The Journal of the Economics of Ageing 6 (2015) 176–186

Contents lists available at ScienceDirect

The Journal of the Economics of Ageing

journal homepage: www.elsevier.com/locate/jeoa

Full Length Article

# Age differences in the reaction to incentives – A test of the successful ageing extension of Social Production Functions Theory

Alec N. Sproten [a,*], Christiane Schwieren [b]

[a] Department of Law and Economics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Lange Gasse 20, 90403 Nürnberg, Germany
[b] Alfred Weber Institut für Wirtschaftswissenschaften, Heidelberg University, Bergheimer Str. 58, 69115 Heidelberg, Germany

ARTICLE INFO

*Article history:*
Available online 12 March 2015

*Keywords:*
Aging
Competition
Social Production Functions
Experiment
Incentives

ABSTRACT

The "aging employee" has recently become a hot topic in many fields of behavioral research. With the aim to determine the effects of different incentive schemes (piece rate, competition, choice between piece rate and competition, social or increased monetary incentives) on performance of young and older subjects, we look at behavior of a group of younger and older adults on a well-established real effort task. Based on the theory of Social Production Functions, we hypothesize age effects that depend on the incentive schemes used. We show that older adults are less productive than younger adults in all conditions, but that different incentive schemes exert similar influences on productivity in both age groups. While we do not find a significant age difference in competitiveness and reject the age-related predictions of the Social Production Functions Theory, we replicate the gender difference in competitiveness found in the literature. Social incentives in men have an at least as strong or even stronger effect on performance than increased monetary incentives. Women do not show an increase in performance with social incentives.



## Introduction

The effect of incentives on human behaviors is a topic that is highly relevant within the field of economics. With the rise of behavioral economics, the differential effects of monetary and non-monetary incentives have become the focus of many research projects. Even though there have been many experimental and theoretical papers on the issue (e.g. Fehr and Falk, 2002), a central topic that has received significantly less attention is ageing. This topic is however of policy relevance: In many countries, there is presently a debate on increasing the retirement age to balance the accounts of pension systems. In France, the retirement age will be increased stepwise from the current 60 years to 62 years by 2018; in Germany, it has recently been raised to 67 years. In light of these changes, it is especially important to understand whether older workers can be incentivized with the same incentives as younger workers. With the tools of experimental economics, investigating this question in a controlled setting has become straightforward. In the current study, we therefore experimentally investigate the effects of both social and monetary incentive schemes on effort provision of younger and older adults.

The few experimental studies that have looked at effects of older age on economic decision-making did not find large effects (e.g. Kovalchik et al., 2005; Charness and Villeval, 2009; McConell, 2013). Research in cognitive psychology however has shown the existence of age effects in decision-making, but in general, the findings are less than conclusive. Some studies found that older subjects were more risk averse than younger subjects, while others found no significant effects (Carstensen and Hartel, 2006; Mata et al., 2011). It has also been shown that older and younger adults follow different goals in decision-making, e.g. the former are more motivated to keep a positive affective state (e.g. Carstensen et al., 1999; Mather, 2006), and that competitiveness evolves non-linearly over the life-span (Mayr et al., 2012).

Though we could draw on many theories to make predictions as to how ageing should influence the reaction to different incentive schemes, we decided to use a theory that has recently been developed by sociologists and which has not found its way into the economic literature on incentives for structuring our arguments: The Social Production Functions theory (hereafter SPF; Ormel et al., 1999). It is a theory of motivation that posits a hierarchy of universal needs, instrumental goals and resources, in its behavioral predictions. According to its authors, it is based on economic, sociological and psychological insights (Steverink et al., 1998). The "economic" reasoning within the theory consists of agents

* Corresponding author.
*E-mail address:* alec.sproten@fau.de (A.N. Sproten).

http://dx.doi.org/10.1016/j.jeoa.2015.02.002
2212-828X/

optimizing well-being within constraints. This does not imply "homo-economicus" like unbiased behaviors, but rather suggest that even bounded-rational agents will still try to optimize well-being. In contrast to many other concepts of motivations, SPF includes a theory of goals. More specifically, rather than universal goals, people are assumed to select and to substitute fulfillment of one goal with fulfillment of another. SPF thereby assumes a hierarchy of goals from universal goals on the top to instrumental goals that are used to fulfill the universal goals. The universal goals can be categorized into fulfilling basic physical needs and fulfilling social needs, which all agents try to achieve. By this, SPF addresses the question that economic models assuming optimization usually do not answer: "Optimizing what?" (see Steverink et al., 1998). The name "Social Production Functions" derives from the way the model describes how goals are related. As Steverink et al. put it "Status (as a goal) can be 'produced' by occupying a certain position. . .." (p. 449). SPF also allows for diversity in how goals are reached and which production functions people use.[1]

In this paper, the focus will be mainly on the fulfillment of social goals/needs, assuming that the basic needs (e.g. sleep, eating) of the agents are sufficiently fulfilled. In contrast to the older and more widely known, but also heavily criticized theory of Maslow (1943), SPF assumes that needs must be at least minimally fulfilled to achieve well-being. However, low fulfillment of one need can be substituted by high fulfillment of another need. Instrumental goals and resources are the instruments by which needs can be fulfilled. The three basic social needs, of which the latter two are the focus of our research, are the need for affection (e.g. love, relationships), the need for behavioral confirmation (e.g. doing the "right" thing in the eyes of relevant others), and the need for status (e.g. being treated with respect).

Although various field studies could be (but are not) linked to SPF theory (e.g. Ashraf et al., 2013; Gneezy and Rustichini, 2000), the only other laboratory experiment on reactions to incentives related to SPF theory was conducted by Heyman and Ariely (2004). According to these authors, standard economic models usually assume that employees are motivated by money or similar financial incentives. Not accounting for efforts that are undertaken without prospected monetary rewards is one of the shortfalls of these models. Heyman and Ariely (2004) address this problem by introducing, aside from the monetary market, a social market. When combining both incentive schemes, monetary incentives inhibit the additional beneficial effects of social incentives on effort provision that can be observed when providing social incentives alone. Their model, however, was only validated with younger adults and based on SPF-SA theory, there are reasons to assume that older people might be motivated by other means than younger people and that (additional) social incentives might be highly efficient motivators for older subjects.[2] Furthermore, within the context of work, monetary rewards are always present, but can be – in the form of a salary – less salient than either an additional monetary bonus or social incentives.

Another issue that also has been largely neglected in the literature is whether the effects of ageing on decision-making are gender-specific (but, see Kryspin-Exner et al., 2011). Though SPF theory makes no gender-specific predictions, it has been shown in the context of economic experiments on the reaction to incentives that men and women react differently to incentive schemes (e.g. Niederle and Vesterlund, 2007). We therefore also analyze gender differences in our study.

### *Theoretical framework and predictions*

"Social Production Functions-successful ageing" theory or *SPF-SA* (Steverink and Lindenberg, 2006; Steverink et al., 1998) is one of the most comprehensive motivation theories that explicitly considers age effects. It is an extension of "SPF" (Ormel et al., 1999), accounting for the motivational changes that occur with ageing. The SPF-SA theory posits that there are age-related changes in the availability of resources for needs satisfaction, with affection relatively more "age proof" than the two others as it depends less on performance. Two main processes guide these changes:

- A patterned change in the availability of resources for the satisfaction of the three social needs over the life span: status satisfaction is the most difficult to maintain, followed by behavioral confirmation. Satisfaction of the need for affection is the easiest to maintain in relation to the two other needs.
- A process of compensation and substitution regarding social need satisfaction over the life course. Behavioral confirmation and affection are substitutes of and compensate for declines in status need satisfaction, and affection need satisfaction also compensates and substitutes for the decline in behavioral confirmation need satisfaction (Steverink and Lindenberg, 2006, p. 283).

Hence, one can extrapolate from SPF-SA theory that the relative prices of the three social needs are changing with age. That is, older adults should focus more on affection need satisfaction, while younger adults should rather focus on behavioral confirmation and status-need fulfillment. This in turn leads to the prediction that different incentives might motivate younger and older subjects. More specifically, as tournament incentives ("competition") focus on status need satisfaction, they might motivate older subjects less than either piece rate incentives (behavioral confirmation & physical needs) or any kind of "social" incentives (e.g. doing something because it is important for someone else – behavioral confirmation or affection).

Concerning status need satisfaction, older adults might prefer not to participate in tournaments as they assume that status confirmation will be difficult for them. If however, they assume that they are in a situation where it is rather easy for them to fulfill their need of status confirmation, they might in fact choose competitive incentives over other incentives, especially when competing with other older subjects, as in our experiment.

It is important to note that SPF-SA theory is not the only theory that can yield testable predictions about age-related changes in motivation. In fact, it is possible that an economic life-cycle model with credit constraints can produce age-related changes in the desire for social vs. monetary rewards. The predictions of such a model would be similar to those produced by SPF-SA. In our view, the mechanism proposed by SPF-SA is however intuitively appealing and produces detailed predictions for an experiment that go beyond what a life-cycle model would predict. To give an example, based on SPF-SA we can predict differences between those older subjects that have a high opinion about their own relative ability in the experimental task and those that have low task-related self-esteem. We therefore focus on SPF-SA in the formulation of our hypotheses.

We use an experimental design that has originally been developed by Niederle and Vesterlund (2007), who studied gender differences in the reaction to incentives. In this experiment, subjects earn money by solving real-effort tasks (summing up two-digit numbers). Performances in the task are incentivized by

[1] Although SPF theory may have numerous flaws when scrutinized in an economic light, it provides a useful vehicle for developing and testing our hypotheses. The reader should keep in mind that other theories can provide similar predictions on behaviors, and that SPF is but one of them. It is especially useful in our context as its extension SPF-SA theory makes precise predictions about changes occurring with age that no other theory makes.

[2] SPF-SA theory is an extension of SPF-theory focusing on changes with age in the way goals are set. «SA» stands for «successful aging».