

## **Objectives of the project**

The primary aim of this grant proposal is to understand the nature of age-related limitations in solving complex judgmental and decision making tasks, as well as to identify possible coping and compensatory mechanisms. Current scientific literature, including several of our own research projects in Poland, indicates clear and marked monotonic decrease in basic fluid cognitive abilities (such as processing speed, working memory capacity, fluid intelligence), from early adulthood, through middle age, to old age. The second kind of important age-related limitations (although often neglected by researchers) has a motivational character. Namely, aging is related to increasing costs of engagement in effortful cognitive activities. As aging proceeds, more resources are necessary to achieve a particular level of performance in an effortful task. These age-related impairments, however, tend to be much smaller (if any) in tasks that have clear self-related implications, concern every day problem solving, and are of interpersonal nature. Importantly, age differences in performance are also less prevalent in tasks that are clearly supported by affective processing systems. This appears to imply that older adults do cope with increasing limitations, mostly cognitive and motivational, by their considerable knowledge and by various compensatory mechanisms. "Knowledge" is understood here as a general knowledge about the world, schemas, mental representations and models, work-related skills, and practical abilities acquired across adult life span. There are considerable costs and benefits of older adults' domain-related knowledge as well as costs and benefits of relying on schemas by older adults. Age-related overreliance on domain-specific knowledge is generally assumed to be a clear manifestation of proactive interference, wherein older memories or existing schemas block access to more recent or schema-inconsistent information. Our aim in the proposed project is to better understand the complex nature of this trade-off between considerable knowledge of older adults and their contextual lack of cognitive and motivational flexibility. The inspiration of the proposed research project is a joint body of research and publications of our team with other national and international researchers within the last few years, where we notice a very clear inconsistency in research on cognitive functioning over the adult life span. On one hand, our own research results and studies worldwide show a clear and linear progressive decline in basic cognitive abilities measured by classical, cognitive tests (such as processing speed, working memory capacity, fluid intelligence) - from early adulthood to old age. On the other hand, we note that even in old age, seniors deal quite well with challenges of professional life, often performing jobs that require very high intellectual competences. In our introductory paper to the special issue of Aging, Neuropsychology and Cognition concerning these exact issues, we presented the results of an integrated meta-analysis that illustrates well the aforementioned inconsistency. It showed that the older the employee the poorer the results (strong negative correlations of level of performance with age) in laboratory cognitive tests (mental speed, memory retrieval and working memory capacity, spatial abilities, reasoning), however employees' age was not related to the level of job performance (correlations close to zero), indicating sustained competence of a senior employee. Therefore, these results point to the existence of compensatory strategies and greater amount of expert-like knowledge available to older adults that allow them to function efficiently in their professional lives despite the limitations in basic cognitive processes. Attempting to cope with the above-mentioned inconsistencies, and based on the most recent literature on the subject as well as some own preliminary research results, we point out a few key aspects in the proposed research program. Most of all, the age-related limitations are of contextual rather than general nature. In some task contexts (e.g., typical cognitive laboratory tasks of abstract nature) older adults may show strong cognitive limitations, while in other contexts (e.g., tasks with direct reference to study participants' real life) favorable conditions for triggering adaptive mechanisms compensating for the age-related limitations may appear. Both the limitations and compensatory mechanisms may relate to cognitive, emotional, and motivational processes.

### **Describe the basic research to be carried out**

In order to grasp the nature of these limitations and potential adaptive and compensatory mechanisms, the research project presented here focuses on two interrelated in the literature classes of complex tasks: decision making and judgment. Each type of the task can be implemented in the context of a purely formal task or in the context of a realistic real life task, which was important for the selection of the above mentioned two classes of tasks. We intend to demonstrate that this type of context may have an important meaning in respect to each of the intellectually demanding classes of tasks.

First line of research: Decision making (Experiments A1 to A8)

The ability to make effective decisions has an increased importance in older adults. Poor decision making regarding for instance finances or health care might affect independence and the need for external support, and therefore the issue of effective decision making among middle-aged and older adults is vital for sustainment of independent living. Older adults compared to younger adults prefer less complex decision making tasks with fewer choice alternatives and apply simplified strategies in the context of everyday situations. Nevertheless, older adults (as well as younger adults) process information adaptively, depending on the information structure. In this research project, we will focus our attention on the explanation of decision making impairments with age, as well as on the identification of compensatory mechanisms occurring in the context of complex decision making tasks of various nature. The studies cover the following topics:

Studies A1 to A3 will concern dealing with complex decision tasks demanding the use of compensatory strategies (considering weights of different attributes when choosing various options). The tasks will be presented in either formal mode (demanding efficient manipulation of numbers and percentages) or narrative mode. Moreover, motivational factors (e.g. the necessity to justify decisions) and modality (tasks presented in visual versus auditory form) will be considered.

Studies A4 and A5 will encompass sequential decision making. It will be a continuation of the research in the interesting paradigm imitating shopping on the internet for different consumer products. In sequential decision making task, study participant has only two alternatives: either searching for a more satisfactory option or choosing a currently presented option (there is no coming back to rejected options).

Studies A6 to A8 will regard the asymmetric dominance effect in the context of older adults' risk aversion. It can be proved that in the domain of consumer preferences (that is where this effect has special application) the most frequently chosen alternative is the one accompanied by a definitely worse, dominated option. We plan to adapt experimental procedures known from previous works, by adjusting them to the specificity of decision making research in the domains of risk and uncertainty.

Second line of research: Objective judgments (Experiments B1 to B6)

In recent years, researchers have demonstrated that older adults compared to younger adults are more likely to stereotype a variety of social groups. One of the common explanations for this finding is that due to a decline in inhibitory function older adults find

greater difficulty than younger adults in inhibiting stereotypic thoughts. Another set of explanations asserts that aging-related limitations in other cognitive functions (e.g., limitations in mental speed, working memory, or flexibility) involved in social information processing, constrain the amount and type of information used in constructing judgments. The studies cover the following topics:

Studies B1 and B2 will constitute a continuation of just published research pointing out that older adults do not use stereotypes about the own group (older drivers), however they do use stereotypes when it comes to the out group (young drivers). The proposed studies will aim at extended replication of this effect, including an additional middle-aged group of participants and motivational context.

Studies B3 and B4 will regard the role of older age and controllability on conspiracy stereotyping. In our recent and pioneering study (random national sample of Poles) linking aging with conspiracy stereotyping we found that older Poles express significantly higher levels of conspiracy stereotypes than younger Poles, nevertheless this result is similar among younger adults with control deprivation. We plan to better understand these mechanisms in a controlled laboratory research.

Studies B5 and B6 will concern judgment of the gist of complex texts of either very technical and abstract or strong emotional interpersonal context. Our aim will be to support the hypothesis that older adults will perform at least equally well as younger and middle-aged adults in comprehension and interpretation of emotional texts, as well as will focus on positive aspects of described situations. However, comprehension of more abstract texts should yield substantial difficulties.

#### **Present the reasons for choosing the research topic**

In an attempt to specify the reasons for choosing the research topic, it is worthwhile to highlight several fundamental issues. First of all, the aging of the population in Poland (and other industrialized countries) presents a new set of challenges for the maintenance of active cognitive functioning and health on all levels of societies, from families to policy makers. An objective and precise scientific description of compensatory mechanisms for age-related limitations in respect to decision making and judgmental tasks may ultimately translate into practical interventions (e.g., dedicated workshops and training programs) aimed at sustaining performance of such tasks in adult life-span. This issue becomes particularly important given the recent amendments regarding the extension of retirement age and accompanying challenges. The essence of the current research project is better understanding of the existing and formulation of the new psychological mechanisms that allow for the maintenance of intellectual potential of the aging population. A deeper understanding of the mechanisms compensating for the negative consequences of healthy aging may also provide a greater autonomy, independence, and relatively high well-being throughout the constantly lengthening human life span.