *what* goals are important.

Another important contribution relevant to successful ageing is the model of developmental regulation across the life course (Heckhausen and Schulz 1993; Schulz and Heckhausen 1996; Heckhausen 1997), based on the life-span theory of control (Heckhausen and Schulz 1995). The core assumption concerns 'primary and secondary control' (Rothbaum *et al.* 1982). Because of the dynamics of growth and decline across the life-span, the individual is confronted with varying challenges to the maintenance of control (Baltes and Baltes 1986). Primary control involves attempts to change the world so that it fits the needs and desires of the individual – bringing the environment into line with one's wishes (the target is the environment). Secondary control refers to attempts to bring oneself in line with the environment (the target is the self). Both types of control are assumed to be intertwined, 'shifting from one to the other depending on the challenges and obstacles encountered' (Heckhausen and Schulz 1995: 285), but it is assumed that primary control holds functional primacy over secondary, in that secondary control serves to protect the motivational resources for primary control. Over the life course, an individual's potential for primary control undergoes major systematic changes as a result of changes in biological and societal potentials and constraints. The way the balance between the two is accomplished is dependent upon the developmental potential of the individual in the different life stages.

Heckhausen and Schulz extended and elaborated Baltes' SOC-model by integrating it with their life-span theory of control. The resulting models, comprising primary and secondary control as well as selection and compensation, lead to four types of control strategies. The effective use of each is regulated by a higher order process: optimisation. In an empirical investigation of the model, Heckhausen (1997) also elaborated on goals, suggesting that developmental goals can be considered as organisers of developmental regulation. However, these (personal) goals were primarily meant to be used for the empirical assessment of modes of developmental regulation. There is no specification of situationally relevant relationships among the goals, and thus here too the criteria for successful ageing must remain necessarily vague.

Summarising the models of Heckhausen and Schulz, it can be stated that they also focus on mechanisms of individual adaptive behaviour over the life course. These adaptive mechanisms are worked out extensively. However, an integrated theory of goals is not considered.

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Statements about criteria for success are made, but it seems that, in the absence of a theory of goals, they remain necessarily vague: 'the right balance between primary and secondary control' is seen as 'the key to optimal development and successful aging' (Heckhausen and Schulz 1995: 291). Also, they suggest that criteria for success should include physical functioning, cognitive, intellectual, affective and creative functioning, and social relations. In their view, 'the more primary control the better' but 'evaluations of success must be tempered by the biological and sociocultural resources of the individual' (Schulz and Heckhausen 1996: 711). The questions about control over *what*, the right balance, and how and when to select or combine which domains of functioning, remain unanswered.

A third theoretical perspective on adaptive ageing is elaborated by Brandtstädter and colleagues (1990*a*, *b*; 1993; 1994; 1995). Adaptation to the different changes and discontinuities of ageing is considered to be regulated by the mechanisms of assimilation and accommodation. These are the two basic processes by which the ageing self maintains a sense of control and a positive view of self and personal development. Assimilative activities aim at transforming situational circumstances or ways of living, in accordance with the values, aspirations, and developmental goals that define the individual's normative self. Accommodation processes involve an accommodation of goals and aspirations to changes in action resources and developmental prospects. Next to these, immunising mechanisms are also considered as influences on the processing of self-relevant information, so that the individual's self-descriptions are stabilised or defended against discrepant evidence (Brandtstädter and Greve 1994). Over the life course, an age-related shift from assimilative to accommodative modes is hypothesised and empirically found (Brandtstädter and Baltes-Götz 1990*a*; Brandtstädter and Greve 1994; Brandtstädter *et al.* 1993). This theoretical approach also emphasises cognitive-behavioural adaptive mechanisms. However, although goals are considered (Brandtstädter and Baltes-Götz 1990*a*; Brandtstädter and Renner 1990*b*), they are not integrated into the theory. A taxonomy of goals is used, but only to assess modes of control. Furthermore, criteria for successful ageing are hard to make explicit in this way.

A last approach to be discussed here is the one based on the developmental tasks concept (Havighurst 1953) which has recently been revived by Nurmi (1992, 1993). Although the concept is applied mainly in child and adolescent developmental psychology (Dreher and Oerter 1986; Nurmi 1993), it is meant to cover the whole life-span (Havighurst 1953; Oerter 1986). A developmental task is:

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a task which arises at or about a certain period in the life of the individual, successful achievement of which leads to his happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by society and difficulty with later tasks (Havighurst 1953: 2).

The basic underlying behavioural assumption is that the individual is directing, controlling and influencing her/his own development as an active agent by fulfilling developmental tasks (Nurmi 1993). Developmental tasks emerge in a social, cultural and historical context, and may be considered to consist of certain role patterns, obligations, normative expectations, and institutional opportunities. Nurmi (1992) applied the concept in a life course approach, and found empirical evidence of developmental tasks reflected in the personal goals of older adults.

By focusing on both individual behaviour and goals, which basically relate to age-graded, sociocultural demands and opportunities, the concept of developmental tasks contains the rudiments of a combined theory of individual behaviour and a theory of goals. This also steers the formulation of criteria in the right direction. However, some problems remain. First, the behavioural theory does not consider how the individual deals with constraints. For example, there is no attention to the possibility of substitution of tasks (*i.e.* compensation in the sense of Baltes) because of different degrees of realisability. Conversely, the theory of tasks does not allow differing and possibly conflicting goals and it thus does not explain why people often choose other things to do than fulfilling a certain developmental task (*e.g.* working on a career instead of finding a partner). Furthermore, developmental tasks may be problematic to define, because basically they refer to statistical or standardised life patterns (*e.g.* learning to walk, starting education, finding a partner), whereas many tasks are clearly not age-standardised (*e.g.* divorce, illness, job loss). This may be especially evident in later life, which is a period characterised by an increasing lack of social structuring and standardisation (Riley *et al.* 1994), and increasing inter-individual heterogeneity (Dannefer 1996). With respect to criteria for success, the concept of developmental tasks implies that having fulfilled a certain task well will lead to success later on. However, because the tasks are not clear, and the possibly conflicting goals are not considered, the criteria by which to evaluate whether adjustment is successful will also remain unsubstantial.

It may be concluded that the models discussed here contribute in important ways to an understanding of the mechanisms of successful adaptation over the life course. However, in all of them, either the behavioural mechanisms seem to be insufficiently specified or

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integrated (violating Requirement 1), or the goals (violating Requirement 2). Consequently, clear criteria for success are lacking as well (violating Requirement 3). When behavioural mechanisms and goals are neither sufficiently specified nor theoretically connected, it is difficult to formulate hypotheses about how adaptive mechanisms relate to successful outcomes; about under which circumstances certain goals will be pursued, substituted or given up, and about whether this will be adaptive in terms of criteria for success. It might be that the various models do not aspire to formulate such specific hypotheses. In that case, they furnish 'orienting statements' about the fact that people are actively seeking to deal with problems by compensation and adaptation. But then, the point remains that no hypotheses about concrete compensation or adaptation and no explicit criteria can be derived.

In the remainder of this article, we propose a model of successful ageing, which in our view meets all three requirements. The model will be based on the general framework of SPF, social production function theory (Lindenberg 1996; Lindenberg and Frey 1993). In our view, this framework offers the basis for a multidisciplinary model of successful ageing and also allows the integration of a number of the above-mentioned insights. But first, in the next section the basic assumptions of this framework will be explicated and related to the basic assumptions of the various theories.

Social production function theory as an integrative framework

The essential feature of SPF theory is that it combines a theory of individual behaviour with a theory of goals, and is grounded in economic, sociological and psychological insights (Lindenberg 1986; 1996; Lindenberg and Frey 1993; Ormel *et al.* 1997; Ormel *et al.* in press). Its recent developments and applications seem promising for gaining a deeper understanding of sociocultural and psychological ageing processes (Nieboer 1997; Steverink 1996*a*, *b*; Steverink *et al.* 1994; VanEijk 1997).

Individual behaviour

SPF assumes that individuals are basically resourceful. They try to maximise overall wellbeing by optimising outcomes within the constraints they are facing. This theory of individual behaviour largely resembles the assumptions of the SOC-model. There is an essential emphasis in SPF on constraints: because of ever-changing resources

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and restrictions in the inner and outer world, optimisation is necessarily constrained. This emphasis leads to selection and substitution processes being given prominence as forms of adaptation to age-related changes in constraints. Selection and substitution are here seen as different manifestations of optimisation under constraints. Furthermore, in SPF theory, compensation is considered a special form of substitution: only in the case of 'loss' will substitution take the form of compensation.

The fundamental assumption that individuals are purposeful and optimising does not mean that they always are conscious of being so. Nor does it mean that behaviour is not influenced by a lack of information, bounded rationality (Kahneman and Tversky 1984), mindlessness (Langer 1989), or other cognitive restrictions or strategies. In SPF theory these cognitive aspects of behaviour are elaborated under the heading of 'framing' (Lindenberg 1993; Lindenberg and Frey 1993). Framing essentially refers to the ways in which individuals define their situation, and how this definition influences behaviour. Framing also includes cognitive processes of anticipation and time perspective.

A hierarchy of goals

The theory of SPF is linked to a theory of goals. It is at this point that the theory of SPF essentially deviates from most other models. This is because it explicitly formulates a theory of goals towards which the behavioural processes of optimisation are directed. A theory of goals is necessary in order to know *what* individuals are trying to optimise, when they are hampered in this striving, and between what alternatives they can substitute. Behavioural mechanisms of optimisation, control, assimilation and accommodation remain essentially 'empty' as long as no objectives are specified. Optimising what? Control over what? Assimilating or accommodating what?

The basis for the theory of goals in SPF theory is the assumption that there are both universal and instrumental goals: universal goals are realised by lower-level means, the realisation of which can in turn be an instrumental goal. In this way, there are instrumental goals hierarchically ordered on different levels, reaching all the way up to the universal goals. 'Social production functions' specify the relationships between goals on various levels. For example, status (as a goal) can be 'produced' by occupying a certain position which, in turn, can be achieved by, say, investment in education. In contradiction to many other goal approaches (for a review see: Austin and Vancouver 1996), diversity of goals is assumed to be the result of instrumental ordering of

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goals into a hierarchy. The universal goals are assumed to be invariant across individuals, but individuals differ in how they go about achieving them. There are different production functions for different kinds of people. Instrumental goals can thus be connected to linked hierarchical chains, each lower level being more specific, concrete, and possibly more idiosyncratic.

Every individual strives to maximise overall wellbeing by realising two universal goals in an optimal mix: *physical* and *social* wellbeing. These goals may seem simplistic at first sight, but they are used primarily as heuristics for the further specification of instrumental goals. They thus function as anchors. This seems especially appropriate because there is a general consensus that they are the dimensions of wellbeing. The WHO definition of health follows a similar logic: 'Health is a state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity' (WHO 1985; see also Birren and Renner 1980, and Baltes and Carstensen 1996). This definition of health refers to a categorisation of three general aspects of wellbeing. In SPF theory, however, psychological wellbeing is considered to be largely the joint result of physical and social wellbeing (Ormel *et al*. 1997; Ormel *et al*. in press). As will be elaborated below, it is assumed that social wellbeing is not only realised by interaction with relevant others, but also by the self-reflective attitudes of the individual toward him or herself. Thus, what SPF theory considers as internalised aspects of social wellbeing are often referred to by others as aspects of psychological wellbeing.

Whether a person is able to achieve a certain instrumental goal, and therefore also a universal goal, depends on the physical, sociocultural and psychological resources and constraints this person is facing. Resources and constraints determine what an individual can strive for. This includes age-related circumstances which function as resources or constraints, in that they 'define' whether and how a person is able to realise certain instrumental goals (for physical and social wellbeing). Because instrumental goals and resources are instrumentally and hierarchically related, they are two sides of the same coin. This is an essential point. Instrumental goals refer to resources the individual wants but does not have, whereas resources the individual has can be used for realising other (higher) instrumental goals. Furthermore, 'resources' are defined broadly: they may refer to endowments, income, specific activities, skills, or latent reserves of the individual (see also Ormel *et al*. 1997).

The first-order instrumental goals that will be explicated below, lie just below the level of the two universal goals. They are still rather

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general, yet they are specific enough to allow a directed search for instrumental goals yet lower in the hierarchy. This, in turn, allows one to specify how changing circumstances will influence whether and how lower- and higher-order goals can be achieved.

First-order instrumental goals

For physical wellbeing two first-order instrumental goals are formulated, as suggested by Scitovsky (1976) and Wippler (1987): *comfort* and *stimulation*. Comfort refers to physical comfort, *i.e.* the satisfaction of basic physical needs, like food, drink, rest, warmth; and the absence of pain, fatigue and other health complaints, and of fear. Stimulation refers to the 'pleasant' range of activation (physically and mentally), *i.e.* the absence of boredom, the right amount of exposure to novelty, challenges and interesting events. Human beings strive for both comfort and stimulation in order to achieve overall physical wellbeing.

For the elaboration of first-order instrumental goals of social wellbeing, Lindenberg (1986) has suggested *affection*, *behavioural confirmation* and *status*, as forms of positive social evaluations for what a person is (affection), does (behavioural confirmation) and has (status). These include one's own self-reflective evaluation. Affection is the feeling of being loved by certain others and by oneself; to feel that others (and oneself) care. Affection is based on the person, not primarily on behaviour. Behavioural confirmation is the feeling of doing, or to have done, 'the right thing' in the eyes of relevant others and of oneself. It is primarily based on social expectations and social norms, including conformity to expectations the individual has about him or herself. Status is an aspect of social wellbeing that is gained by the feeling of being 'better than' or 'superior to' many others in the eyes of relevant others and oneself. Status can be gained by having or controlling socially valued resources, such as privilege, money, talent, power, influence, knowledge, luxury goods, etc. High status on any dimension can, by definition, only be gained by some people in a certain social structure, because of its positional nature.

As already mentioned, for all three first-order goals of social wellbeing, the self is treated like a relevant other. In other words, social wellbeing is not just realised by whether others love, approve and respect the individual, but whether the individual can also love, approve and respect him or herself. Therefore, 'self-esteem' is considered to be, not an ultimate goal (or need) in itself, but rather an internalised affection, behavioural confirmation and status. As has been shown, for instance by Baumeister (1982) and Tice (1992),

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positive attitudes about the self largely depend on (earlier) positive attitudes from others.

The five instrumental goals on the first level below the universal goals are considered an exhaustive enumeration of the first-order instrumental goals of physical and social wellbeing. Comparing them with other hierarchies or taxonomies (Maslow 1970; Rokeach 1973; Simons 1984; Weiss 1974), a considerable overlap may be found. Furthermore, it is important that the first-order goals are still sufficiently general to be applicable to all people. Below this level in the hierarchy, other levels of instrumental goals can be distinguished. These can be elaborated as second-order instrumental goals. For instance, affection may be achieved by the lower-order goal of intimate interaction. Second- and lower-order instrumental goals can also be elaborated as 'resources' (*i.e.* activities, endowments, skills, or latent potential) which are needed to realise one or more of the higher-order instrumental goals. In that case the person may already have what it takes to achieve the higher-order goal.

Optimisation and substitution

The core of the theory of SPF is that individual behaviour and context are essentially linked in hierarchical processes of optimisation, by substitution (including expansion and investment) of resources and instrumental goals. As stated earlier, resources (and instrumental goals) are essentially determined by, and change as a function of changes in, the physical, cultural, social and psychological circumstances of the individual. Because the individual is continuously acting and reacting in a process of changing resources (and constraints), instrumental goals are likely to change when resources change. It is thus essentially in this hierarchical mechanism that individual behaviour and context are linked and in which they affect each other.

A change in resources can be positive (growth) or negative (loss). It is assumed that the proactive individual will, in general, seek expansion when resources are available or expected to become available: increasing resources will incite a striving for still more wellbeing. However, there are also diminishing returns in the 'productiveness' of resources. The more a person has realised one particular instrumental goal, the more likely that he or she will shift in the direction of attaining other instrumental goals. For example, if affection can be easily realised, the person may quickly reach a point at which social wellbeing can be more productively enhanced by concentrating on behavioural confirmation and status. Conversely, loss of resources will lead to

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attempts to minimise the loss of wellbeing by substitution or compensation of other resources. For instance, a person may obtain behavioural confirmation from playing tennis but, when problems arise with physical fitness, may substitute or compensate this by putting more effort into billiards. When one loses resources that cannot be compensated by resources for the same instrumental goal, substitution *for* higher-order instrumental goals will be sought. For instance, when losing occupational status after retirement, one will seek substitution in behavioural confirmation and affection. Complete substitution between physical and social wellbeing is not possible because a person has to have a minimum amount of both.

Criteria for 'success'

The basic assumptions of SPF theory, as elaborated above, allow us to expand on criteria for 'successful' behaviour and to state under what conditions 'success' will be likely. Based on the theory of goals, the criteria for success can be derived hierarchically from overall wellbeing, to the universal goals of physical and social wellbeing, to the first-order instrumental goals for physical and social wellbeing: comfort, stimulation, affection, behavioural confirmation and status. The more physical and social wellbeing a person is able to achieve, the more overall wellbeing (or 'success') he or she will have. And, because of the mechanism of substitution, 'success' will be reached or maintained more easily, given better resources or substitution possibilities for achieving or maintaining the first-order instrumental goals. Thus, while 'success' itself is defined only in terms of an overall measure of wellbeing, the specific content of success comes in through the specification of the first-order instrumental goals for the achievement of physical and social wellbeing, and through the heuristic guidance for the specification of lower-order goals in the hierarchy.

Two aspects concerning the criteria may be explicated in more detail. First, as will be clear, the criteria are flexible and processual – elements deemed necessary for any criterion for successful ageing (see Baltes and Carstensen 1996; Schulz and Heckhausen 1996). This is so because, on lower levels of the hierarchy, different people may have different instrumental means for achieving overall wellbeing, and because the core mechanism of substitution allows changes in instrumental means without a necessary change in overall wellbeing. For example, a person who is or becomes disabled can reach, restore or maintain wellbeing, depending on how he or she is able to realise the goals of physical and social wellbeing by substitution. This person may

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be able to substitute the loss of functional capacity by use of a wheelchair and other aids in the home. This may restore the loss of comfort. Similarly, friends may call or special hobbies may be taken up which will compensate for the loss of stimulation.

Second, although the criteria for success basically refer to objective indicators which are theory-driven by the universal and the first-order instrumental goals, this does not necessarily mean that they do not relate to subjective representations of 'success' or wellbeing (Diener 1984; Ormel *et al.* in press). Because the universal and first-order instrumental goals command widespread consensus, high levels of success in achieving them should correlate substantially with high levels of subjective indicators (see VanEijk 1997). This is an empirical claim of the theory, and it is justifiable because subjective representations will need shared meaning in a social reality for people to be able to communicate and function (Baumeister 1991). As we have said, on lower levels of the hierarchy, the means and instrumental goals will become ever more specific and possibly idiosyncratic. At these levels it becomes harder to formulate objective indicators and, without theoretical guidance, it may become very difficult to interpret subjective statements (Fischhoff *et al.* 1980; Zaller and Feldman 1992). Here the objective indicators of the higher levels may help to interpret the more subjective and idiosyncratic representations of wellbeing or success. For instance, if a grandfather says he feels well when grandchildren come to visit, this could be interpreted as an expression of the grandchildren's importance for his realisation of the first-level instrumental goals of affection and stimulation.

Now that the basic assumptions of the general theoretical framework of SPF theory have been developed, the question is how to elaborate a theory of successful ageing on that basis. How do ageing individuals, facing a changing balance between gains and losses, maintain or eventually enhance their overall wellbeing, and thus age successfully? We do not claim a full elaboration of the model. However, in what follows, we will explicate the basic mechanism that allows one to trace developments of substitution possibilities, the core of successful ageing. For this we will focus on the five first-order instrumental goals.

Successful ageing: patterned change in resources and goals

The basic assumptions of the framework of SPF theory, as suggested above, allow the derivation of a model of successful ageing that shows *how* ageing individuals behave and adapt in the face of changing

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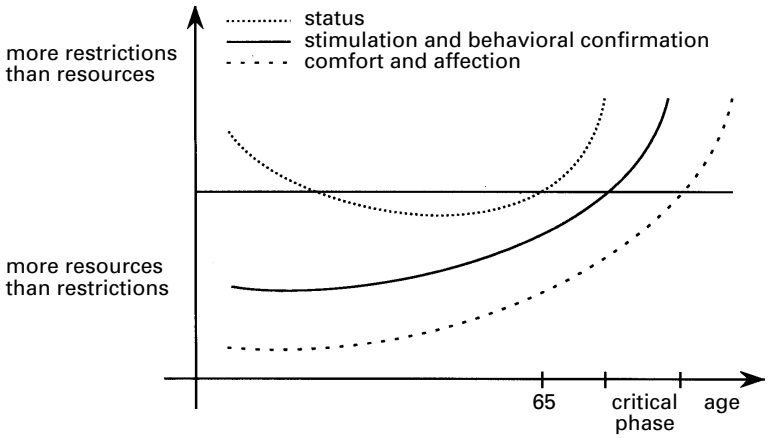


Figure 1. Hypothetical course of the relative difficulty of goal realisation for status, stimulation and behavioural confirmation, and comfort and affection across the life span (in a Western society).

resources and constraints, and when this behaviour will be (un)-successful. The process of ageing can be characterised as a changing balance between gains and losses (in resources), in which losses will increasingly outweigh gains. With regard to delaying and mitigating this changing balance, the *substitution* or compensation of resources and instrumental goals is considered to be the central mechanism of successful adaptive behaviour in ageing individuals. Because of the central assumption that resources and instrumental goals are functionally linked (*i.e.* only those instrumental goals will be pursued that one will reasonably expect to reach with available resources), a systematic pattern of realisation and substitution of the five first-order instrumental goals is hypothesised over the life span. This hypothetical pattern is shown in Figure 1. As a consequence of the regular social and physical influences on the changing balance between resources and restrictions with increasing age, a prototypical life-span pattern of substitution in instrumental goals is expected, resulting from the increasing relative 'difficulty' (costs) with which the first-order instrumental goals of physical and social wellbeing can be achieved over the life-span (in a Western society). First consider status: in a Western society this goal is mostly reached through occupational prestige. Therefore, this goal will be hard to achieve before reaching a certain position at a certain age. Later, after retirement, status will become difficult to maintain, because status through occupational prestige is reduced and one would have to find new ways to retain

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status. At that point it may be easier to put more effort into behavioural confirmation and affection by, for instance, conforming more closely to certain norms of behaviour, and by intensifying social contacts with family and friends. Thus, for many, status will be the first instrumental goal to decline after retirement, while affection and behavioural confirmation will become relatively more prominent.

Next, consider the goals of stimulation and behavioural confirmation. From childhood to middle adulthood, individuals may have and acquire many resources for these goals: maturation of physical abilities, and learning how to conform to norms and behavioural expectations. Then, with increasing age, the resources for both goals will gradually decline: loss of physical strength, and the loss of social norms and expectations (by loss of roles, social structures, and formal settings). These will cause a decrease in opportunities for stimulation and behavioural confirmation, and substitution will be sought by shifting relatively more effort to the goals of comfort and affection. In 'good circumstances', these goals are relatively easy to reach in early life and they can be maintained over the life course. Comfort for elderly people is also relatively well provided for in Western societies; affection, especially when one has a spouse and (grand)children, will also be relatively enduring, without major effort. This argument leads to the general hypothesis that in later life first, the goal of behavioural confirmation, and later the goals of comfort and affection, will gain in relative importance (as means of substitution). This, of course, depends on the relative ease (i.e. resources) with which these goals can be maintained.

It should be noted that Figure 1 shows a prototypical pattern, which cannot take into account individual differences. However, two additional remarks will clarify why, on the whole, this pattern is still generalisable. First, although the individual *timing* of changes in resources and restrictions will be increasingly heterogeneous (from a rather homogeneous timing of developmental changes in the early years), an average pattern of change may be expected. Second, not so much the higher-order goals, but rather the lower-order means by which the first-order instrumental goals are being reached, will become increasingly specific and idiosyncratic as people age. There are two main reasons for this. First, the cumulative effects of differences in early 'tracks' (in schooling and otherwise) cause individuals to differ increasingly from others with respect to acquired resources and encountered restrictions. Second, the decreasing standardisation of the life course after retirement and loss of other important social roles, causes individuals to rely on ever more idiosyncratic ways of achieving

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the instrumental goals of wellbeing in later life. This increasing heterogeneity of lower-order means is compatible with a general similarity of patterns for the achievement of first-order goals (as depicted in Figure 1).

From Figure 1 a number of hypotheses may be derived. The main hypothesis concerns the life-span substitution pattern of ways of achieving the five first-order instrumental goals for physical and social wellbeing. A first provisional test of the substitution-hypothesis among 600 elderly people aged 65 and over confirmed that stimulation and behavioural confirmation decline relatively faster with age than comfort and affection (Steverink 1996*a*). Changes in status could not be considered, as status was measured as a fixed prestige-level of one's former occupation.

A second hypothesis concerns the 'critical phase' (see Figure 1). This hypothesis follows from the fact that, because social and physical wellbeing cannot be substituted in their entirety, substitution possibilities on the level of primary instrumental goals are exhausted once only affection and comfort are left. The individual now becomes very vulnerable to large losses in overall wellbeing. A critical phase is reached the faster the fewer the substitution possibilities that are left. A critical phase may also occur in other periods of the life course, but only under relatively unusual circumstances. The threat of a critical phase in old age may become so intense that people are willing to take drastic steps to avoid it. Steverink (1996*a*) has empirically shown that the wish for nursing-home admission among frail elderly people is significantly related to the loss of resources for comfort and affection (as compared with status, behavioural confirmation and stimulation). This seems to indicate that the wish for nursing-home admission originates in this critical phase. Successful ageing thus also implies reaching the critical phase as late as possible, or even avoiding it altogether.

A third hypothesis is the 'action perspective' hypothesis, which is based on the notion of 'framing' (see previous section). This hypothesis is closely related to the hypotheses on substitution and the 'critical phase'. This is because the action perspective is assumed to reinforce the negative development of a 'critical phase' by an increasing negative expectation about the stability of resources in the future. Because individual behaviour is inherently embedded in a time frame (Lewin 1948; Nuttin 1985; Zaleski 1994), older individuals, facing a decreasing time horizon, may be especially affected (Rakowski 1979). It is therefore assumed that the optimising principle of behaviour may take different forms for different circumstances, and for different expectations about the future. We refer to the latter as the *action*

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perspective. This perspective is defined as the 'master strategy' with respect to resources, and is based on expectations regarding future possibilities for achieving important goals.

In general, three forms of action perspectives can be distinguished: growth, maintenance and loss avoidance (Steverink 1996*a*). Overall, it is expected that adolescents and young adults (given enough resources) will have an action perspective that reflects relatively more *growth* and expansion than maintenance and loss avoidance. However, when resources cease to expand, people will gradually become more conservative in their expectation about the future realisation of goals. They will increasingly reflect a commitment to maintaining the status quo rather than to expansion. Finally, when sizeable losses in resources repeatedly occur, losses which cannot be substituted or compensated for, an action perspective of *loss avoidance* is likely to develop. Now, the optimising striving is primarily aimed at the avoidance of further loss.

In general, as a consequence of the changing balance between gains and losses, the perspective of maintenance will gradually become more important than that of growth as people age (Baltes 1997; Marsiske *et al*. 1995). Losses weigh generally more heavily than gains (Kahneman and Tversky 1984), and thus a series of losses that cannot be compensated for is likely to trigger a general expectation that 'things will get worse'. This is an unfavourable development, because a loss perspective causes people to become very short-term and safety minded. Consequently they act sub-optimally in dealing with the limited substitution possibilities that they have. A loss perspective undermines investment behaviour (for the future maintenance of resources) and reinforces a downward spiral of further loss. Therefore it is expected that the stronger the loss perspective, the fewer the possibilities of substitution. Steverink (1996*a*) has shown that the loss of resources, and reaching the critical phase, significantly relate to an action perspective of loss. Successful ageing thus also implies avoiding the development of a loss perspective.

A fourth important hypothesis is the 'variety-hypothesis' (Steverink *et al*. 1994). Whereas the hypotheses formulated thus far primarily state why and when ageing may be unsuccessful, this hypothesis states why and under which circumstances ageing might be successful. Substitution is the core mechanism for maintaining instrumental goals and resources for physical and social wellbeing over the life course. Thus *variety in resources* is essential for dealing with the changing balance of gains and losses in such a way that the overall level of wellbeing is affected as little as possible. It is not just variety in resources as such, but variety explicitly aimed at the different instrumental goals. A

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positive relationship between variety in resources for the first-level instrumental goals and subjective wellbeing has been found in a group of frail elderly people (Steverink 1996*b*; Steverink *et al.* 1994). Indirect empirical support is also found in a study of the association between multiple roles and psychological wellbeing among adults aged 60 and over (Adelmann 1994).

It is likely that variety in substitution possibilities needs to be built up during the life course. However, at the same time, the individual life course will show an accumulated specialisation and selection with respect to resources. This will make it ever more difficult to develop and maintain variety. Therefore, an important question is how to promote variety over the life course and how to avoid too much specialisation, which makes people vulnerable in later life to sub-optimal substitution possibilities. Schulz and Heckhausen (1996) discuss a related notion of diversity. The advantage of SPF theory is that variety requirements can be specified more clearly. For example, there may be variety for achieving the goal of status, but variety in the means of reaching *different* first-order goals is preferable in terms of successful ageing (because of substitution possibilities). Similarly variety in multi-functional resources can produce various higher-order goals simultaneously (such as a partner, grandchildren, playing tennis in a social club, etc.).

We shall briefly mention two final hypotheses, which are not yet empirically investigated. These concern the role of cognitive (adaptive) processes. In the face of limited possibilities for active substitution, and especially in the case of heavy loss of resources or the threat of such a loss, it is very likely that individuals will attempt a (re)definition of the situation and the self. This would have the aim of trying to stabilise important resources and goals. In this way it may become clear again what to do and how to use resources, or how to cope with restrictions in order to maintain or restore wellbeing. For instance, by social comparison one may redefine the situation and the self (Wills 1981; Wood and Taylor 1991), and subsequently find new ways to use resources effectively. Other examples are strategies of illusion (Cantor 1990; Taylor and Brown 1988) or reminiscence (Tobin 1988; Wong and Watt 1991). Therefore, it is expected that cognitive strategies will only be adaptive when they help restore or maintain investment and substitution behaviour.

The second hypothesis is that, depending on the context, the same cognitive strategies may be maladaptive when they undermine investment and substitution behaviour. They may, as a consequence, cause an even stronger loss perspective, leading to increased anxiety

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and depression (Schulz *et al.* 1994). With reference to the concepts of primary and secondary control (Heckhausen and Schulz 1995), it is exactly the explicit context of substitution that allows one to predict when the *combination* of primary and secondary control leads to successful adaptation and when secondary control alone leads to unsuccessful adaptation (see also Schulz and Heckhausen 1996).

The notion of variety may also be applied to cognitive skills and adaptive strategies (Linville 1987; Markus *et al.* 1990). The more variety in cognitive adaptive strategies, the more opportunities a person has to redefine the situation and the self, and so the more likely one will remain able to invest or substitute resources optimally.

Conclusion and discussion

The purpose of this paper has been to work out a model of successful ageing based on the integrative framework of social production function theory. Starting with three basic theoretical requirements, some recent perspectives on successful ageing were reviewed in the light of these requirements. Next, the theoretical framework of SPF theory was presented. This meets these requirements and, on this basis, a model of successful ageing was constructed. Although this assumes an unfavourably changing balance between gains and losses over the life-span, the resulting model should not be considered a deficit-model of ageing. This is because the essence of the model is the proactive individual, having resources to substitute, and being able to maintain wellbeing over the life-span even in the face of loss. In this final section the advantages and limitations of the presented model will be evaluated, and some directions for further research will be discussed.

In our view, the integration of a theory of individual behaviour with a theory of goals, and the subsequent derivation of criteria for success, are the main requirements for a theory of successful ageing. If these requirements are not met, it remains difficult systematically to link individual behaviour and context, and to derive hypotheses on successful adaptation over the life course. Basically, without specifying goals in the theory of behaviour, it is not possible to say anything specific about processes of substitution. By using the theory of SPF, which offers a multidisciplinary framework and the heuristics for the formulation of criteria of success, it may become possible to bridge psychological (behavioural and cognitive) mechanisms with socio-cultural and physical circumstances. This can be done in terms of

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resources and constraints, and can state whether successful outcomes will result. Although the model of successful ageing presented here must be seen as a first step towards a more elaborated one, we believe the model has the potential to be worked out in several directions, and to integrate a number of existing insights.

Some limitations must be mentioned. First, the review of existing models has been restricted in this paper to some recent models on *successful* ageing which are mainly found in the field of life-span developmental psychology. Other theories on ageing (Bengtson *et al.* 1997; Marshall 1996), although not directly related to the topic of successful ageing, should be considered in a further elaboration of theory construction on successful ageing.

Second, a number of important aspects are still underdeveloped in the proposed model: the psychological (*i.e.* cognitive) adaptive mechanisms, the possibility to extend the model to cover the whole life-span, and the physiological or biological influences on ageing processes. An integrated theory of successful substitution over the life-span should include cognitive skills and adaptations as well as biological or physiological processes. In most of the models here discussed, the psychological (*i.e.* cognitive) and life-span extensions are more elaborated than in our model, while in all models, including our own, the biological or physiological aspects are rather undeveloped. Still, it seems useful to integrate cognitive adaptations explicitly with processes of substitution, as we have suggested in this paper. The model proposed here emphasises how cognitive adaptation is specifically relevant to understanding how older people attempt to deal with loss in the light of limited possibilities for substituting. Cognitive adaptive mechanisms are primarily concerned with (re)defining the situation (and the self) in order to be able to 'know' again what to do in certain circumstances characterised by changed resources and constraints. Therefore, cognitive adaptive strategies are not considered to be adaptive in themselves, but rather to be functional in restoring or maintaining adaptive behaviour in terms of substitution. Because adaptive behaviour in certain circumstances may yield relatively more cognitive activity, as for instance in the case of heavy loss or unexpected change, cognitive models of adaptation may co-vary with age, and show a developmental change (Brandtstädter and Renner 1990*b*). In our opinion, a further elaboration of cognitive adaptation should consist of (a) the identification of different processes, as for instance processes of social comparison or illusion; and (b) their adaptive function with respect to restoring, or maintaining, one's ability to substitute resources in order to achieve the goals of wellbeing.

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Concerning the life-span extension of the model, we believe this is possible through a stronger elaboration of mechanisms of 'growth' by expansion and investment of resources and goals, instead of a sole focus on 'maintenance' and 'loss avoidance' by substitution and compensation mechanisms. Here also the influence should be considered of the possible life-span accumulation of learning experiences and selection processes, which may be important determinants of the *variety* of future resources.

The theoretical elaboration of physical and physiological aspects might be primarily connected to the universal goal of physical wellbeing. Nevertheless, whether and how physical and physiological processes relate to, or result from, life-span choices and circumstances themselves should be investigated. For instance, certain habits developed over the life-span may leave their mark on physiological states or processes, which in turn may influence the range of possible lower-order instrumental means (relating for example to degrees of stimulation).

A third point deserving discussion is the measurement of criteria. Although the criteria for success are basically objective (*i.e.* theory-driven) indicators of 'success' (as far as the universal and the five first-level instrumental goals are concerned), the empirical assessment can be based on both objective and subjective methods. It even seems preferable to combine both objective and subjective methods, for this will validate the criteria. Choice of measurement can be based on the researcher's preference, but also on substantive considerations (see also Ormel *et al.* 1997; Ormel *et al.* in press). For instance, it may be preferable to measure physical and social wellbeing on a subjective level, whereas the five first-level instrumental goals can be measured both objectively and subjectively. Lower-order goals and resources, however, can be measured partly objectively (for instance income, education, marital status), but also subjectively (the perceived quality of activities or relationships). Good measurements of both sorts will have to be developed.

The last point of discussion concerns the empirical status of the model and the formulation of new research directions. Although some empirical studies on the model have been executed (Nieboer 1997; Steverink 1996*a*, *b*; Steverink *et al.* 1994; VanEijk 1997), a number of hypotheses still have to be worked out and tested empirically. Different elements of the model have been measured by both conventional measurements and newly developed ones, using both objective and subjective measures. For instance, status has been measured by a prestige-scale (Sixma and Ultee 1983); affection by a loneliness-scale

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that assesses non-affection (DeJong-Gierveld and Kamphuis 1985) and comfort by an ADL/IADL-scale (Kempen and Suurmeijer 1990). Stimulation and behavioural confirmation have been assessed by activity patterns and social activities respectively (Steverink 1996*a*), and a scale for an age-related action perspective has been constructed (Steverink 1996*a*). In further empirical work it will be necessary to undertake longitudinal studies in order to trace substitution processes. In short, although much work still has to be done, we believe the model presented here has the potential to be developed in several directions. At the same time, it may allow the integration of a number of diverse existing studies and approaches.

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