

The world is facing two major trends: rapidly aging populations and rapid advancements in knowledge and technology. The extent to which older adults can keep up with the pace of these advancements greatly influences their psychological, cognitive, and physical well-being. To better adjust to an era of knowledge and technological advancement, older adults need to proactively engage in learning behaviors (Hickman et al., 2007). However, studies have consistently found that older adults do not like to engage in cognitive behaviors (Busch et al., 2021; Haan et al., 2021; Queen & Hess, 2018) and do not enjoy the process of cognitive engagement (Hess, 2014; Wu et al., 2016). Age-related decline in cognitive abilities has been considered an important reason for age-related decline in cognitive engagement. Therefore, the majority of studies have focused on training to improve general cognitive abilities, such as memory and reasoning, among older adults, in order to increase their engagement in learning. However, numerous studies in the area of developmental and educational psychology have found that *motivation* is as important as, if not more important than, cognitive ability in driving learning behaviors. The effects of motivation on learning behaviors may be even stronger for older adults than for adolescents and younger adults because older adults may be less likely than younger adults to consider learning a compulsory task, and they consume much more cognitive and mental resources during learning than younger adults (Freund, 2006). Thus, the effect of motivation on learning should not be neglected in studies elucidating age-related differences in learning behaviors.

In the field of psychology and aging, age-related differences in several motivational processes have been identified and empirically tested. Compared with younger adults, older adults prioritize present-oriented emotionally meaningful goals (e.g., to experience positive emotions) over future-oriented knowledge goals (e.g., to acquire new knowledge and know new people) because of their limited future time perspective (Carstensen et al., 2003), value goals of high self-relevance over those of low self-relevance to a greater extent (Hess, 2014), and emphasize more on maintaining the current status over gaining new achievements (Freund, 2006). These age-related differences in motivational processes have been shown to affect engagement in leisure activities (Jiang et al., 2019; 2020; Tse, 2018), performance on memory tasks (Hess et al., 2016), and persistence in sensorimotor tasks (Freund, 2006). Given that all the above processes seem relevant to learning, the proposed project will aim at clarifying the processes by which these age-related differences in motivational processes affect age-related differences in learning motivation and behavior, based on the socioemotional selectivity theory (Carstensen et al., 2003), the theory of selective engagement (Hess, 2014), and the selection, optimization, and compensation theory (Baltes & Baltes, 1990; Freund & Baltes, 2000).

The proposed mechanisms have been supported by findings of two pilot studies using correlational designs (Pilot Study 1:  $N=208$ , Age Range: 18 to 88 years,  $M_{age}=43.38$  years,  $SD_{age}=24.81$  years; Pilot Study 2:  $N=63$ , Age Range: 18 to 88 years,  $M_{age}=45.84$  years,  $SD_{age}=23.98$  years). To better clarify the causal relationships, three empirical studies will be conducted to examine the roles of future time perspective, self-relevance, and gain-oriented goals as mechanisms underlying age-related differences in learning motivation and behavior. We use both self-reported and behavioral outcomes to measure learning motivation and its related behaviors. In particular, we will measure self-reported learning motivation and intention, anticipatory and actual affective experiences during learning, and persistence in learning activities. In addition to using validated scales, intentions and behaviors in two real-life scenarios will also be examined to increase the ecological validity of the findings. Together, these studies will (1) provide causal evidence on the mechanisms underlying age-related differences in learning motivation, anticipatory and actual well-being during learning, and persistence in learning; (2) advance understanding of how and when older adults are more motivated to learn, enjoy learning to a greater extent, and engage in the learning for a longer period of time; and (3) provide information on developing interventions.