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SUBJECTIVE WELL-BEING AND SOCIAL PRODUCTION FUNCTIONS

ABSTRACT. Recent reviews of scientific work on subjective well-being (SWB) reveal disagreements in conceptualization, measurement, and explanation of the concept. We propose Social Production Function theory as a framework to resolve them. Social Production Function (SPF) theory integrates strengths of relevant psychological theories and economic consumer/household production theories, without their limitations (namely, tradeoffs between satisfaction of different needs are not in the first, and goals or needs are not in the second). SPF theory identifies two ultimate goals that all humans seek to optimize (physical well-being and social well-being) and five instrumental goals by which they are achieved (stimulation, comfort, status, behavioural confirmation, affection). The core notion of SPF theory is that people choose and substitute instrumental goals so as to optimize the production of their well-being, subject to constraints in available means of production. SPF theory guides research measurement and explanatory models, and it integrates features of contemporary subjective well-being theories.

INTRODUCTION

Subjective well-being (SWB) refers to an individual's appraisal of his or her life situation overall -the totality of pleasures and pains, or quality of life (Bradburn, 1969; Campbell et al., 1976; Diener, 1984; Omodei and Wearing, 1990; Watson, 1988). The nature and sources of subjective well-being (SWB) have intrigued social scientists for several decades. Both psychology and economics have developed and tested relevant theories.

In psychology, theoretical and empirical contributions were reviewed by Larson (1978) and Diener (1984, 1994). Since then, progress has been made that reduces differences among theoretical positions and between theory and data (Argyle, 1987; Brief et al., 1993; Costa et al., 1981; Headey and Wearing, 1989; Omodei and Wearing, 1990; Ormel and Schaufeli, 1991; Ormel and Wohlfarth,



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1991). In current versions of subjective well-being theory (e.g., Headey, 1993), the classic positions of telic need theory (Maslow, 1970; Murray, 1938) and autotelic activity theory (Csikszentmihalyi, 1975, 1982; Schachtel, 1959) are combined. But a strong limitation persists, namely, that tradeoffs between satisfactions of diverse needs are not considered. Because of this, no heuristic exists to systematically examine how resources and constraints are utilized by humans to achieve subjective well-being.

In economics, important contributions for understanding SWB come from consumer economics and household production theory (Juster and Stafford, 1985; Stigler and Becker, 1977, 1996). Economics takes tradeoffs very seriously and thus provides a heuristic to understand behavior. But it leaves needs, or fundamental human goals, unspecified.

To study the sources of SWB, the virtues of psychological and economic theories need to be integrated. In this article, we show how a theoretical framework of SWB can be developed with a set of assumptions about how people produce their well-being subject to resources and constraints, and how they employ adaptive strategies to optimize well-being. The assumptions are called Social Production Function (SPF) theory. The theory states two universal goals (physical well-being and social well-being) that are accomplished through five main instrumental goals (stimulation, comfort, status, behavioural confirmation, and affection).

Our use of several terms should be clear at the outset: “Well-being” is the central goal of human activity. In our model, it is synonymous with overall psychological well-being. An individual’s level of well-being can be evaluated by him/herself or by someone else (e.g., spouse, researcher, health professional). A person’s own evaluation is “subjective well-being” (SWB). The term “resource” refers to means of production for well-being that are available to an individual. By contrast, “constraint” refers to resources that are not at his/her disposal.

The article proceeds as follows: First, relevant psychological and economic theories for understanding sources of well-being are sketched and critiqued. Next, we describe SPF theory and its suitability for understanding well-being. Third we show how SPF theory can be used to develop theory driven measurement strate-

gies for the two universal and five main instrumental goals. Fourth, using the assumptions of the SPF theory, we sketch and integrated explanatory framework of SWB that accounts for its maintenance and change. Fifth, we discuss how SPF theory integrates current models of SWB such as personality, adaptation level, and dynamic equilibrium models.

PSYCHOLOGICAL AND ECONOMIC THEORIES ON SOURCES OF SUBJECTIVE WELL-BEING

In this section, we review and contrast the contributions of psychological and economic theories relevant to subjective well-being.

Psychological Theories

Psychological theories of subjective well-being can be classified along two dimensions: (a) telic versus autotelic theory, and (b) bottom-up versus top-down approaches.

The fundamental difference between telic and autotelic theories is where each places the sources of subjective well-being (Diener, 1984; Omodei and Wearing, 1990). In telic theory, the attainment of desired end states is the source of well-being. The telic position is differentiated by whether the end state refers to a few common universal needs (Maslow, 1970; Murray, 1938) or the more numerous personally chosen goals (Allport, 1961; Michalos, 1980). In autotelic theory, the process of activities and experiences is the source, that is, the movement towards an endpoint rather than the endpoint itself. For example, Csikszentmihalyi (1975) found that involvement in fully discretionary activities like mountaineering and chess-playing served as the experience's reward. The telic and autotelic approaches are less different than they appear since personally-chosen goals typically represent personal schemes to attain things/states that do ultimately fulfill universal needs. Thus, explicit activities are instrumental goals for universal needs. Whether they define fulfilment in terms of needs or goals, theorists share the view that it is related to positive affect, and its absence to negative affect.

The second dimension by which well-being theories can be classified distinguishes the significance attributed to changing life cir-

cumstances/experiences versus stable person characteristics (Brief et al., 1993; Diener, 1984). The bottom-up approach asserts that well-being is determined by the balance of pleasant and unpleasant experiences. "A happy individual is happy precisely because he or she experiences many happy moments" (Brief et al., 1993: 646). Well-being is directly related to the ratio of negative and positive experiences (Bradburn, 1969; Campbell et al., 1976; Reich and Zautra, 1983). By contrast, the top-down approach maintains that well-being levels derive largely from stable personal features. Global personality traits such as neuroticism predispose people to experience and react to situations in positive, or negative, ways. "Despite circumstances, some individuals seem to be happy people, some unhappy people" (Costa et al., 1981, p. 79).

Current views are that all the approaches above are pertinent in real-life behavior. With respect to telic and autotelic sources: "Need satisfaction and involvement are conceptually different sources of well-being that overlap empirically because they share a common source in the perception of opportunities for need satisfaction. These opportunities lead to both the experience of involvement and behaviour that results in the satisfaction of needs" (Omodei and Wearing, 1990, p. 763). With respect to bottom-up and top-down sources: Most evidence points to the validity of a dynamic equilibrium model that involves both stable person characteristics and life circumstances/experiences (Headey and Wearing, 1989; Ormel and Schaufeli, 1991; Ormel and Wohlfarth, 1991). These two sources are not independent; genetic characteristics interact with environmental factors to shape personality (Plomin, 1994). Since people tend to select and create environments that fit their personality, it is likely that associations between genetic factors and environmental ones (such as controllable life events, chronic stressors, social support) result from the intervening effects of personality (Kendler et al., 1992; Saudino et al., 1997). Saudino et al. (1997) found significant genetic effects on controllable life events (e.g. breakup of a relationship) but not on life events which were outside a person's control (e.g., death of a child). The genetic effects were mediated by neuroticism, extraversion, and openness to experience. In other words, people differ in exposure to controllable life events partly as a result from genetically determined differences in personality.

In sum, strong points of psychological theories relevant to well-being are (a) the linkage of goal achievement/need satisfaction with feelings of well-being and (b) the notion of instrumental goals as means to achieve higher order goals. But the theories differ greatly in the needs deemed universal and they neglect how satisfactions of various needs might substitute for each other. In psychology, needs are taken as independent of each other. So a unit of esteem need in the famous Maslow need hierarchy can not take the place of any portion of a physiological need. This may be true for certain states of deprivation, but it does not seem sustainable over the whole range of need satisfactions in regular life (McKenzie and Tullock, 1985). For example, one cannot give up sleep and comfort entirely to obtain more affection or status, but some sleep and comfort can be omitted for those purposes (e.g., monks). We must turn to economic theories for notions of substitution and elasticity of demand.

Economic Theories

Part of the standard equipment of any economic analysis is the law of demand. The lower the cost of a good relative to other goods, the more people will produce, have, use, or consume of that good (Alchian and Allen, 1983). This is a robust regularity and it implies a tendency to substitute according to changes in relative prices.

In order to work with the law of demand, economists have typically assumed that human beings aspire to secure material goods and services and that their preferences are stable. Only then can the powerful law of demand be unambiguously applied, with changing prices governing behaviours under fixed income constraints. This methodologically-inspired limitation to stable preferences makes economics almost useless as a source of theory for subjective well-being, even though economics is much better able to consider processes of substitution than psychological theories.

This picture changed when Becker introduced a new “household economics” in which individuals are mainly seen in their role as producers rather than consumers. Individuals all have the same universal goals (i.e., stable preferences at that level) but these goals must be realized through a process of production (Becker, 1976, 1996; Stigler and Becker, 1977; Lindenberg, 1996). For that, the individual needs “means of production.” Depending on the circum-

stance, the individual can use one good to substitute for another. For example, for the production of musical pleasure, the individual can go to a concert or purchase and listen to a CD at home. If the price of concerts goes up or that of CD's goes down, people will shift more from the former to the latter. Means of production create changeable preferences ("instrumental goals") for achievement of the stable preferences. Nonmaterial preferences, such as musical pleasure, can be especially introduced and linked to material or nonmaterial means of production.

Contributions to the theory of well-being stemmed from Becker's lead (Headey, 1993; Juster and Stafford, 1985). The main problem has been that universal goals are not specified, so the analysis of well-being remains subject to arbitrary assumptions about people's aims. Further, empirical links between individual behavior and well-being are not clear. In cross-national research, a positive correlation between subjective happiness and material resources appears, but the richer the country, the smaller this correlation is at individual level (Veenhoven, 1994). Diener and Fujita (1995) find that resources vary in their relevance to SWB from one individual to another; the resources most relevant to his/her strivings are the best predictors of his/her subjective well-being. As a result of the specification and empirical problems just noted, solid contributions of economic theories to psychological theories have been slowed.

In sum, strong points of economic theory are the attention to production as well as consumption, and the recognition of substitution (or elastic demand) once the most pressing physiological and safety needs are achieved.

SOCIAL PRODUCTION FUNCTION THEORY

Social Production Function (SPF) theory was introduced by Lindenberg (Lindenberg 1986, 1991; Lindenberg and Frey, 1993). The theory asserts that people produce their own well-being by trying to optimize achievement of universal goals, within the set of resources and constraints they face. Drawing on both psychological and economic theories, humans are seen as active agents who rationally choose cost-effective ways to produce well-being, given that

Top level	Subjective Well-being				
	Physical Well-being		Social Well-being		
Universal goals					
First-order instrumental goals	Stimulation/ Activation (optimal level of arousal)	Comfort (absence of physiological needs; pleasant and safe environment)	Status (control over scarce resources)	Behavioral Confirmation (approval for "doing the right things")	Affection (positive inputs from caring others)
Activities and endowments (means of production for instrumental goals) (examples)	Physical and mental activities producing arousal	Absence of pain, fatigue, thirst, hunger; vitality; good housing, appliances, social welfare, security	Occupation, life style, excellence in sports or work	Compliance with external and internal norms	Intimate ties, offering emotional support
Resources (examples)	Physical and mental effort	Food, health care, money	Education, social class, unique skills	Social skills, competence	Spouse, empathy, attractiveness

Figure 1. The hierarchy of social production functions.

the rational considerations of cost-benefit are limited by available information.

Central components of SPF theory are (a) the link between realization of goals and well-being, (b) explicit definitions of universal and instrumental goals, and (c) substitution among instrumental goals according to cost-benefit considerations. The first feature derives from psychological theories; the second, from new household economics theory; and the third, from microeconomic price theory.

Universal and Instrumental Goals

Although the new household economics distinguishes between universal goals (identical for all human beings) and instrumental goals (individual preferences for the means leading to universal goals), those goals are not well-defined. SPF theory identifies both and their relationship to each other. This allows much more specificity about how individuals go about achieving well-being, and it reduces ad hoc statements of needs and wants.

Two universal goals are identified in SFP theory: physical well-being and social well-being. (1) Physical well-being is attained by two instrumental goals: stimulation (also called activation) and comfort (Figure 1). Stimulation refers to activities that produce arousal, including mental and sensory stimulation, physical effort, and (competitive) sports. Although humans prefer some degree of

activation, prolonged levels of high stimulation become unpleasant (cost exceeds benefit). Thus the association of activation with well-being takes an inverted U shape (Hebb, 1958; Scitovsky, 1976; Wippler, 1987). Comfort is a somatic and psychological state based on absence of thirst, hunger, pain, fatigue, fear, extreme unpredictability, and the like. Activation within the pleasant range, and comfort, are each related to physical well-being in a positive way. In economic terms, these are monotonically increasing production functions with decreasing marginal product. The more physical well-being a person has, the less valuable an additional unit of stimulation or comfort is.

(2) Social well-being has been repeatedly claimed a crucial universal goal, albeit with different names and labels. “Nature, when she formed man for society, endowed him with an original desire to please, and an original aversion to offend his brethren. She taught him to feel pleasure in their favourable, and pain in their unfavourable regard” (Smith, 1976 [1759], p. 116). Marshall (1920, pp. 14–17) reiterated the importance of social well-being, as did Parsons and Shils (1961, p. 69). In modern terms, “the struggle to preserve or enhance feelings of self-worth or prestige marks all men who live above a bare subsistence level” (Krech et al., 1962, p. 96). In SPF theory, social well-being is attained by three instrumental goals: status, behavioural confirmation, and affection (Figure 1). Status refers to relative ranking to other people, based mainly on control over scarce resources. Behavioural confirmation is the feeling one has “done right” in the eyes of relevant others, even when direct reinforcement does not occur. Affection includes love, friendship, and emotional support; it is provided in caring relationships (intimate, family, friendship). All three instrumental goals are assumed to have monotonic increasing relationships with social well-being, with decreasing marginal value for their production.

Others have discussed some of these instrumental needs for social well-being in different conceptual frameworks and terms. Simons (1983) distinguishes three components of psychological need: need for assistance and security, need for intimacy, and need for positive self-esteem. Inability to satisfy them results in, respectively, feelings of insecurity and anxiety, of isolation and loneliness, and of worthlessness and unfulfillment. Simon’s conception derives

from Weiss' typology of social needs (1974) which include attachment, social integration, opportunity for nurturing, reassurance of worth, sense of reliable alliance, and obtaining guidance. Similar goals are formulated in Brandtstadter and Baltes-Gotz (1990) and Rokeach (1973). Omodei and Wearing (1990) state fundamental universal needs that are linked to well-being, such as self-esteem, personal control, purpose, and meaning. The contemporary literature on social support consistently points out the importance of various forms of social support for maintenance and recovery of well-being when people face adversity. Animal research also verifies the importance of attachment and status for primates and rodents' normal behavior and health (e.g., De Kloet et al., 1988; De Kloet, 1994).

There is considerable overlap with Maslow's renowned need hierarchy but there are also important differences (Maslow, 1970; Lindenberg, 1996). The overlap consists of comfort (physiologic needs in Maslow's system), affection (belongingness and love needs), and a combination of status and behavioural confirmation (esteem needs). Maslow's system does not consider stimulation but includes safety needs and the need for self-actualization. Lindenberg (1996) has persuasively argued that safety needs can be conceptualized as instrumental goals for comfort and that self-actualization ultimately depends on approval by others. Stimulation was included in the SPF model as a main instrumental goal because there is ample evidence that people do not only seek physical well-being by drive reduction (or comfort) but also by stimulation (Hebb, 1958; Wippler, 1987). This is not meant to say that stimulation and comfort are two sides of the same coin, in that people seek an optimal level of arousal. In that case people would seek stimulation when their arousal level is too low and comfort when it is too high. Consequently, even small substitutions between comfort and stimulation would not be possible. This idea of an optimal level of arousal is too simplistic. Indisputably, extreme levels of arousal are noxious. But within a large range of arousal, people seem to derive pleasure from both reducing and increasing arousal. Thus, within this range, individuals may seek comfort and stimulation at the same time, for instance by watching an exciting movie in a comfortable chair in a warm and pleasant environment.

Hierarchy

In SPF theory, goals are hierarchically arranged with the two ultimate goals at the top, the five first-order instrumental goals just below, and lower-order instrumental goals that serve to produce those five farther down. Production functions specify the factors needed to produce a given goal. Thus, an array of production functions between goals of different levels will show how well-being is generated, maintained, or changed.

To visualize these relationships, consider one example: Utility (U) is achieved through physical well-being (PW) and social well-being (SW); thus $U = f\{PW, SW\}$. In turn, social well-being is produced by status (S), behavioural confirmation (BC), and affection (A); thus $SW = f\{S, BC, A\}$. Each of these is itself a goal that is produced by “second-order” means of production. For example, behavioural confirmation is often generated by membership in groups (I) and conformity to norms (C); thus $BC = f\{I, C\}$. Further, conformity to norms derives from engaging in and abstaining from various activities, depending on the social expectations in the individual’s milieu. The lower one goes in the SPF hierarchy, the more context-specific the production functions become.

If an individual lacks the necessary resources to realize a higher-order goal, then the production of resources becomes an instrumental goal in itself. For example, a hungry teenager on the way to playing football can stop at a store and buy chocolate to satisfy the hunger, and thereby have sufficient energy for the game. Or, a woman may direct her activities toward making money so that she can renovate her house. When there is plenty of time between a resource-gaining activity and its eventual goal, the first is viewed as an investment. The distinction between activities that immediately satisfy a goal and those which increase potential for future production is important to conceptualize and then detect in empirical research.

Immediate and delayed satisfactions are intertwined, so that dropping an activity related to the first can have consequences for the second, and vice versa. For example, preventive maintenance of the house (e.g., painting it) is an investment, but it may be accompanied by the desire to gain immediate behavioural confirmation from one’s partner and neighbours. Loss or serious illness of the partner

and lack of social control in the neighbourhood can eliminate motivation for such investment behaviours, with ensuing decline in the quality and yield of social production functions.

Substitution

In SPF theory, instrumental goals are substitutable depending on their relative cost. For example, if opportunities and resources for status achievement decrease, a person may increase production of affection and behavioural confirmation if that appears easier (thus, “cheaper”) than status production. Similarly, if someone becomes disabled and can no longer perform sports activities that offered stimulation, s/he may increase alternatives such as reading, watching television, and telephoning friends. The alternatives open to people who face dissatisfactions, losses, and dilemmas depend heavily on the extent and diversity of their resources. Variety tends to increase over one’s life, and high diversity gives not only richness to a current behavioural repertoire but also good chances of alternatives if a particular resource recedes.

Many activities are multifunctional; they achieve several instrumental goals, or they combine immediate production with investment. For example, close social interaction in intimate relationships may produce affection, behavioural confirmation, and stimulation all at the same time, while also serving as investment for future access to social contact. Such activities are especially efficient in a person’s set of social production functions. Losing them can create substitution problems of such magnitude that finding satisfying replacements is impossible or takes a very long time.

Substitution comes into play when valued activities or satisfactions decrease for any reason. For example, close social interactions may decrease sharply when a spouse/partner dies, an intimate friend moves away, or a cherished tie dissolves in conflict. If grief inhibits formation of new ties, people may turn toward more solo activities for a short or long time. Another example is loss of satisfying work. Work not only provides income and status, but it often also encompasses multifunctional activities that produce stimulation and behavioural confirmation. Whether overall utility (U) decreases or is maintained depends on the satisfaction derived from the substituted

activities. Some losses are so severe, they surpass a person's ability to substitute and s/he shifts to a lower overall utility level.

Substitutability has limits, at the levels of universal as well as main instrumental goals. For example, people need some level of physical well-being, and no amount of social well-being will suffice to compensate for it (although suicide bombers appear to have been willing to trade physical well-being for social approval). Likewise, people need some degree of physical stimulation, and no realistic level of comfort can compensate that. This can be formally represented by a Cobb-Douglas production function of the form $A = X^a \cdot Y^b \cdot Z^c$, where $a, b, c = 1$. The outcome A refers to a sought goal, and $X, Y,$ and Z are the lower-order resources used toward it.

Finally, besides the problems of large losses and limited substitutability, cognitive and emotional features can create obstacles to substitution behavior. When an individual is threatened by loss of an important resource for physical or social well-being, considerations of costs and benefits can become one-sided. The potential loss can become so salient that perception of possible gains is void and other goals are temporarily displaced (Kahneman et al., 1982; Kahneman and Tversky, 1984). This process is known as framing. For example, older people who lose a number of valuable resources (work, income, health, siblings, friends) may focus so much on loss, they fail to invest in ways that buttress their future production possibilities (Steuerink, 1996a). As another example, when one's house is burglarized, a person can become obsessed with security far beyond the amount stolen or likely to be stolen ever again. Framing also occurs when functional or organic mental illness impairs a person's discriminatory capacities. The reason that neurophysiological impairments (cognitive decline, depression, anxiety, pain) produce so much disability and loss of well-being (Ormel et al., 1993; Ormel et al., 1994; Von Korff et al., 1992; Wells et al., 1989) may be because those impairments cause decrements in higher-order mental capacities such as energy, self-regulation of affect, self-confidence, concentration, memory, reasoning, and long-term planning (which we later denote as an important category of third-order means of production). These have profound effects on how well someone selects means of production and engages in them. In all the examples noted above, appraisal does not proceed according to relative

price effects. To an outside evaluator, the individual's rationality of appraisals and corresponding actions (given his/her resources and constraints) are non-optimal, i.e., less productive than feasible given the objective constraints.

Substitutability is an essential feature of SPF theory, and stands as such in sharp contrast with Maslow's need hierarchy. This is one of the aspects of the theory which makes it also relevant from a sociological point of view. For instance, in western societies status is largely produced by occupations, and becomes relatively more costly to produce after retirement. Consequently, following retirement elderly will tend to substitute status by behavioural confirmation and affection. When, with increasing functional limitations by ill-health, it also becomes more difficult to perform many roles that produce behavioural confirmation, sources of affection (partner, grandchildren) will become increasingly important to the elderly (Steverink, 1996a). This is a movement that can not be predicted by Maslow's hierarchy.

Resources

Resources and constraints play a major role in SPF theory because they determine the relative costs of alternative ways to produce physical and social well-being. Key personal resources are physical and mental health, time, energy, income, education, kin and friend ties, and social skills. Constraints are absence of resources that could help achieve a particular goal; in economic terms, they constitute costs. Besides constraints due to low personal skills, finances, or motivations, there are important environmental constraints in law, social infrastructure, norms, and climate.

Individuals develop social production functions that use existing resources, avoid constraints, and generate new resources. Over the short and long runs, people's activities arise in an ongoing "deliberation" between central instrumental goals on the one hand, and resources and constraints on the other. At a given time, preferred ways of producing well-being stem from both perceived current resources and also personal history of which production functions have been most and least successful to date.

Resources are means of production a person has at a given time. We can usefully distinguish at least three levels below the first-

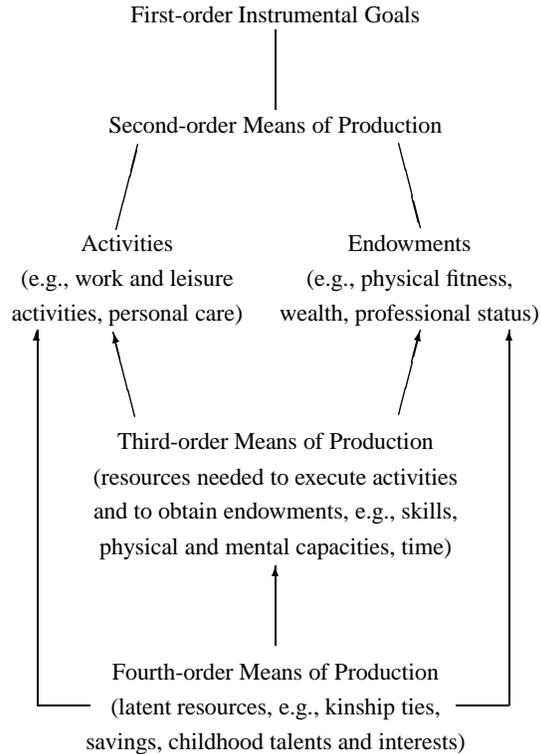


Figure 2. Means of production: The interplay of resources and goals.

order means of production (stimulation, comfort, etc.) (Figure 2). *Second-order* means of production are activities and endowments that help produce the key instrumental goals. Activities are current behaviours aimed toward a goal, and endowments are statuses and resources as a result of prior activity that enhance its production. For example, bathing regularly helps produce comfort, and long-time good health also enhances it. Satisfying work and marriage represent important endowments in addition to activities. During most of the adult life span, having work and being married yield by itself, that is without any activity, status and behavioural confirmation. In addition, satisfying work and good marriage also encompass a variety of (multifunctional) activities that produce stimulation, behavioural confirmation, affection, and comfort (through income). *Third-order* means of production are resources needed for executing activities and obtaining endowments. Examples are basic skills and abilities such as time, effort, and social intuition. These are use-

ful in production functions for many higher-order goals. We note that some resources can operate on goals at several levels in the hierarchy; for example, money confers high status directly, but it also serves at lower levels to give access to activities and reinforce endowments. *Fourth-order* means of production are those that can be mobilized when changes in production capacity require substitution. Such latent resources are analogous to credit or savings. For example, when a partner dies, some of the lost production capacity for affection can be regained by reopening kinship ties that have been dormant for some time.

It is not difficult to envisage how resources and constraints affect the costs of activities and endowments. For individuals who have long working hours and low pay, all activities and endowments that require time and money, will be more costly than for the rich and retired. Likewise, the costs of activities that require much human interaction are much lower for people with strong social skills.

OPERATIONALIZATIONS AND MEASUREMENTS

This section discusses empirical features of SPF theory – how well-being, goals, resources, and activities can be measured in research settings.

Well-being

Measures of overall psychological well-being are usually based on self-reports. This is called subjective well-being (SWB). Indicators range from one-item measures such as Cantril's ladder (1967), Andrews and Withey's Delighted-Terrible Scale (1976), and Fordyce's global measure of happiness (1988) to multi-item scales such as Kammann and Flett's Affectometer (1983), Diener et al.'s Satisfaction with Life Scale (Diener et al., 1985), and Bradburn's Affect Balance Scale (1969). Other measures are based directly on utility assessments of specific states/outcomes (Hays et al., 1993; Torrance, 1987). In the most general definition, SWB is "the degree to which an individual judges the overall quality of his life as a whole in a favourable way" (Veenhoven, 1984). There is current consensus that two components comprise subjective well-being:

people's average pleasantness level over the long-run (called hedonic tone) and overall life satisfaction. Hedonic tone is the balance between pleasant and unpleasant affects; it taps emotional reactions to events during a certain time frame. Life satisfaction is a more overtly cognitively-based judgment of life. It provides a broad-brush picture, in contrast to the more reactive and close-at-hand picture from hedonic tone. Analyses differ on whether hedonic tone by itself has two distinct dimensions or a single bipolar one (Bradburn, 1969; Diener, 1994; Schuur and Kiers, 1994). Similarly, the empirical structure of SWB is not certain. The correlation between hedonic tone and life satisfaction is substantial but far from unity. Diener (1994, p. 140) states: "The size of the relationship will depend on the time frame of the affect and satisfaction questions, on the degree to which the person's conscious and unconscious motives differ, and on numerous other factors. Life satisfaction is dependent on global appraisals of life, appraisals which are guided to some extent by the immediate situation and current mood. Hedonic level, in contrast, is dependent on the on-line, often unconscious appraisals the person makes of ongoing reactions."

SPF theory accommodates a subjective assessment of overall wellbeing, as well as a multidimensional approach to its components. On the first point, single survey items that are seemingly one-dimensional can take into account recent theory on cognition and emotions (Diener, 1994). There are probably some good alternatives to simple verbal and self-administered questionnaire formats (e.g., time trade-off approaches), and these need to be studied by survey methodologists.

On the second point, SPF theory sets forth a hierarchical structure of goals, activities, and resources that serve to produce physical, social, and overall well-being. (a) For the key instrumental goals, respondent-based or investigator-based measurement procedures are both applicable. For example, respondents can judge how much affection they receive; or investigators can use a standard protocol for loneliness or social support; or investigators can conduct a semi-structured interview about affection-related behaviours and make an expert judgment for the collected information. (b) For activities, an attractive measurement procedure is a time-budget. Participation in and time spent on major activities (sleep, personal care, paid

work, housekeeping, shopping, child and elder care, seeing friends, sex, attending sports events or movies, etc.) can be determined by diaries or time estimates. Benefits (e.g., affection, comfort, status, stimulation) and costs (e.g., time, effort, money) of activities can be determined, though this requires a fair amount of respondent commitment to the research project. (c) Endowments and other resources can be queried by regular interview procedures. Summing up, the measured variables will serve as independent variables (activities, endowments, resources) or dependent variables (instrumental goals, desired resources, and all other big or small aims), depending on the specific model being estimated.

SPF theory offers clear definitions of concepts and also high theoretical embeddedness (stated and sensible relationships among concepts). This gives a good basis for developing explanatory models of how environmental and personality factors affect well-being, since the models can launch from a common set of universal and first-order instrumental goals. For the empirical researcher, one challenge is to develop comprehensive models for specific goals, including and measuring all relevant sources for the outcome. The notion of marginal utility must be estimable in a given model. The relative importance of the component means-of-production for a goal is one desideratum of the research. Another challenge is to integrate lower-level models in order to explain levels of physical and social well-being and their final synthesis, subjective well-being. The issue of substitution is especially difficult, but also appealing.

TOWARDS A GENUINE EXPLANATORY MODEL OF WELL-BEING

By genuine, we mean a framework that provides heuristics for explaining how well-being rises, falls, or remains stable as people age, events accumulate, and social milieux change. At its best, such a framework should distinguish the importance of stable personal characteristics versus life changes for production of well-being.

On the side of stable characteristics, personality and social class related variables shape long-term baseline of positive and negative affect (e.g., Costa and McCrae 1980; Ormel and Schaufeli, 1991). influence exposure to life changes (e.g. Fergusson and Horwood, 1987; Ormel and Wohlfarth, 1991), and dampen or amplify effects

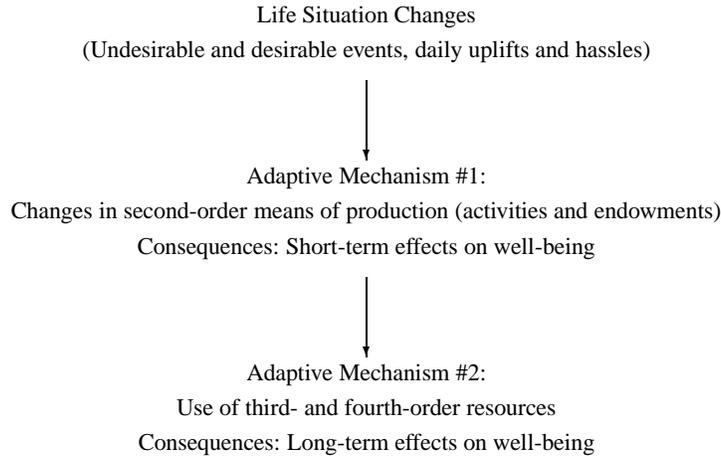


Figure 3. A framework for explaining how life changes affect well-being.

of life changes on well-being (e.g., Ormel et al., 1989). On the other side, from the stress-vulnerability perspective now popular in psychology and psychiatry, the constellation of daily hassles, daily uplifts, and life events are strong factors behind well-being (e.g. Brown and Harris, 1978; Ormel and Wohlfarth, 1991).

Within the framework of Social Production Function (SPF) theory, stable characteristics are modelled in terms of resources and constraints that facilitate or limit production of well-being and investment in production capacity. Life changes affect achievement of first-order instrumental goals by altering the relative costs of their means of production (activities and endowments), and they also affect lower-order means of production and substitution abilities. For instance, being laid off reduces occupational prestige, a major endowment for status, and frequently also leads to loss of income, a major resource for physical well-being. Consequently, production of status, comfort and stimulation become more expensive. A new harmonious intimate relationship is a formidable resource that provides multiple opportunities for activities that produce comfort, affection and behavioural confirmation. Consequently, it becomes 'cheaper' to achieve these main instrumental goals. Likewise, many life changes can be analysed in terms of their impact on an individual's social production function and resources, although it will be difficult to express these changes in terms of some unit of costs.

We think that life events have a direct impact on the entire hierarchy, but the effect on first-order means of production is generally limited in time because of substitution, whereas the changes at lower levels can be long lasting. We think that life changes have their most obvious and prompt effects on the five main instrumental goals, and more hidden and delayed ones on lower-order goals (Figure 3). Elaborating this: Short-term effects on well-being are determined largely by the extent to which highly cost-effective means of production are facilitated or constrained by life changes. Long-term effects depend on the extent to which opportunities for substitution are promoted or curtailed in fundamental means of production. There are life situations and changes that clearly affect fundamental means of production negatively for a protracted period. Enprisonment, and abusive spouse, loss of hearing and vision, widowhood, long-term unemployment, the birth of a severely handicapped child, all these will tend to bring about substantial reduction in resources for productive activities and endowments. When substitution at the third- and fourth-order levels becomes infeasible, then producing an instrumental goal, or increasing one of them as another decreases, becomes problematic. From both higher-order and lower-order impacts, life changes percolate through the hierarchy toward well-being in swift and slow ways.

Undesirable life changes increase constraints by reducing opportunities to achieve well-being and by increasing the costs of some means of production. This reduces behavioural means to achieve the first-order instrumental goals, with ensuing negative effects on well-being. On the other hand, desirable life changes decrease costs of some means of production and expand resources. Through this, behavioural means for goal achievement are increased. In short, life changes affect the cost-benefit ratios for the pre-event means of production that are operating. Most individuals have opportunities for substitution in face of undesirable life changes, and this allows well-being to return to baseline level. Only severe, unusual, or prolonged life changes are likely to result in long-term changes in well-being.

SPF THEORY AND MODELS OF THE DYNAMICS OF SUBJECTIVE WELL-BEING

Several models about dynamics of subjective well-being (SWB) have been proposed. Headey and Wearing (1989) distinguish four types: the personality model; the adaptation level model; the life event model; and the dynamic equilibrium model. (1) The personality model assumes that SWB depends mostly on personality, especially the traits of neuroticism and extroversion (e.g., Costa and McCrae, 1980). (2) The adaptation level model asserts that life events prompt only transient changes in SWB because a person rapidly adapts to the new situation by raising or lowering comparative standards in the direction of the new situation, or adapts by other means (Brickman et al., 1978; Heyink, 1993). This process minimizes discrepancy between achieved and desired life situation. Personality is involved in this; it can explain why some people persistently experience large discrepancies (unsatisfied) and other small or no discrepancies (satisfied). (3) The life event model proposes that life changes are exogenous shocks that have significant but transient effects on SWB (e.g., Lawton, 1983). (4) Empirical evidence strongly suggests a mixed model involving both life events and personality. Headey and Wearing (1989) call this a dynamic equilibrium model, and it is their preference. The essential feature is that each person has a normal, or equilibrium, pattern of life events and normal level of SWB; both are predictable on the basis of stable personality characteristics. Deviations from the pattern of life events alter SWB, but the change is usually temporary because personality traits act to equilibrate the situation and draw people back to their normal level. Studies since Headey and Wearing's (1989) discussion have provided good support: Ormel and Schaufeli (1991) found that 60% of explained variance in distress is due to stable person characteristics, and 40% to life changes. (The 60% contains effects of personality mediated by controllable life changes; these could not be separated in the data.) Other twin and longitudinal studies show that stable person characteristics, especially neuroticism, predict exposure to *controllable* undesirable life events and long-term difficulties (Kendler et al., 1993; Kessler et al., 1992; Saudino et al., 1997; Ormel and Wohlfarth, 1991; Plomin, 1994). In sum, these suggest interacting influences of personality and life events on well-

being. A good theory of well-being must be able to deal with such interactions.

SPF theory can provide a framework that encompass these findings, that is suitable for dealing with complex interactions between person characteristics and environmental changes, and that allows to develop specific hypotheses on the mechanisms through which person characteristics and environmental changes influence well-being. On the first point, the SPF-based explanatory framework readily handles results about small long-term impacts of life events on subjective well-being for most people. In the instance of undesirable events, the cost-effectiveness of all or most current activities is not significantly changed by the events, important resources may not be altered, and effective and rapid substitution occur if they are. In contrast to adaptation level theory, which posits highly reactive changes in personal standards, SPF theory allows for steadiness of those standards in the short run and gradual change in the long run. On the second point, SPF theory views humans as actively shaping and reshaping their activities to attain goals, using all manner of personality and environmental resources at hand. Interactions of stable person characteristics and environmental features are fundamental empirical devices for understanding how people respond to life changes in their social production functions.

At present all knowledge on the 'productivity' of common activities, endowments, and resources is based on common sense; good empirical evidence is lacking. We do not know the productivity of a good marriage and satisfying work or the counter productivity of a poor marriage and dissatisfying work, relative to being single. Neither do we know the marginal utilities of major resources such as income, occupational prestige, friends, and luxury. But if information on relative utilities becomes available, we will have the tools to test a large variety of hypotheses, for instance about why person characteristics such as neuroticism and extraversion are so strongly associated with SWB. It might be that persons with high neuroticism and low extraversion get themselves involved in counter-productive activities; that they have neglected to build up variety in resources, in terms of work skills and relationships; that they lack the resources for effective substitution, such as self-efficacy, competence and control. All this might be involved in the

apparent psychosocial vulnerability of some individuals. Likewise, we can deal with important intractable environmental factors such as poverty, social class, and climate.

DISCUSSION AND CONCLUSION

In this article, we have proposed a conceptual framework about sources of well-being and some heuristics about how those sources are generated and combined. Social Production Function (SPF) theory integrates current psychological theories about well-being with economic consumer/household production theories. It provides directions for solutions for limitations on each side (psychological theory does not consider substitution of needs, and economic theory lacks a model of goals or preferences).

Overall well-being is a function of physical well-being and social well-being, and subjective well-being (SWB) is a person's overall evaluation of that ultimate goal. The first is produced by stimulation and comfort; and the second by status, behavioural confirmation, and affection. These five instrumental goals are themselves produced by various activities and endowments. Individuals choose among their available resources to produce goals and ultimately well-being, according to relative costs and benefits of using the resources. Differences in resources (education, social skills, income, etc.) lead to different pathways by which people achieve instrumental goals and hence well-being. Constraints (absent resources) also exist that inhibit maintenance and change of goals, and hence well-being.

SPF theory offers a framework for explaining how life changes influence well-being through their impacts on cost-benefit considerations about using and generating resources. The theory suggests that (a) ability to substitute, based on the richness of a person's behavioural repertoire and latent resources, (b) ability to engage in multifunctional activities that achieve several instrumental goals or investments. A particularly effective set of resources might be those that facilitate rational choice about activities and goals in the face of constraints and losses. In this context, self-regulation is relevant. This concept from social learning theory (Bandura, 1977) refers to a set of processes by which a person attempts to control physiolog-

ical, psychological, behavioural, and environmental factors in order to reach a goal (Clark et al., 1991). Key processes include planning, monitoring, evaluation, and reward. There are several related concepts to self-regulation: self-efficacy, competence, and control. Intervention research shows that self-efficacy can be increased by targeted programs (Lorig, 1993). Control (or autonomy) over life choices is widely regarded as a fundamental underlying determinant of well-being (Brandtstadter and Baltes-Gotz, 1990; Rodin et al., 1991). Rodin and Langer (1977) have confirmed this by showing that nursing home patients encouraged to exercise greater personal control felt happier, were more active socially, and were more alert than other patients. Stated in our SPF-based framework, self-regulation is learned ability to make the right decisions about exploiting resources to maintain or improve means of production and to achieve goals.

The SPF-based framework of well-being needs development and testing of specific hypotheses. In its current state, it represents a conceptual framework rather than a tight and refined theory with a coherent set of testable hypotheses. A first step could be the development of hypotheses on the differential effects of life events on well-being and the time pattern of effects. Life events are well researched but, with some notable exceptions (e.g., Brown and Harris, 1978; Leenstra et al., 1995), typically without systematically derived hypotheses about the features and contexts of life events that influence their outcome. Another step consists of testing some straightforward assumptions of the framework. For instance, the assumption that SWB is determined by the level of only two universal goals: physical well-being and social well-being; or, the assumption that social well-being depends on only three main instrumental goals: status, behavioural confirmation and affection. Finally, it would be interesting to examine cultural differences in second-order instrumental goals for status and behavioural confirmation, and how these correlate with variation in the emphasis on the individual versus the community (guilt versus shame).

We did not address how SPF-theory relates to natural selection and genetics. Although important and potentially rewarding, it is outside the scope of this paper to examine how compatible SPF-theory is with modern insights from behavioural genetics

(e.g., Plomin et al., 1997), the theory of the selfish gene and the extended phenotype (Dawkins, 1976, 1983), sociobiology (e.g., Wilson, 1975) and evolutionary psychology (e.g., Buss, 1991). But it is not difficult to recognize the value of the first-order instrumental goals for what biologists call 'inclusive fitness.' Their significance for reproduction is most easily seen for the goals of comfort and status, both have influenced reproductive opportunities of social animals including man, and they still do so. We think that the central assumption of SPF-theory - human beings seek to optimize physical and social well-being- is not incompatible with the natural selection and the notion of the selfish gene. If a gene influences behavior, it can only remain in the gene pool, if the gene, through behavior, maintains or extends its number of copies in the gene pool of the next generation. It is even likely that the tendency to optimize physical and social well-being results from selective pressures, and because of that probably has a genetic background. Human behavior includes moral and altruistic behaviours which sometimes reduce a person's reproductive opportunities. This does not have to be incompatible with SPF-theory. For instance altruism may not only enhance reproduction of genes in relatives, it is also an important source of social approval, which yields behavioural confirmation and status.

Neither did we discuss to what extent goals/preferences differ between individuals and why they do so, although clear directions for theory development were presented. Elsewhere we have discussed why and under what circumstances people's ageing might be(come) successful (Steverink et al., in press). Steverink et al. suggest an important role for variety in resources. "The variety-hypothesis follows from the fact that, because substitution is the core mechanism of maintaining instrumental goals and resources for physical and social well-being over the life course, variety in resources is essential for dealing with the changing balance of gains and losses of means of production in such a way that the overall level of well-being does not fall." It is not just variety in resources as such that matters, but variety explicitly aimed at different first-order instrumental goals. Some direct and indirect empirical support for the variety hypothesis has been reported (Steverink, 1996b; Adelman, 1994).

There is little empirical knowledge about the functional relationships between well-being and the actions taken to preserve or increase it. Information about three aspects has potential practical utility. First, SPF theory asserts that well-being is often insensitive to seemingly major changes in activities. Understanding the functional relationships between well-being and activities to preserve well-being among persons who experience severe losses would help in our understanding the stability of well-being, and it might suggest therapeutic approaches to sustain well-being in face of adversity. Second, the theory asserts that multifunctional activities are especially productive of instrumental goals, and thus valuable to have and keep. Understanding how life changes affect multifunctional activities, and how some individuals maintain them in the face of change, also has value for therapy and counselling. Third, SPF theory highlights substitution of goals and resources as a mechanism individuals readily use when problems arise. Understanding the frequency and efficacy of substitution by persons, especially those with apparently limited resources, can give guidelines about adaptation useful for all persons. In sum, empirical research should aim at identifying uniformities and differences in links among activity patterns, the five key instrumental goals, and overall well-being, and also the relative importance of various activities in producing common human goals.

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