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RESEARCH PAPER

Flow Experiences Across Adulthood: Preliminary Findings on the Continuity Hypothesis

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Abstract

Flow experience is a psychological state characterized by simultaneous absorption, concentration, and enjoyment. Examining the change and continuity of the flow experience—an optimal state that contributes to well-being—is critical to the understanding of the lifelong trajectory of human flourishing. Nevertheless, to date there has been no systematic investigation of the relationship between age and flow experiences across adulthood. Developmental models of flow experiences suggest the continuity hypothesis that people are motivated to sustain a high level of flow experiences as long as conditions permit. We conducted two studies to investigate flow experiences among adults of different ages. Study 1 ($N=1{,}162$; age range 30–80) used longitudinal data from the Midlife in the United States (MIDUS) project, investigating the changes in flow experiences at work over a 10-year span. Study 2 ($N=393$; age range 20–82) was an online survey that examined age-related differences in flow experiences. Both studies revealed minimal relationships between age and flow experiences. Post-hoc analyses revealed no significant moderating effect of common demographics including gender, race, and education on the age–flow relationship. Taken together, these studies elucidate the "flow profile" in adulthood that is consistent with the continuity hypothesis. We discuss relations of the findings to the literature on flow experiences and well-being.

Keywords Lifespan development · Optimal experience · Longitudinal design · Adult development

1 Introduction

How can people live well across adulthood—the longest developmental stage in the lifespan? Psychologists have proposed that flow experience is a key ingredient of a good life (e.g., Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2002). Therefore, the study of flow experiences across adulthood may highlight a path toward optimal living and thriving for adults of different ages. The flow state is characterized by merging of action and

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awareness, complete concentration, strong sense of control, loss of self-consciousness, distortion of time perception, and autotelic (intrinsically rewarding) experience (Csikszentmihalyi, 1975). A balance between perceived challenges and skills, clear and proximal goals, and immediate and unambiguous feedback facilitate flow experiences (Csikszentmihalyi, 1990). Activities structured in this way are flow-conducive; common flow-conducive activities include leisure activities and work (Nakamura & Csikszentmihalyi, 2002).

We report two studies investigating the age differences in and temporal changes of flow experiences. We focus on adulthood because little is known about the temporal course of flow experiences across this long stretch of life and, unlike other life stages, either continuity or change could be predicted. The many life transitions and role shifts during adulthood, such as marriage, parenthood, and retirement, may catalyze changes in experiences (Elder et al., 2015; Settersten, 1999). Research on lifespan and personality development has, however, revealed increasing stability of psychological constructs, such as cognitive capacities and personality traits, in adulthood relative to childhood and adolescence (e.g., Caspi & Roberts, 2001; Staudinger & Baltes, 1996). The understudied development of flow experiences across adulthood leaves a lacuna in the understanding of the continuity and discontinuity in adult flourishing.

2 Flow Experience and Human Development

Flow experiences are crucial to human development by drawing us willingly into interactions with the environment that call for full engagement and stretch our capacities (Csikszentmihalyi & Rathunde, 1998; Freire et al., 2021; Massimini & Delle Fave, 2000). As noted by Csikszentmihalyi (1997), “flow experience acts as a magnet for learning…in an ideal situation, a person would be constantly growing while enjoying whatever he or she did” (pp. 32–33). Indeed, in an intrinsically motivated competitive activity (Abuhamdeh & Csikszentmihalyi, 2012), players may choose and find most enjoyable being modestly overmatched despite losing more often than they win, a skill-stretching condition that encourages learning and growth. More generally, flow experiences serve as an internal “psychic compass,” orienting individuals toward activities they want to persist at in the future (Delle Fave et al., 2011; Massimini & Delle Fave, 2000). For example, flow experiences in a knowledge quiz game predicted the willingness to play the game later (Keller et al., 2011). Studies in multiple domains (e.g., sports, education) have revealed that people show improvement and high performance in activities where they experience flow (see Landhäußer & Keller, 2012 for a review). Therefore, developmental theorists have considered flow experiences to be a *vehicle for*, or an *indicator of*, human development (e.g., Delle Fave et al., 2011; Massimini & Delle Fave, 2000; Rathunde & Csikszentmihalyi, 2006). Nevertheless, how flow experiences, as the *subject* of development, change or remain stable when people age has received less attention in the field. Because flow experiences contribute to positive human development and human flourishing (see also Seligman, 2011; Waterman, 2007), understanding how flow develops across adulthood is crucial to the investigation of human flourishing across this stage.

The challenge-seeking and skill-building model delineates the development of flow experiences (Rathunde & Csikszentmihalyi, 2006). When people engage in an activity, they build skills and expertise until their skills outpace challenges and they experience boredom. To return to the “flow channel,” they seek out new challenges in the activity. When the challenge level surpasses the skill level, people feel anxious, and this motivates them to build skills again. The intrinsic rewards of flow experiences motivate people to engage in a cycle of challenge-seeking and skill-building until they master a high level of skill that is compatible with a high level of challenge. This model is widely applicable to childhood and adolescence (e.g., Csikszentmihalyi et al., 1997), or when there is sufficient growth capacity with minimal developmental losses.

As people age, functional declines that create a discrepancy between challenges and skills become more common. Nevertheless, the decline in functional capacity does not prohibit them from experiencing flow. Specifically, the engagement–disengagement model explains how people can renegotiate the challenge-skill balance and flow experiences in the face of developmental losses (Tse et al., 2020). When people experience physical and cognitive decline, they can either continue engaging in the same activities (e.g., playing sports) by skill maintenance (engaging in high-intensity practice) and challenge reduction (participating in amateur instead of professional sports), or give up and reinvest time in other flow-conducive activities (coaching rather than playing). These responses help regulate flow experiences when growth capacity is limited (Tse et al., 2020), such that people can overcome skill decline and continue enjoying optimal experiences.

The two flow developmental models suggest that when abundant growth capacity and developmental resources exist, people generally sustain flow experiences through challenge-seeking and skill-building. However, when developmental losses become prevalent, people sustain flow experiences by maintaining skills, reducing challenges, or exploring alternative flow-conducive activities. For both models, the underlying assumption is that people of all ages strive to pursue and maintain a high level of flow experiences (because flow experiences are self-reinforcing), if conditions permit (Rathunde & Csikszentmihalyi, 2006). This prediction, that individuals of different ages are motivated to sustain a high level of flow experiences, is hereby referred to as the continuity hypothesis.

3 Current Findings on Age-differences in Flow Experiences

Freire and colleagues' review (2021) has summarized the findings of flow studies from childhood to late adulthood and concluded that although the dimensions of flow experiences—such as intrinsic motivation, concentration, and engagement—remain consistent, the contexts and individual differences that are conducive to flow experiences may be different at various life stages. We review study findings that are related to age differences in different aspects of flow experiences, including (a) types of activities in which people experience flow, (b) the frequency of flow experiences in certain activities or domains, and (c) flow proneness—the tendency to experience flow in everyday life. These findings provide insights into how likely, in what activities, and how frequently people of different ages experience flow.

3.1 Types of Flow-conducive Activities

People experience flow in many activities, ranging from creative arts for artists to surgeries for medical doctors (Csikszentmihalyi, 1990). First, Freire and colleagues' review (2021) suggests that younger and middle-aged adults are more likely to experience flow in study- or work-related activities, whereas older adults report experiencing flow more often in leisure activities. Similarly, Han (1988) found that most older Korean immigrants reported hobbies and home activities as flow-conducive activities, whereas work was the most commonly reported flow-conducive activity among younger U.S. workers. Moreover, Lee and Payne (2016) found that older U.S. adults reported greater flow experiences in cognitively stimulating leisure activities (compared to physically- or socially-oriented activities). These age-related differences directly contrast with Delle Fave and Massimini's (1988) observations of rural Italian adults. In their study, the older and younger generations reported traditional farm work and leisure activities as the major sources of flow experiences, respectively.

These findings do not converge to a simple classification of "age-appropriate" flow-conducive activities. Instead, they highlight that the diversity of flow-conducive activities is preserved even when people age. At present, no clear, systematic age differences have emerged in the literature.

3.2 Frequency of Flow Experiences in an Activity

Even when people engage in the same activity, such as playing the piano, some people may experience flow every time they play the piano, while others may only enter a flow state when they play their favorite pieces. The findings on the age differences in flow experiences in a specific activity have been inconclusive. First, a cross-sectional study of young male soccer players ($M_{age} = 18$) found no age effect on the flow state in a soccer match (Bakker et al., 2011). In late adulthood, Lee and Payne (2016) found no relationship between age and the frequency of flow experiences in leisure activities (age range 60–96). However, a diary study of older adults aged 70 to 86 revealed that age was negatively associated with flow experiences (Collins et al., 2009). This may underscore the boundary conditions of the continuity hypothesis. When skill declines become very prevalent (e.g., when people are approaching the older-old age; Baltes & Smith, 2003), people are unable to sustain high-intensity flow experiences.

Outside of early or late adulthood these studies focus on, there has not been a systematic investigation of the frequency of flow experiences across adulthood. The existing evidence is insufficient to either support or refute the continuity hypothesis.

3.3 Flow Proneness

Some people can experience the flow state in virtually any activity, whereas others can enjoy and get absorbed in leisure but find it hard to enter the flow state at work. The former group represent people high in flow proneness, the tendency to experience flow across life domains. For experience sampling studies, whereas there are no age differences in flow proneness among Japanese college students (Asakawa, 2004), flow proneness decreased with age among American older adults (Collins et al., 2009). In a large-scale, cross-sectional survey study in Sweden, Ullén and colleagues (2012) reported a significant age difference between younger college students ($M_{age} = 25.6$) and an older national twin sample ($M_{age} = 58.6$), with the latter group showing significantly higher levels of flow proneness. Again, there is no consensus regarding whether (and in what way) age is associated with flow proneness.

In brief, the literature appears to provide no concrete conclusion about whether or how there is continuity or discontinuity in flow experiences across adulthood (regarding activity types, frequencies in an activity, or general proneness). It is noteworthy that some findings may be confounded by cultural or cohort differences. For example, in Han's (1988) pioneering study on older Korean immigrants and adult American workers, the effect of age was confounded with the effect of culture, as shown by later studies that revealed differences in flow experiences between East Asian and Western cultures (e.g., Moneta, 2004). In rural Italy, Delle Fave and Massimini (1988) found that older and younger adults experienced flow more at work and in leisure, respectively. As they noted, however, this finding also could be attributed to cohort differences given the more urbanized lifestyle of the younger (vs. older) cohort. Being aware of these design constraints and sampling issues, we conducted two studies to examine the relationship between age and flow experiences.

4 The Current Studies

The overarching research question was whether flow experiences vary by age across adulthood. We broke down the overarching question into the following research questions.

Research Question 1 Are there longitudinal, within-person changes in flow experiences among adults of different ages?

Research Question 2 Are there cross-sectional age differences in flow experiences across adulthood? Specifically, does the prevalence of experiencing flow (RQ2a), the activity that induces flow experiences (RQ2b), and the frequency of flow experiences in a particular activity and across life domains (RQ2c) vary by age?

We conducted a secondary analysis of longitudinal data collected from a U.S. national sample of workers (Study 1) to address RQ1 and a cross-sectional survey study that featured an online adult sample (Study 2) to address RQ2. In addition to the zero-order relationships between age and flow experiences, we also estimated the age–flow relationships with covariates such as sex, race, and education level (see Studies 1 and 2 Methods below for the full list of covariates).

5 Study 1 Method

Work is a common source of flow experiences in adulthood (Csikszentmihalyi & LeFevre, 1989; Engeser & Baumann, 2016). Given the wide age range of the working population (16–64; Organization for Economic Cooperation and Development, 2019), it is important to understand whether flow experiences at work vary among workers of different ages. Study 1 used data from a U.S. national sample of workers to understand the continuity and discontinuity in flow experiences at work in a 10-year span (RQ1).

5.1 Data and Sample

Data were from Waves 2 (2004–2006) and 3 (2013–2014) of the Midlife in the United States Project (MIDUS; Radler, 2014). We excluded Wave 1 data because the psychological measures in Wave 1 were substantially different from those in Waves 2 and 3. Participants who completed both MIDUS 2 and 3, and worked or were self-employed in both waves, were retained. The final sample consisted of 1,162 adults (age range at MIDUS 2: 30–80, $M=49.10$, $SD=8.56$; 50.5% male; see Table 1 for the demographic information).

Table 1 Descriptive Statistics of Study 1 Participants at Baseline (MIDUS 2)

Variables	*M* (*SD*) / %
n	1162
Age	49.10 (8.56)
[Age range]	[30–80]
Gender (% Female)	49.5
Race (% White)	93.1
Education (% Bachelor's degree or above)	51.9
Annual income (% $45,000 or above)	50.0
Occupation	
% Managerial occupation	26.1
% Professional occupation	25.7
% Other occupations	48.2
Industry	
% Manufacturing industry	14.3
% Professional services	38.3
% Other industries	47.5
Working hours per week	40.91 (13.19)
Number of years employed	28.92 (9.62)
Flow experience at work (1–5)	3.47(0.61)

5.2 Measures

5.2.1 Flow Experience at Work

Respondents rated their job characteristics on five items that described aspects of flow experiences on a 5-point Likert scale from 1 = *All of the time* to 5 = *Never*. These items included: "[you] get so involved in your work that you forget about everything else, even the time" (complete concentration and time distortion), "your job[s] provide you with a variety of things that interest you" (autotelic experience), "you control the amount of time you spend on tasks," "you have a choice in deciding how you do your task at work," and "you have a choice in deciding what tasks you do at work" (sense of control). The items roughly corresponded to the factors of absorption, work enjoyment, and intrinsic work motivation in the Work-related Flow Inventory (Bakker, 2008). We reverse-coded all items such that higher scores reflected higher frequencies of flow experiences at work. The Cronbach's alphas were 0.72 (MIDUS 2) and 0.69 (MIDUS 3).

5.2.2 Demographic and Work-Related Information

Alongside age, covariates included sex (male, female), race (non-white, white), education level (less than Bachelor's degree, Bachelor's or above), workers' annual income ($< \$45,000, \geq \$45,000$), work hours per week, years of employment, current occupation (managers, professionals, and other occupations), and current industry (professional services, manufacturing, and other industries) in MIDUS 2.

5.3 Analysis Plan

We first conducted confirmatory factor analysis (CFA) and evaluated longitudinal invariance of the flow items by comparing the models which had the factor loadings set free or fixed to be equal across two waves. Next, we evaluated the continuity of flow experiences at work using the latent change model approach (Allemand et al., 2007), in which we estimated the differences in the latent scores of flow experiences at work between both waves. We evaluated whether age and quadratic age at baseline were associated with the magnitude of the latent change. Instead of examining the correlation between flow experiences in both time points, the latent score difference can reveal continuity or discontinuity at the individual level (de Fruyt et al., 2006).

We employed the "lavaan" package in R (Rosseel, 2012) with maximum likelihood estimation with robust (Huber-White) standard errors (MLR) to conduct these analyses. For CFA and path analyses, we determined an acceptable model fit with comparative fit index (CFI) > 0.90, root mean square error of approximation (RMSEA) < 0.08, and standardized root mean square residual (SRMR) < 0.08 (Hooper et al., 2008; Hu & Bentler, 1999; Kline, 2016). Following Cheung and Rensvold (2002) and Chen (2007), we considered the scales demonstrated satisfactory metric invariance if the models with and without factor loading constraints had a difference in ΔCFA < 0.010, ΔRMSEA < 0.015, and ΔSRMR < 0.030.

6 Study 1 Results and Discussion

For the longitudinal invariance of the flow experience at work scale across waves, we first created a first-order factor—sense of control—under the second-order factor, flow experience at work. The sense of control factor included items "deciding how you do your tasks," "deciding what tasks you do," and "control the amount of time you spend." The configural invariance model (items sharing the same factor structure across waves) showed a good fit: $\chi^2(27) = 94.56$, $p < 0.001$, CFI $= 0.97$, SRMR $= 0.04$, RMSEA $= 0.05$, CI_{90} [0.04, 0.07]. The longitudinal invariance model constraining the factor loadings to be equal across waves also showed a good fit: $\chi^2(33) = 110.53$, $p < 0.001$, CFI $= 0.97$, SRMR $= 0.04$, RMSEA $= 0.05$, CI_{90} [0.04, 0.06] and indicated satisfactory longitudinal invariance (ΔCFI $= 0.004$, ΔRMSEA $= 0.002$, ΔSRMR $= 0.005$). All standardized loadings were statistically significant (βs > 0.25, ps < 0.001).

Second, we evaluated the continuity of flow experiences at work between MIDUS 2 and 3. In the latent change model, the difference in flow experiences at work between MIDUS 2 and MIDUS 3 was represented by a latent factor. Figure 1 shows the model results. The latent change factor did not significantly differ from zero ($M = 0.01$, $p = 0.664$, CI_{95} [−0.03, 0.02]). That is, the latent means of flow experiences at work in MIDUS 2 and 3 were very close to each other. The variance of the latent change factor is statistically significant (variance $= 0.04$, $p = 0.001$, CI_{95} [0.02, 0.06]), implying that the *SD* of the differences in flow experiences at work between MIDUS 2 and 3 is 0.20. Figure 2 shows the plot of flow experiences at work in both waves.

The zero-order correlations between the latent change factor and linear ($r = 0.06$, $p = 0.259$, CI_{95} [−0.04, 0.17]) and quadratic age at baseline ($r = 0.10$, $p = 0.141$, CI_{95} [−0.03, 0.22]) were non-significant. Similarly, the zero-order correlations between baseline flow experiences at work (MIDUS 2) and linear ($r = 0.08$, $p = 0.071$, CI_{95} [−0.01, 0.16])

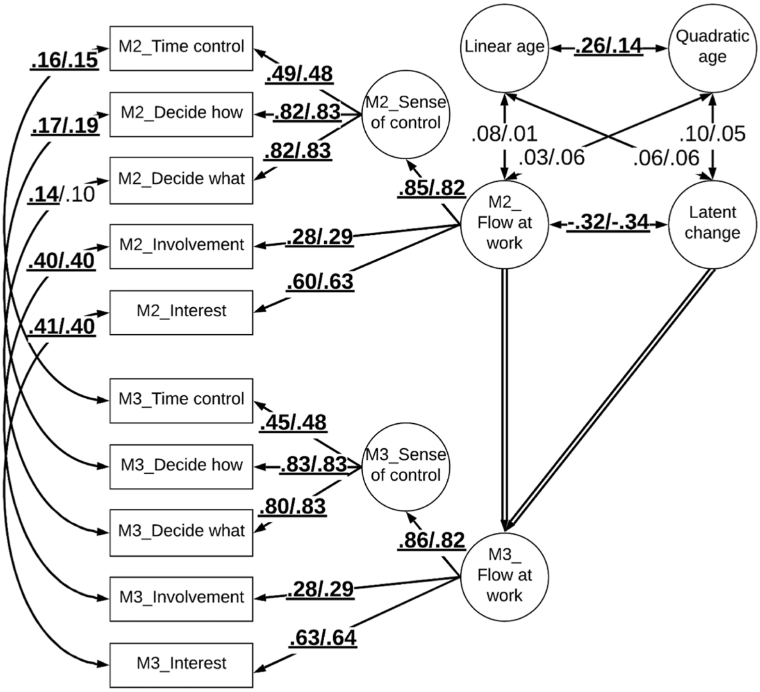
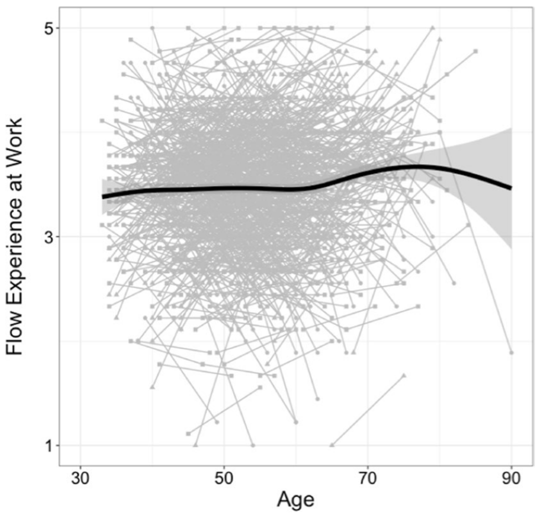


Fig. 1 Latent change model of flow experience at work from MIDUS 2 (M2) to M3 in Study 1. Double lines represent regression paths and factor loadings that are fixed at 1.00. Single arrows refer to regression paths or factor loadings; double arrows refer to correlations. Factor loadings, correlations, and regression coefficients on the left are from the model without covariates (gender, race, education, income, years of employment, weekly working hours, occupations, and industries), whereas those on the right are from the model including covariates. All of them are standardized, with the statistically significant ones ($ps < .05$) bolded and underlined. The residuals of scale items, disturbances of factors, and covariates are omitted from the figure for parsimony

Fig. 2 Prototypical age trajectory for flow experiences at work in Study 1 with confidence interval. Gray lines represent individual trajectories across waves



and quadratic age ($r = 0.03$, $p = 0.400$, CI_{95} [−0.05, 0.12]) were non-significant. This suggests that the latent change did not have a systematic difference across age. After including the covariates in the model by regressing all factors on them, the partial correlations between the latent change factor and linear ($r = 0.06$, $p = 0.252$, CI_{95} [−0.04, 0.15]) and quadratic age ($r = 0.05$, $p = 0.440$, CI_{95} [−0.08, 0.19]), and those between baseline flow experiences at work and linear ($r = 0.01$, $p = 0.791$, CI_{95} [−0.09, 0.12]) and quadratic age ($r = 0.06$, $p = 0.139$, CI_{95} [−0.02, 0.14]) remained non-significant. We found no significant relationships between age and flow experiences at work.

We further conducted post-hoc analyses to examine whether the correlations between flow experiences at work (both baseline scores at MIDUS 2 and latent changes) and age differ across the covariates. We compared models in which the correlations were freely estimated or fixed to equal between the levels (e.g., male vs. female). To control for the inflated Type-I error rate associated with many post-hoc analyses, we adopted the false discovery rate controlling step-up Bonferroni procedure (Benjamini & Hochberg, 1995) following the recommendations of Breitsohl (2019), given that the procedure can balance between controlling family-wise error rate and maintaining acceptable statistical power (Cribbie, 2007). We found no significant moderating effects of any covariates on the age–flow relationship (all ps > corresponding α_{adj}; last-step $\alpha = 0.006$; see Supplemental Table S1 for the model comparison results).

Several results are worth highlighting. First, although the non-significant mean of the latent change factor provided preliminary evidence supporting the continuity hypothesis, its significant variance ($SD = 0.20$ out of a 5-point scale) implies that substantial individual differences in changes over 10 years existed at the person level. Because neither linear nor quadratic age had significant correlations with flow experiences at work, age per se was unlikely the reason for these intra-individual changes. Post-hoc analyses also indicated that the age–flow relationships did not differ across demographic or occupational groups. During the 10 years, non-normative changes in the immediate working environment such as job duty changes, promotion, and team personnel changes may impact personal and organizational resources (e.g., social support), and in turn, facilitate or inhibit flow experiences at work (Salanova et al., 2006). Future research is necessary to investigate the potential causes of the individual differences in changes in flow experiences at work over 10 years.

Study 1 examined flow experiences longitudinally in a common life context (work). However, it excluded specific demographic groups such as full-time students, the unemployed, and retirees. Furthermore, focusing on flow experiences at work cannot illuminate the dynamics of flow pursuit across multiple life domains. For instance, for workers who did not experience flow at work, did they achieve the flow state in leisure activities instead? Additionally, aspects of flow experiences other than frequency, such as its proneness and prevalence, were not assessed. Finally, although the CFA and invariance tests of the flow experiences at work items were satisfactory, using more commonly employed flow measures would enhance the comparability of the findings to previous research. Therefore, we conducted an online survey study to examine flow experiences across adulthood.

7 Study 2 Method

Study 2 was a survey study using a U.S. adult online sample to extend the investigation of flow experiences from work to examine the age differences in flow activities, dispositional flow in these activities, and flow proneness across domains across adulthood. We collected new data from adults in all walks of life (e.g., college students) and employed existing flow measures. While our analyses focused on age differences, we also employed retrospective techniques to estimate changes in flow experiences over time within the limitations of the cross-sectional research design.

7.1 Participants and Procedure

This study was part of a larger research project (Anonymized citation). Participants were U.S. residents recruited from Amazon Mechanical Turk (MTurk). Given that the MTurk population features more younger adults (Paolacci & Chandler, 2014), to ensure adequate representation of older adults in the sample, we set quotas of 25% for participants aged 18–30, 45% for those aged 31–55, and 30% for those aged 55+. This was roughly equivalent to the age distributions reported by the United States Census Bureau (2018). A priori power analyses conducted with G*Power (Faul et al., 2009) revealed that at least 387 participants were necessary to detect $\Delta R^2 = 0.02$ with power = 0.80 and $\alpha = 0.05$.

Participants first reported whether and in which activity they experienced the flow state (Flow Questionnaire) and the frequency of flow experiences in that activity (Short Dispositional Flow Scale) and in life domains (Swedish Flow Proneness Questionnaire) in the past year (see Measures). After that, participants were instructed to think back to 10 years ago. To facilitate the retrospection, participants first read several news headlines from 10 years ago and completed four open-ended questions: where they lived, who the important people were in their lives, what goals they had, and what problems they recalled at that time. Research has used this procedure to enhance retrospection (Ryff, 1991). Participants then reported whether and in which activity they experienced the flow state 10 years ago. We excluded asking the frequency of flow experiences 10 years ago because unlike peak experiences like flow state and flow-conducive activities, abstract frequency items are more susceptible to recall bias (Biemer et al., 1991; Neale et al., 1987).

Overall, 439 participants completed the survey. We excluded 15 participants because they completed the survey more than once, or their birth year did not match their self-reported age. We further screened out 34 participants because their qualitative data, such as activity description, were low in quality (e.g., copy-and-pasting the instruction, meaningless numbers or words). The final sample consisted of 390 participants (age range: 20–82; $M = 42.81$, $SD = 14.75$, 49.0% female). Table 2 shows the demographic information of the sample.

7.2 Measures

7.2.1 Flow Questionnaire

The Flow Questionnaire (FQ; Csikszentmihalyi & Csikszentmihalyi, 1988) presented a first-person description of the flow experience to participants (see Moneta, 2012, p. 25 for the exact description), and asked whether they had ever had similar experiences in the past year and 10 years ago. Then, participants reported the activity in which they had felt the experiences in the quotations most intensely and classified it as a work-related activity, a learning-related activity, an active leisure activity (e.g., sports), a passive leisure activity (e.g., watching TV), or a maintenance/routine activity (e.g., chores). If respondents reported never experiencing flow in the past year or 10 years ago, they were instructed

Table 2 Descriptive Statistics of Study 2 Participants

Variables	*M* (*SD*)/%
N	390
Age	42.81 (14.75)
[Age range]	[20–82]
Gender (% Female)	49.0
Race (% white)	86.4
Employment status (% full-time employment)	66.2
Education	
% Less than high school	0.5
% Some high school or less	0.0
% High school diploma/GED	11.8
% Some college	34.4
% College degree	39.2
% Master's degree	10.8
% Professional degree	3.3
Subjective physical health (1–5)	3.37 (1.03)
Subjective psychological health (1–5)	3.68 (1.10)
Flow-conducive activities in the past year	
% Work-related activities	24.1
% Learning-related activities	6.2
% Active leisure	30.8
% Passive leisure	14.4
% Maintenance activities	2.8
% Never experienced flow in the past year	21.8
Flow-conducive activities 10 years ago	
% Work-related activities	15.1
% Learning-related activities	8.4
% Active leisure	18.5
% Passive leisure	10.0
% Maintenance activities	3.1
% Never experienced flow 10 years ago	44.9
Frequency of flow experiences in the flow-conducive activity (1–5)	4.22 (0.73)
Flow proneness (1–7)	
Leisure	5.07 (1.03)
Maintenance	4.61 (1.01)
Work	5.13 (1.05)

to identify an activity in which they came closest to the experience described (hereafter, "close-to-flow" activity) and continue the survey.

7.2.2 Short Dispositional Flow Scale

Once participants had identified their flow activity (or the closest activity to flow), they completed the Short Dispositional Flow Scale–2 (SDFS-2; Jackson et al., 2008). This

9-item, 5-point Likert scale measured the frequency of experiencing flow in the specified activity in the past year. The items corresponded to the dimensions of flow experience described by Csikszentmihalyi (1990; e.g., sense of control, complete concentration). Response options ranged from 1 = *Never* to 5 = *Always*, with higher average scores indicating greater frequency of flow experiences in that activity. The Cronbach's alpha was 0.84.

7.2.3 Swedish Flow Proneness Questionnaire

The 21-item Swedish Flow Proneness Questionnaire (SFPQ) measured the frequency of flow experiences at work (including schoolwork), in leisure, and in maintenance activities (e.g., chores; Ullén et al., 2012). Participants reported the frequency of experiencing flow in the past year in each domain on a 7-point scale from 1 = *Never* to 7 = *Every day, or almost every day*. We computed average scores for each domain; higher scores reflect greater tendencies to experience flow in each domain. The Cronbach's alphas were 0.84 for flow proneness at work, 0.80 in leisure, and 0.78 in maintenance activities.

7.2.4 Demographic Information

Alongside age, we measured gender (male, female), race (non-white, white), education level, employment status (full-time worker, other statuses), and subjective physical health and mental health conditions (both, 1 = *Poor*, 5 = *Excellent*; Radler, 2014) as covariates (see Table 2).

7.3 Analysis Plan

We first conducted binary logistic regressions to examine the relationship between age and the probabilities of having experienced flow or not in the past year and 10 years ago (RQ2a). We then conducted multinomial logistic regressions to investigate the relationship between age and the type of activities people found most flow-conducive at both time points (RQ2b). For frequency of flow experiences in the activity (dispositional flow) and in life domains (flow proneness; RQ2c), we first conducted CFA to evaluate the factor structure. Because frequency of flow experiences was activity-specific, we performed multi-group-CFA to examine the invariance of its factor structure across activities and evaluated its relationship with age separately. Then, we examined the correlations between the latent scores and linear and quadratic age. Statistical packages and model fit evaluations were identical to those in Study 1.

8 Study 2 Results and Discussion

8.1 Prevalence of Flow Experiences and Flow-Conducive Activities (RQs 2a and 2b)

Among the participants who reported having experienced flow in the past year and 10 years ago, active leisure, such as sports and creative arts, was the most common source of flow experiences, followed by work, passive leisure, learning-related activities, and maintenance activities, such as chores and errands (see Table 2). First, binary logistic regression results showed that neither linear age (odds ratio[OR] = 0.88, p = 0.188, 95% CI [0.72, 1.06], $r_{\text{point-biserial}} = -0.08$) nor quadratic age ($OR$ = 1.00, p = 0.945, CI_{95} [0.88, 1.14], $r_{pb} = -0.05$)

had a significant zero-order relationship with whether people experienced flow in the past year. The partial relationships controlled for covariates were also non-significant, for linear age: $OR = 0.81$, $p = 0.072$, CI_{95} [0.65, 1.01], $r_{pb} = -0.09$; for quadratic age: $OR = 1.02$, $p = 0.737$, CI_{95} [0.89, 1.18], $r_{pb} = -0.03$). However, linear ($OR = 1.23$, $p = 0.011$, CI_{95} [1.05, 1.44], $r_{pb} = 0.18$), but not quadratic age ($OR = 1.08$, $p = 0.188$, CI_{95} [0.96, 1.22], $r_{pb} = 0.14$), was associated with greater likelihood of experiencing flow 10 years ago. This relationship persisted after controlling for covariates, for linear age: $OR = 1.23$, $p = 0.026$, CI_{95} [1.03, 1.47], $r_{pb} = 0.14$; for quadratic age: $OR = 1.06$, $p = 0.326$, CI_{95} [0.94, 1.21], $r_{pb} = 0.10$. That is, age only had a small positive, linear relationship with the likelihood of experiencing flow 10 years ago. Figure 3 shows the predicted probability plot of experiencing flow in the past year and 10 years ago by age.

For flow-conducive activities, because some categories had very few cases, we combined work- and learning-related activities into one group, and passive leisure and maintenance activities into another to ensure sufficiently large group sizes for subsequent multigroup analyses. Table 3 shows the multinomial logistic regression results, with productive activities (work- and learning-related activities) as the comparison group. For

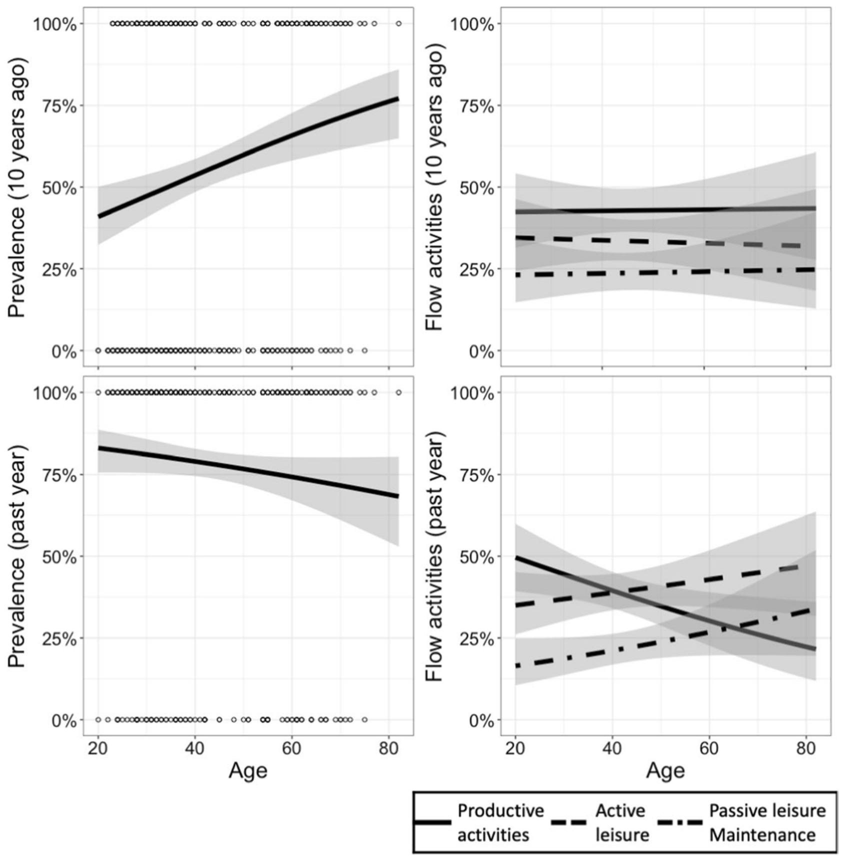


Fig. 3 Predicted probabilities of prevalence of flow experiences (whether a person experienced flow at least once) 10 years ago (top-left) and in the past year (bottom-left) and those of flow-conducive activities 10 years ago (top-right) and in the past year (bottom-right) in Study 2 with confidence intervals

Table 3 Odds Ratios (OR) and 95% Confidence Intervals (CI_{95}) of Multinomial Logistic Regression Predicting Flow-conducive Activities in the Past Year (Left) and 10 Years Ago (Right)

Variable	In the past year				10 years ago			
	Active leisure		Passive–Maintenance		Active leisure		Passive–Maintenance	
	OR	CI_{95}	*OR*	CI_{95}	*OR*	CI_{95}	*OR*	CI_{95}
Unconditional model (without covariates)								
Linear age	1.20	[0.81, 1.35]	1.28	[1.04, 1.58]	0.98	[0.81, 1.20]	1.01	[0.81, 1.26]
Quadratic age	1.07	[0.95, 1.22]	1.10	[0.95, 1.27]	0.92	[0.80, 1.06]	1.00	[0.87, 1.15]
Conditional model (with covariates)								
Linear age	1.21	[0.96, 1.52]	1.15	[0.88, 1.51]	1.00	[0.75, 1.34]	1.01	[0.74, 1.38]
Quadratic age	1.03	[0.88, 1.21]	1.06	[0.89, 1.27]	0.82	[0.68, 1.00]	1.01	[0.83, 1.23]
Race	1.24	[0.58, 2.66]	2.77	[0.87, 8.82]	2.56	[0.83, 7.88]	1.07	[0.38, 3.02]
Education	0.98	[0.75, 1.29]	0.72*	[0.52, 1.00]	1.08	[0.78, 1.50]	0.65*	[0.45, 0.94]
Employment status	1.22	[0.65, 2.29]	0.94	[0.46, 1.94]	0.44*	[0.21, 0.93]	0.71	[0.31, 1.63]
Gender	1.09	[0.64, 1.88]	0.59	[0.31, 1.13]	1.39	[0.72, 2.67]	1.65	[0.79, 3.41]
Subjective physical health	1.32	[0.97, 1.79]	0.98	[0.69, 1.40]	0.91	[0.64, 1.30]	1.11	[0.75, 1.66]
Subjective mental health	1.02	[0.75, 1.37]	1.08	[0.75, 1.54]	1.33	[0.90, 1.94]	1.05	[0.69, 1.60]

Productive (work- and learning-related) activities was the reference category. The numbers of people who considered productive activities, active leisure, and passive–maintenance (passive leisure and maintenance) activities as flow-conducive in the past year were 118, 120, and 67, respectively; for flow-conducive activities 10 years ago, $n = 92$ (productive activities), 72 (active leisure), and 51 (passive–maintenance)

$^*p < .05$

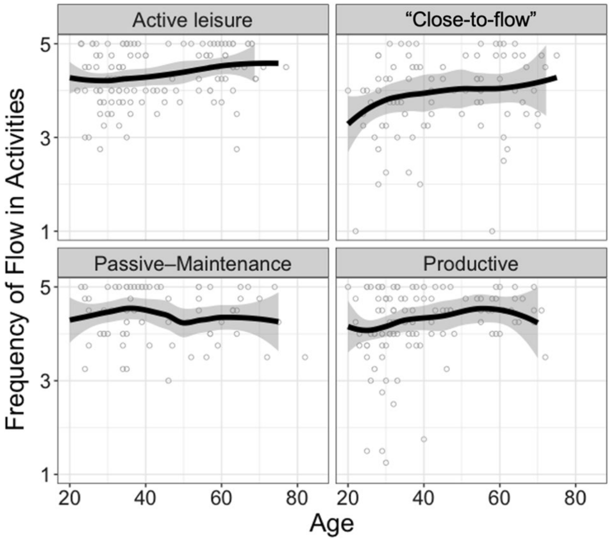
flow-conducive activities in the past year, only the positive, linear, zero-order relationship between age and the likelihood of passive leisure–maintenance activities was statistically significant ($OR = 1.28$, $p = 0.019$, CI_{95} [1.04, 1.58], $r_{pb} = 0.10$). However, the relationship did not remain significant after controlling for covariates ($OR = 1.15$, $p = 0.316$, CI_{95} [0.88, 1.57], $r_{pb} = 0.04$). For flow-conducive activities 10 years ago, none of the age-related relationships was significant (ps > 0.05). Taken together, the analyses suggest that age had minimal effect on the activities in which adults experienced the flow state.

8.2 Frequency of Flow Experiences (RQ2c)

Because SDFS-2 measures the frequency of flow experience in a specific activity, we split the data based on the types of flow activity people reported and performed multi-group structural equation modeling to estimate the age–flow correlations in different activity groups. Similar to previous analyses, we finalized our activity grouping as productive (work- and learning-related) activities, active leisure, passive leisure–maintenance, and "close-to-flow" activities. Figure 4 is the plot of SDFS-2 in different activity groups by age.

We first evaluated the metric invariance of SDFS-2 across activity groups. The model of the original SDFS-2 showed an unsatisfactory fit with the data, $\chi^2(108) = 248.51$, $p < 0.001$, $CFI = 0.86$, $RMSEA = 0.12$, CI_{90} [0.10, 0.14], $SRMR = 0.07$. Factor loadings of two items (time distortion, autotelic experience) were not always statistically

Fig. 4 Prototypical age trajectories of frequency of flow experiences in activities in Study 2 with confidence intervals, split by types of flow-conducive activities



significant across activity groups. After the removal of these items, the model fit improved, $\chi^2(48)=70.28$, $p<0.001$, CFI = 0.97, RMSEA = 0.07, CI_{90} [0.03, 0.11], SRMR = 0.04. The final model that constrained factor loadings to be equal across activity groups also had satisfactory fit, $\chi^2(66)=91.80$, $p<0.001$, CFI = 0.96, RMSEA = 0.07, CI_{90} [0.03, 0.10], SRMR = 0.08. Comparing these models, we concluded metric invariance was marginally satisfactory, ΔCFA = 0.006, ΔRMSEA = 0.005, and ΔSRMR = 0.037. All standardized loadings were statistically significant (βs > 0.31, ps < 0.001). Supplemental Figure S1 shows the final measurement model of the SDFS-2.

Table 4 shows the estimates of age–flow relationships across activity groups with and without covariates. Overall, the only significant (linear, zero-order) relationship between age and the frequency of flow experiences was in active leisure, $r=0.21$, $p=0.044$, CI_{95} [0.01, 0.41]. However, the relationship was non-significant after controlling for covariates, $r=0.19$, $p=0.085$, CI_{95} [−0.03, 0.42]. Other than that, neither linear nor quadratic age was significantly associated with flow experience in any activities, with or without covariates (range of rs: −0.03–0.17, ps > 0.05).

For frequency of flow experiences beyond the specific activities, we first evaluated the measurement invariance of the SFPQ across work, leisure, and maintenance domains. The configural invariance model showed a satisfactory fit to the data: $\chi^2(162)=339.64$, $p<0.001$, CFI = 0.93, SRMR = 0.05, RMSEA = 0.06, CI_{90} [0.05, 0.07]. The invariance model constraining the factor loadings to be equal across domains also showed a satisfactory fit, $\chi^2(176)=375.53$, $p<0.001$, CFI = 0.93, SRMR = 0.07, RMSEA = 0.06, CI_{90} [0.05, 0.07] and indicated satisfactory measurement invariance, ΔCFA = 0.007, ΔRMSEA = 0.000, ΔSRMR = 0.015. All standardized loadings were statistically significant (βs > 0.46, ps < 0.001). Supplemental Figure S2 shows the final measurement model of the SFPQ.

We then examined the relations of linear and quadratic age to flow proneness in different domains. Figure 5 is the plot of flow proneness by age. Across all life domains, the zero-order, positive correlations between linear age and flow proneness were statistically significant, in leisure: $r=0.19$, $p=0.001$, CI_{95} [0.07, 0.30]; in maintenance activities:

Table 4 Summary of Correlations Between Age and Flow Experiences in Study 2

Variable	Zero-order correlations		Partial correlations	
	Linear age	Quadratic age	Linear age	Quadratic age
Prevalence of flow experiences				
Ever experienced flow in the past year	−.08	−.05	−.09	−.03
Ever experienced flow 10 years ago	.18***	.14***	.14*	.10
Flow-conducive activities in the past year				
Productive activities	−.14*	−.08	−.11	−.07
Active leisure	.06	.03	.08	.04
Passive leisure–maintenance activities	.10	.05	.04	.04
Flow-conducive activities 10 years ago				
Productive activities	.01	.05	.04	.09
Active leisure	−.01	−.08	−.09	−.17*
Passive leisure–maintenance activities	.01	.04	.05	.08
Frequency of flow in an activity				
Productive activities	.16	−.04	.13	−.08
Active leisure	.21*	.12	.19	.17
Passive leisure–maintenance activities	−.001	−.04	−.01	−.03
"Close-to-flow" activities	.16	.01	.17	.09
Flow proneness				
Leisure	.19**	.09	.13*	.10
Maintenance	.15**	.03	.13*	.04
Work	.31***	.12	.27***	.12

For partial correlations, gender, race, education, employment status, subjective physical health, and subjective mental health were the covariates

*$p < .05$. ** $p < .01$. *** $p < .001$

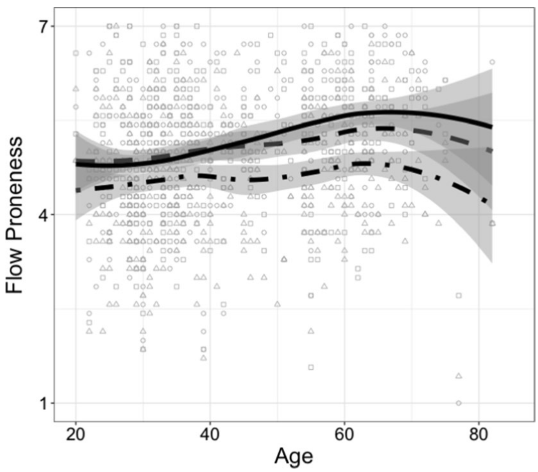


Fig. 5 Prototypical age trajectories of flow proneness in work (solid line), leisure (dashed line), and maintenance activities (dotted-dash) in Study 2 with confidence intervals

$r = 0.15$, $p = 0.009$, CI_{95} [0.04, 0.27]; at work: $r = 0.31$, $p < 0.001$, CI_{95} [0.20, 0.43]. These relationships remained significant after controlling for the covariates, in leisure: $r = 0.13$, $p = 0.030$, CI_{95} [0.01, 0.26]; in maintenance activities: $r = 0.13$, $p = 0.040$, CI_{95} [0.01, 0.24]; at work: $r = 0.27$, $p < 0.001$, CI_{95} [0.15, 0.40]. In contrast, the correlations of quadratic age and flow proneness were not significant, with or without covariates (range of *r*s: 0.04–0.12, *p*s > 0.05). In other words, older adults were more prone to experiencing flow in all life domains than younger adults.

8.3 Post-hoc Analyses

Similar to Study 1, we conducted post-hoc analyses to examine whether the above correlations differed across the covariates by comparing models in which the correlations were freely estimated or fixed to equal between the levels. We also adopted the false discovery rate controlling step-up Bonferroni procedure (Benjamini & Hochberg, 1995; Breitsohl, 2019; Cribbie, 2007) and found no significant moderating effects of any covariates on the age–flow relationships (all *p*s > corresponding α_{adj}; last-step $\alpha = 0.002$; see Supplemental Table S2 for the model comparison results).

8.4 Discussion

Table 4 summarizes the zero-order and partial correlations between linear and quadratic age and different measures of flow experiences. Consistent with Study 1, the correlations were either statistically non-significant or significant but with a small effect, suggesting minimal age-related differences in flow experiences across adulthood. Several age–flow relationships were statistically significant with or without the demographic covariates. First, younger adults were more likely to experience the flow state at least once in the past year than 10 years ago, whereas such a past–present discrepancy was minimal among the older adults. Because the youngest participant was 20 years old, the past–present discrepancy at the younger end of the sample was essentially a comparison between late childhood/adolescence and early adulthood. This finding is consistent with the challenge-seeking and skill-building model (Rathunde & Csikszentmihalyi, 2006), illustrating how flow experiences are developed and enhanced from childhood to adulthood. The diminished past–present discrepancy for middle-aged and older adults, together with the minimal cross-sectional age differences in prevalence of flow experiences in the past year, indicate relative continuity of flow experiences across most of adulthood consistent with the continuity hypothesis.

Additionally, older (vs. younger) adults reported greater proneness to experiencing flow at work, in leisure, and in maintenance activities. Nevertheless, our effect sizes are smaller compared to the Ullén and colleagues' study (2012) using the SFPQ in which older adults showed greater flow proneness than their younger counterparts. One speculation is related to the characteristics of the younger participants: Whereas the younger sample in the original study consisted only of college participants, our MTurk sample included adults from all walks of life. Given that college-attending youth can differ notably from non-college youth (Henrich et al., 2010), the age difference found in the original study may be confounded by the differences in education levels and work statuses between the younger and older groups. Also, given the minimal longitudinal changes in flow experiences at work in Study 1, whether these cross-sectional differences in flow proneness reflect cohort-related differences (e.g., Baby Boomers vs. Millennials) or measurement-specific (SFPQ) observations warrants further investigations in the future.

9 General Discussion

As stated by Seligman and Csikszentmihalyi (2000), "psychologists can't assume that what makes a teenager happy will also contribute to his or her happiness as an adult" (p.12). Similarly, psychologists cannot assume that flow experiences stay the same across adulthood because flow states are volatile and subject to contextual changes (Csikszentmihalyi & Hunter, 2003). Our studies explored the potential age-related differences (or similarities) and changes (or stability) of flow experiences across adulthood. Overall, age had a minimal to small positive relationship ($|r|$'s < 0.30; Cohen, 1992) with the prevalence, activity context, and frequency of flow experiences. Taken together, the results provide initial support for the continuity hypothesis. That is, flow experiences appear to be generally stable across adulthood.

In their review of flow experiences across the lifespan, Freire and colleagues (2021) concluded that flow experiences were more prevalent in the work domain for younger/middle-aged adults and in the leisure domain for older adults. However, our findings revealed that the activity contexts in which older adults experienced flow were mostly similar to those of the younger age groups. We speculate that the difference is attributable to the older sample compositions. Whereas previous flow studies on older adults were mostly retirees (e.g., Collins et al., 2009; Heo et al., 2010), our older samples consisted of full-time workers (Study 1) and MTurk "workers." As the aging population is undergoing a shift from complete retirement to extended engagement in productive activities (Cahill et al., 2006), our findings suggest that the differences in flow experiences are likely to be associated with sociocultural structures more than psychobiological changes in adulthood (see also the Limitation below regarding the sample age range). Additionally, our post-hoc exploratory analyses suggest that the age–flow experience relationship in adulthood does not differ across demographic groups (e.g., gender, race, education). Whether psychological factors, such as openness to experience (Freire et al., 2021), conscientiousness, and neuroticism (Ross & Keiser, 2014), may strengthen or weaken the age–flow relationships warrants further investigation in the future.

The weak age–flow experience relationships may be relevant to the paucity of age–flow research in the literature. Rosenthal's (1979) "file drawer problem" describes the publication bias that favors statistically significant ($p < 0.05$ in most cases) results over non-significant ones. The weak age–flow experience association may be kept unpublished partly due to "statistical non-significance," despite the clear "scientific significance" of understanding flow experiences across the lifespan suggested by many developmental psychologists (e.g., Freire et al., 2021; Nakamura & Csikszentmihalyi, 2002). We encourage flow researchers to publish both statistically significant and non-significant findings on age–flow experience relationships, given that this practice is more effective to obtain a precise estimate than selectively publishing significant results only (van Assen et al., 2014). Even for studies in which age is not the research focus, researchers can report the correlation between age and flow experiences. The more available data there are, the more precise will be the estimates of age–flow experience relationships summarized by future meta-analyses.

Our findings also connect with the well-being and lifespan development literature. For example, studies have found a small upward trend of life satisfaction as people age (e.g., Diener & Suh, 1998; Horley & Lavery, 1995). Studies have also revealed that people who experience flow frequently are also more satisfied with their lives (e.g., Collins et al., 2009; Tse et al., 2020, 2021). As such, the small, positive correlation between age and flow proneness found in Study 2 is consistent with the age–life satisfaction relationship in the literature. For psychological well-being (PWB), studies have revealed a negative effect of age on personal growth (e.g., Ryff, 1995, 2014; cf. Mann et al., 2021). In the flow literature focusing on adolescence, long-term pursuit of flow-conducive activities is linked to growth in capacity and self-improvement (Landhäußer & Keller, 2012). However, the engagement–disengagement model posits that people can still pursue flow experiences even when their growth capacity becomes limited, suggesting that flow experiences and personal growth can be independent of each other (Tse et al., 2020). In our studies flow experiences are generally stable across ages, which departs from the negative effect of age on personal growth. Future research can investigate further the relationships between flow experiences and other PWB dimensions, and whether such relationships change with age.

The discussion of skill acquisition and maintenance across the lifespan goes beyond the flow literature. For example, Ericsson and colleagues (1993) have highlighted the importance of deliberate practice—intense training activities that maximize improvement of performance—to the attainment of expert performance in many domains. Ericsson (1996) also suggests that flow experiences may not occur during deliberate practice because the monitoring of explicit goals and feedback is incompatible with the complete immersion in flow experiences. However, he also speculates that some parts of practice activities may induce flow experiences as deliberate practice usually does not occupy the practice session entirely. The deliberate practice literature has underscored several criteria of people improving their skills, such as sustained attention to the goals, processes, and performance, and the acquisition of essential memory skills to generate and evaluate potential events (Ericsson, 1996). These concern the *cognitive* and *behavioral* strategies of skill acquisition to achieve (and maintain) high levels of performance (Ericsson et al., 1993; Krampe & Ericsson, 1996). In contrast, flow theory focuses on how people are *motivated* to initiate and continue skill development, and less on what people do during the skill-building stage to prepare for the desired performance. As such, while deliberate practice and flow experiences may not coexist at the momentary level, the two bodies of literature complement each other to illuminate the dynamics of skill-building in the long run. Interestingly, research has shown that while experts' weekly practice time peaks at early adulthood and then declines by age, amateurs' practice time remains relatively stable across age (Krampe & Ericsson, 1996). The latter appears to be consistent with the stable age–flow trajectories found in our studies, focusing on flow experiences in everyday activities (work, leisure, and maintenance) in a non-expert population. Future studies can further disentangle the relationship between deliberate practice and flow experiences with both expert and non-expert samples in specific domains across the lifespan at both momentary and person levels.

9.1 Strengths, Limitations, and Future Directions

We used multiple operationalizations of flow experiences to estimate the age–flow relationship across adulthood. In Study 1, we created a flow experience at work scale using survey items that resembled different dimensions of flow experiences (Nakamura et al., 2019). Study 2 used a cross-sectional survey with retrospection design that included widely used flow scales, including the FQ, SFPQ, and SDFS–2. Using these existing scales allows us to compare our findings with those obtained in previous studies. Our two studies complement each other and enable the triangulation of the age–flow relationships among adults of different ages. However, it is noteworthy that for the flow experience at work scale in Study 1, the subfactor of sense of control loaded (loadings: 0.85–0.86) considerably more heavily than the items of autotelic experience and complete concentration (loadings: 0.28–0.63). The relative weight of sense of control may partly contribute to the continuity of flow experiences because people whose employment allows them more (vs. less) control and autonomy are also less likely to change positions. Another possibility is that people with less (vs. more) control and autonomy at work may be more likely to have left the job market in the subsequent wave and thus be excluded from our analyses. Future research may explore these possibilities by collecting data on objective changes in job duties and work environments in addition to flow experiences.

Besides flow experiences, future research can employ alternative operationalizations of other constructs. For example, researchers can explore the relation of flow experiences to *subjective* or *self-perceived* age rather than *chronological* age. Studies have shown that the relations of flourishing, longevity, and vitality, to subjective age are as strong as (or stronger than) to chronological age (e.g., Keyes & Westerhof, 2012; Stephan et al., 2018; Westerhof et al., 2014). Given the association between the flow experiences and these well-being indicators, it is worth investigating whether the weak association between flow experiences and chronological age holds for subjective age.

Our studies also covered a wide age range in adulthood (20–80), compared to most previous flow research that has targeted specific age groups (e.g., older adults, Collins et al., 2009). As adulthood is the longest developmental stage, it is important to sample adults spanning early and late adulthood to understand the development of flow experiences. Furthermore, power analyses provided greater confidence that the null findings on age–flow experience relationships were not due to inadequate statistical power. Instead, the relationship estimates may in fact reflect a true but minimal age effect on flow experiences.

Nevertheless, our samples were far from a perfect representation of the adult population. The working population (Study 1) and online crowdsourcing “workers” (Study 2) enabled us to compare younger and older adults’ flow experiences and proneness at work, in contrast to the previous research focusing on leisure activities in late adulthood with predominantly retirees (see Freire et al., 2021 for a review). However, our samples necessarily excluded some age groups. For example, older-old adults are less likely to have a full-time job or use the Internet (e.g., U.S. Bureau of Labor Statistics, 2018; Williamson & Asla, 2009). Given our underrepresentation of older-old participants (fourth age, typically over 80 years old) and their distinct physical and cognitive conditions (Baltes & Smith, 2003), readers should be cautious when generalizing the study findings to the population beyond the sample age range.

Despite the limitations, our studies help elucidate the stability of flow experiences across adulthood. To the best of our knowledge, there have been no systematic investigations of the age–flow experience relationship across adulthood previously. Our work provides preliminary evidence supporting the underlying assumption—that people are motivated to sustain a high level of flow experiences in the long term—of the developmental models of flow experiences. The findings lay a foundation for future lifespan developmental studies on flow experiences to explore the boundary conditions of such continuity and the factors that disrupt it. The development of flow experiences in adulthood deserves more attention both within and beyond academia, given the potential importance and influence of flow experiences on human development and human flourishing (e.g., Csikszentmihalyi et al., 1997; Massimini & Delle Fave, 2000; Rathunde & Csikszentmihalyi, 2006; Seligman, 2011).

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Availability of data and material Study 1 used secondary data available at the Inter-university Consortium for Political and Social Research (ICPSR). Data supporting the findings of Study 2 are openly available in Open Science Framework at https://osf.io/zmnv3/.

Declarations

Conflict of interest The authors have no conflicts of interest to declare that are relevant to the content of this article.

Ethical approval This study was reviewed and exempted by the Institutional Review Board, Claremont Graduate University (ref: #3363).

Consent to participate All participants provided informed consent before participating in Study 2.

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