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Macro-Level Phenomena to Micro-Level Mechanisms*

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## Table of Contents

<b>Acknowledgements</b> .....	<b>V</b>
<b>Abstract</b> .....	<b>VII</b>
<b>CHAPTER 1 General Introduction</b> .....	<b>1</b>
1.1 Plasticity and Diversification During Late Adulthood: The Role of Life Events .....	3
1.2 Late-Life Relocation and Personality Development .....	4
1.3 Short-Term Changes and Long-Term Development of Personality After Relocation ..	6
1.4 Heterogeneity of Relocation Effects.....	7
1.5 Core Research Questions and Overview of the Dissertation.....	9
<b>CHAPTER 2 Excessive Reassurance-Seeking and Anxiety among Chinese New Urban Older Adults: The Role of Attention to Negative Information and Resilience</b> .....	<b>12</b>
2.1 Introduction .....	13
2.1.1 Excessive Reassurance-Seeking and Anxiety.....	14
2.1.2 The Potential Mediating Role of Attention to Negative Information.....	15
2.1.3 The Potential Moderating Role of Resilience .....	15
2.1.4 The Present Study .....	17
2.2 Methods.....	18
2.2.1 Participants .....	18
2.2.2 Data Collection Procedures .....	19
2.2.3 Measures.....	20
2.2.4 Data Analysis .....	22
2.3 Results .....	23
2.3.1 Common Method Bias Test.....	23
2.3.2 Participant Characteristics .....	23
2.3.3 Descriptive and Correlation Analysis .....	24
2.3.4 Mediation Effect Analysis .....	25
2.3.5 Moderated Mediation Model Analysis.....	25
2.4 Discussion .....	29
2.5 Conclusion .....	34
<b>CHAPTER 3 Personality Differences of Older Adults Living in Nursing Homes versus Private Homes in 25 European Union Countries</b> .....	<b>35</b>

3.1 Introduction .....	36
3.1.1 Living in Nursing Homes and Personality Traits .....	37
3.1.2 Individual-Level Factors Related to Accommodation Type and Personality Traits	38
3.1.3 Cross-Regional Perspectives and Country-Level Factors .....	40
3.1.4 The Current Research .....	42
3.2 Method .....	43
3.2.1 Sample .....	43
3.2.2 Measures .....	44
3.2.3 Data Analysis Strategy .....	46
3.3 Results .....	49
3.3.1 Differences between Nursing Home and Private Home Residents in Personality Traits .....	49
3.3.2 Role of demographic and health-related factors in explaining associations between accommodation type and personality traits .....	51
3.3.3 Country-Level Differences in the Associations between Accommodation Type and Personality Traits .....	55
3.4 Discussion .....	63
3.4.1 Personality Trait Differences when Living in Nursing Homes .....	63
3.4.2 Personality Traits of Nursing Home Residents in Different EU Regions .....	65
3.4.3 Limitations and Future Directions .....	66
3.5 Conclusion .....	69
<b>CHAPTER 4 Temporary Shake and Long-term Shift: Different Types of Late-Life Relocation Shape Older Adults' Personality and Life Satisfaction .....</b>	<b>71</b>
4.1 Introduction .....	72
4.1.1 Late-Life Relocation and Personality Traits .....	74
4.1.2 Methodological Strategies to Examine Longitudinal Relocation Effects .....	77
4.1.3 The Present Study .....	81
4.2 Method .....	82
4.2.1 Transparency and Openness .....	82
4.2.2 Data Source and Overall Design .....	82
4.2.3 Participants .....	83
4.2.4 Measures .....	84

4.2.5 Analytic Strategy .....	86
4.3 Results .....	89
4.3.1 Study Part 1: Community Relocation .....	89
4.3.2 Study Part 2: Nursing Home Admission .....	98
4.4 Discussion .....	107
4.4.1 Community Relocation: Personality Selection and a Mild Transition.....	107
4.4.2 Nursing Home Admission: Multi-phase Upheaval and Turning Points.....	109
4.4.3 Theoretical Mechanisms of Late-Life Relocation .....	111
4.4.4 Strengths, Limitations, and Future Directions .....	112
4.5 Conclusion .....	114
<b>CHAPTER 5 My New Home: Study Protocol for a Prospective Cohort Study on the Long-Term Personality Development and Short-Term Processes During Transitions into Nursing Homes.....</b>	<b>116</b>
5.1 Introduction .....	118
5.1.1 The Long-Term Development of Personality During Transitions to Nursing Homes.....	119
5.1.2 Methodological and Moderators in the Study of Relocations to Nursing Homes on Personality Development .....	121
5.1.3 Short-Term Processes of Personality Change During Relocation Transitions: States, Daily Routines, and Social Activity .....	124
5.1.4 Summary .....	127
5.2 Methods.....	129
5.2.1 Participants .....	129
5.2.2 Design.....	131
5.2.3 Procedures.....	131
5.2.4 Measures.....	134
5.2.5 Data Analysis Plan .....	137
5.3 Discussion .....	138
<b>CHAPTER 6 General Discussion .....</b>	<b>141</b>
6.1 Summary of Key Findings .....	141
6.1.1 RQ1: Late-Life Relocation as a Stressor for Mental Health and Personality Development.....	142

6.1.2 RQ2: Personality Development During Late-Life Relocation Transitions .....	143
6.1.3 RQ3: Moderating Effects of Relocation Type, Individual Characteristics, and Macro-Level Factors.....	145
6.2 Strengths, Limitations, and Future Directions .....	147
6.2.1 Strengths and Limitations.....	148
6.2.2 Future Directions .....	149
6.3 Practical Implications.....	150
6.3.1 Individuals and Families: Enhancing Understanding and Support.....	151
6.3.2 Nursing Homes: Targeted and Proactive Support .....	151
6.3.3 Social Governance: Optimizing Resource Allocation and Aging Policies .....	152
6.4 Conclusion .....	153
<b>References.....</b>	<b>155</b>
<b>Supplemental Materials.....</b>	<b>183</b>
Supplemental Materials for Chapter 3 .....	183
Supplemental Materials for Chapter 4 .....	195
<b>List of Publications and Personal Contributions.....</b>	<b>203</b>
<b>Declaration in accordance to § 8 (1) c) and d) of the doctoral degree regulation of the Faculty.....</b>	<b>205</b>

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## Abstract

Against the backdrop of accelerating global population aging, late-life relocation has become an increasingly common major life event. However, previous research has largely overlooked the profound association between this event and personality development. Older adults' personality not only serves as a key predictor of successful adaptation to relocation, but a series of changes triggered by relocation, such as shifts in environment, social networks, and daily routines, may also drive changes in personality development. This dissertation addresses this research gap by systematically exploring the mechanisms associating late-life relocation and personality development. It comprises three empirical studies and one study protocol, employing a progressive research logic and diverse methodologies to enable an in-depth exploration spanning from macro phenomena and long-term developmental processes to micro mechanisms.

Chapter 2 examines the personality-related emotional responses of older adults following involuntary relocation. Focusing on a sample of Chinese older adults ( $N = 301$ ) who moved from rural to urban areas due to policy-driven resettlement, this study found that participants widely reported clinically significant levels of anxiety. Although excessive reassurance-seeking was positively associated with anxiety, this association was primarily mediated by attention to negative information. Furthermore, the study revealed a paradoxical effect of resilience in the context of late-life relocation. Older adults with higher resilience, when experiencing stressful events such as relocation, were more likely to amplify negative attention bias in their external support-seeking behaviors (i.e., reassurance-seeking), thereby exacerbating their anxiety.

Chapter 3 extends the focus from post-relocation emotional responses to more stable personality traits. Using data from Wave 7 of the Survey of Health, Ageing and Retirement in Europe (SHARE) across 25 EU countries ( $N = 48,298$ ), this study examined personality differences between nursing home and private home residents. The results showed only slight differences between the two groups. These differences were largely explained by a combination of individual-level sociodemographic and health-related factors, as well as macro-level contextual factors such as regional and national economic development and investment in long-term care. Chapter 4 investigates the dynamic trajectory of personality development before and after relocation by analyzing 16 years of longitudinal data from the Health and Retirement Study (HRS; approximately 20,000 participants). Separate models were estimated for two relocation types: community relocation and nursing home admission. The results indicated that

community relocation had mild effects, mainly reflecting the positive personality selection effect before the move. Such relocation did not change the overall trajectory of personality development and was even associated with higher life satisfaction after relocation. In contrast, nursing home admission represented a profound psychological turning point. It was characterized not only by a significant negative selection effect, but also by immediate shocks and complex, long-lasting nonlinear changes in personality, accompanied by a marked decrease in life satisfaction.

Chapter 5 presents a prospective cohort study protocol to address the limitations of existing panel data and traditional longitudinal methods in capturing personality development processes. The protocol employs a high-density longitudinal tracking design with daily and monthly assessments following relocation, aiming to accurately capture the complete dynamic process through which short-term fluctuations in post-relocation personality states, social interactions, and daily routines develop into trait-level personality changes.

Overall, this dissertation systematically reveals the significant association between late-life relocation and personality development, delineating the complex boundary conditions of personality plasticity in later life. The studies emphasize that the effects of relocation on personality are not uniform but are profoundly influenced by the combined moderating roles of relocation type, individual characteristics, and macro-level socioeconomic and policy factors. These findings extend theoretical understanding of late-life personality development and provide an empirical foundation and practical guidance for developing multi-phase, personalized intervention programs and psychosocial support strategies for older adults in different relocation contexts.

## CHAPTER 1

### General Introduction

As the saying goes, “life is a succession of meetings and partings.” Against the backdrop of accelerating global aging, late-life relocation has become an increasingly common life event. For older adults, moving is not simply a change of address; it represents a reshaping of person–environment interactions involving cognitive, relational, and behavioral dimensions. Although older adults generally prefer to “age in place” (Badawy et al., 2019), surveys indicate that over 20% of adults in both China and the United States experience at least one relocation after age 50 (Lu & Kong, 2025; U.S. Census Bureau, 2016). Such relocations typically include transitions across communities to be closer to caregivers (e.g., adult children) or moves into long-term care facilities (Bloem et al., 2008; Keister, 2006). Late-life relocation is often accompanied by a systematic restructuring of social networks, living environments, and daily routines (Sergeant et al., 2010; Verspeek et al., 2024). These transitions may serve as significant psychosocial stressors, posing challenges to older adults’ daily lives and mental health (Fitzpatrick & Tzouvara, 2019; Lan et al., 2020; Verspeek et al., 2024). Moreover, changes in environmental conditions and social interactions may also trigger new social investments and adaptation processes, thereby driving personality change and development in later life (Borschel et al., 2019). However, as relevant empirical evidence remains limited, the mechanisms underlying the association between late-life relocation and personality development have yet to be clearly articulated.

Personality, defined as relatively stable patterns of thinking, feeling, and behaving

(Johnson, 1997), plays a crucial role in the major life transition of late-life relocation. On one hand, personality predicts individuals' life outcomes (Roberts et al., 2007; Soto, 2019), influencing how they select, respond to, and even shape new living environments (Buss, 1987). On the other hand, personality development trajectories may also be altered by the consequences of relocation. Over the past two decades, with the flourishing growth of longitudinal research in personality psychology, the view of personality plasticity has become widely recognized (Bleidorn et al., 2022; Damian et al., 2019). Personality develops continuously across the lifespan, including in late adulthood (Kandler et al., 2015; Roberts et al., 2006). Researchers generally agree that major life events constitute an important driving force of personality development (Bühler et al., 2023; Denissen et al., 2019). However, existing studies on life events and personality development have focused primarily on normative life events in early adulthood (such as marriage and parenthood), while research on late-life events and personality development remains relatively scarce (Asselmann & Specht, 2020; Bühler et al., 2023). These limitations hinder our comprehensive understanding of how different types of life events relate to personality development, and they prevent the evaluation and refinement of later adult personality development theories.

Although the impact of late-life relocation on personality development has significant theoretical and practical implications, this topic has not been systematically explored empirically to date. We know little about the causal mechanisms, dynamic processes, and contextual boundary conditions through which relocation impacts personality. Given that personality is a powerful predictor of long-term health, well-being, and even mortality (Roberts

et al., 2007; Soto, 2019), systematically exploring how this major life event interacts with personality is essential for advancing our understanding of successful aging. Accordingly, in this dissertation, I conducted a series of multimethod studies to systematically explore the effects of different types of late-life relocation on personality development. These studies integrate cross-sectional and longitudinal designs, as well as consider both individual-level factors (e.g., sociodemographic characteristics and health status) and national-level factors (e.g., national economic status and pension systems) that may influence relocation decisions and subsequent trajectories of personality.

### **1.1 Plasticity and Diversification During Late Adulthood: The Role of Life Events**

Lifespan developmental theory posits that personality development does not end in early adulthood, but rather is a continuous process across the lifespan (Baltes et al., 2006). Previous studies on personality development in mid-to-late adulthood have found a pattern often described as the “*la dolce vita*” effect (Asselmann & Specht, 2021; Marsh et al., 2013). After age 50, openness tends to decline; agreeableness and emotional stability gradually increase; and conscientiousness tends to rise during early old age but begins to decline after age 75. Yet not all older adults’ personality development follows this trend strictly—substantial individual differences in personality development are observed across the lifespan. These differences are often attributed to the joint influence of genetic and environmental factors (Bleidorn et al., 2009; Hopwood et al., 2011).

Contextual theories emphasize that non-normative and individualized life events constitute key drivers of personality deviations from average developmental trajectories

(Bleidorn & Denissen, 2021). Researchers have defined life events as “time-discrete transitions that mark the beginning or the end of a specific status” (Luhmann et al., 2012, p. 594). When older adults anticipate, experience, and adapt to such life events, their established social roles, interpersonal relationships, and self-conceptions are challenged, potentially driving personality changes from the bottom up (B. W. Roberts, 2018; Wrzus & Roberts, 2017; Wrzus et al., 2016). For example, previous research has found associations between retirement and declines in conscientiousness (Schwaba & Bleidorn, 2019), whereas widowhood may have long-term effects on emotional stability (Bühler et al., 2023). Relocation, as a major life event in later adulthood, is associated with changes across multiple domains of older adults’ lives, including their living environments and the reconstruction of social networks. These changes may exert both short-term shocks and long-term effects on personality development. Next, I will briefly outline the potential associations between late-life relocation and personality development by drawing on relevant personality theories and prior empirical findings.

## **1.2 Late-Life Relocation and Personality Development**

Based on previous research findings (cf. work experience research; Roberts et al., 2003), the association between late-life relocation and personality traits likely reflects a reciprocal and dynamic process. The person–relationship transactions framework provides the core theoretical foundation for this dissertation, positing that continuous interactions between individuals and their environments drive personality development (Bühler et al., 2024; Magnusson, 1990; Neyer & Asendorpf, 2001). Within this framework, selection and socialization effects are emphasized as the main mechanisms through which life events influence personality

development.

The selection effect emphasizes the proactive role of personality traits, meaning that individuals' preexisting personality traits influence their relocation decisions and their coping strategies in new environments (Bühler et al., 2024; Buss, 1987; Jackson & Wright, 2024). For example, predictive studies on older adults' admission to nursing homes have shown that those with higher agreeableness and lower conscientiousness are more likely to move into such institutions (Friedman et al., 2013). The socialization effect highlights the impact of life events on personality development (Asselmann & Specht, 2020; Denissen et al., 2019). The series of changes brought by relocation, including changes in environment, daily routines, and social networks, may ultimately lead to personality changes. For example, research on relocating during young and middle adulthood has shown that participants who experienced multiple moves exhibited lower personality stability (Lin et al., 2011).

Late-life relocation is a complex process that includes both pre-move decision-making and post-move adaptation across different stages (Verspeek et al., 2024). To fully understand the impact of late-life relocation on personality traits, it is important to examine both the pre-move selection effect and the post-move socialization effect. Therefore, in Chapter 3, I first conducted a cross-sectional study to examine whether personality traits differ among residents living in different accommodation types. This analysis provided initial evidence for the potential existence of both selection and socialization effects. Then, in Chapter 4, I conducted a longitudinal analysis to distinguish and examine more clearly the roles of pre-relocation selection effects and post-relocation socialization effects in the personality development

process.

### 1.3 Short-Term Changes and Long-Term Development of Personality After Relocation

Simply identifying superficial changes in average personality scores before and after relocation is insufficient. It is more important to understand *when*, *how*, and *why* relocation impacts personality. The socialization effects of relocation are not instantaneous events, but rather dynamic processes that unfold over time. Theoretically, this process begins with the immediate shock brought by sudden changes in environment and social roles at the onset of relocation. This shock may first be expressed as fluctuations at the state level, including significant changes in emotions, cognition, and behavior (Roberts & Jackson, 2008; Wrzus & Roberts, 2017). Relocation, as a strong psychosocial stressor, may influence individuals' emotional states, serving as both the starting point and surface phenomenon of personality dynamics. Therefore, in Chapter 2, I examined how relocation stress affects anxiety through cognitive-behavioral processes (i.e., excessive reassurance-seeking and attention bias), providing initial empirical support for the association between late-life relocation and personality traits.

Moreover, merely experiencing life events may not be sufficient to produce lasting changes at the personality traits level (Wrzus & Roberts, 2017). The actual catalysts for trait modification are the changes in social roles, interactions, and daily routines triggered by such events (Lüdtke et al., 2011). Earlier frameworks, such as the sociogenomic model of personality (Roberts & Jackson, 2008), the framework for self-regulated personality development (Hennecke et al., 2014), as well as the more recent TESSERA framework (*triggering situations*,

*expectancies, states and state expressions, and reactions*; Wrzus, 2021; Wrzus & Roberts, 2017), emphasize that the recurrent short-term states following exposure to trait-relevant situations are a prerequisite for long-term personality development. Therefore, once the short-term impact of relocation has been verified, a more central question emerges. At what point do these short-term state fluctuations occur, and how do they transform into long-term development at the trait level? To explore these specific dynamic mechanisms, in Chapter 4, I divided the examination of relocation effects into three stages: the pre-move selection effects, the immediate shocks following relocation, and the post-move long-term changes. And, given the limitations of current longitudinal data, I present a prospective research protocol in Chapter 5. This protocol aims to investigate the micro-level mechanisms and processes of relocation effects on personality through intensive assessments conducted before and after relocation.

#### **1.4 Heterogeneity of Relocation Effects**

The effects of life events on personality show significant heterogeneity. Even when faced with the same life event, individuals may react differently, sparking debate over how to account for these differences (Bühler et al., 2024). To date, however, researchers have found almost no reliable cross-event moderators that can explain these differing reactions (Schwaba & Bleidorn, 2018; Schwaba et al., 2023). Existing theories and empirical findings mainly highlight two levels of explanation: environmental or contextual factors and individual characteristics (Bühler et al., 2023).

At the environmental level, the characteristics of the life event itself are critical (Bühler et al., 2023). Recent studies indicate that even within the same life domain, different subtypes

of events may exhibit significant differences in the direction, intensity, and duration of their impact (Bleidorn et al., 2018; Luhmann et al., 2021; Schwaba et al., 2023). Relocation can be broadly defined as the permanent change of an individual's residence. In practice, however, late-life relocation is more complex. Different types of relocation vary greatly in both scope and intensity of influence. Based on relocation purposes and accommodation types, late-life relocation is generally categorized into community relocation and nursing home admission (Lam et al., 2023; Sergeant et al., 2010). Compared with community relocation, nursing home admission typically means more disruptive environmental changes, more pronounced social network shrinkage, and more complete withdrawal from social roles (Fitzpatrick & Tzouvara, 2019; Yong et al., 2021). Thus, personality changes following nursing home admission may be even more significant. In light of this, in Chapter 4, I examined separately the effects of these two typical types of late-life relocation on personality development.

At a more macro-contextual level, factors such as national economic development, pension systems, and the availability of long-term care resources together form the socioecological system within which nursing home admissions occur (Fischer et al., 2022; Stolz et al., 2019). These macro-level factors may systematically moderate the average impact of relocation on personality. To examine this, in Chapter 3, I analyzed data from the large cross-national Survey of Health, Ageing and Retirement in Europe (SHARE; Börsch-Supan et al., 2013). This analysis not only tested differences in the association between accommodation type and personality among older adults across 25 EU countries, but also further explored the role of macro-level national factors in this association.

Finally, at the individual level, even when faced with the same event type and macro-context, individuals' personality development trajectories still exhibit considerable variability. Older adults' personal resources (e.g., age and health status) and existing personality tendencies shape their subjective evaluations and responses to relocation. For example, older adults in poor health may view moving into a nursing home as a source of relief and support, whereas those in good health may perceive it as a loss of autonomy (Verspeek et al., 2024; Yong et al., 2021). These individual-level factors are key to understanding heterogeneity in personality development (Wagner et al., 2016). Based on the above, in Chapter 3 I tested the contributions of individual-level factors to personality differences across different accommodation types; in Chapter 4, I then incorporated these variables as key covariates to estimate more precisely the independent effects of relocation.

### **1.5 Core Research Questions and Dissertation Overview**

Late-life relocation, as an increasingly common major life event, is closely associated with personality. Personality not only influences older adults' relocation decisions and adaptation processes but may also undergo developmental changes as a consequence of relocation. However, the mechanisms underlying the association between late-life relocation and personality, the dynamic changes in personality across different relocation stages, and the key moderating factors influencing these processes have not been adequately examined. To address these research gaps, this dissertation aims to investigate the following three core questions through a logically progressive and systematic exploration consisting of three empirical studies and one study protocol.

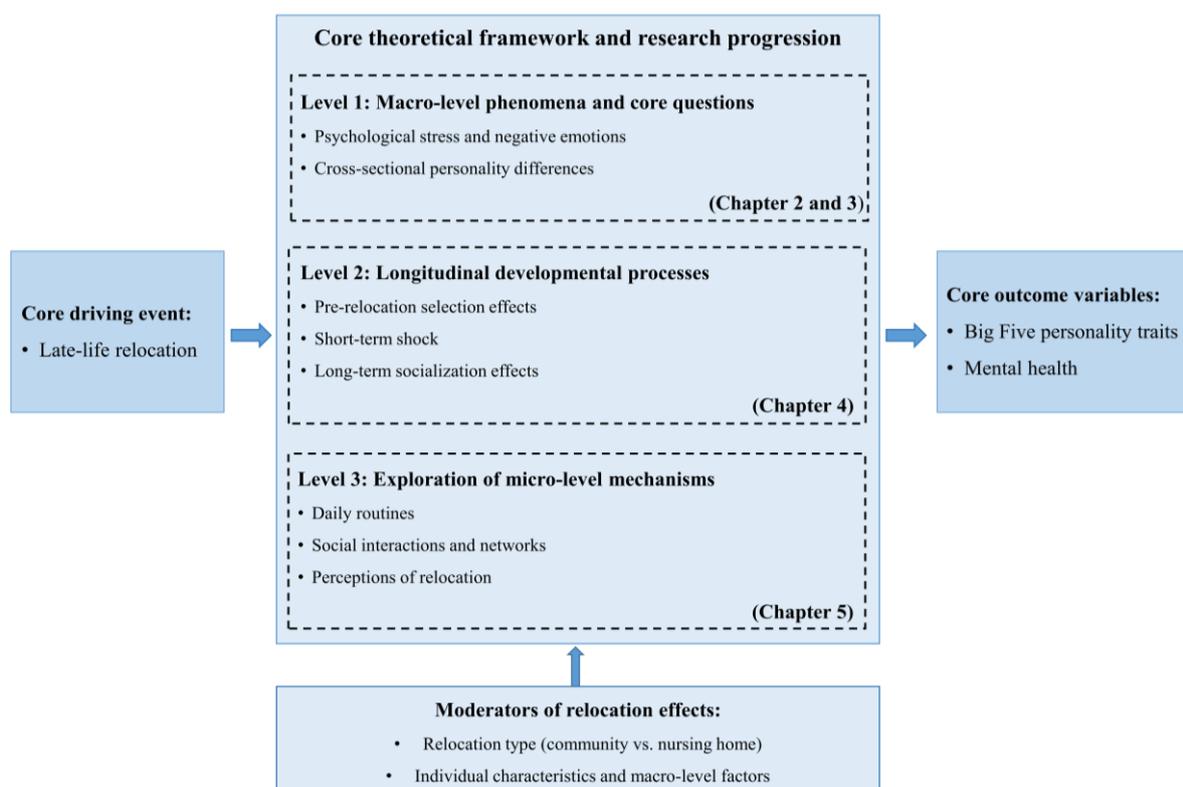
**RQ1.** Does late-life relocation function as a psychosocial stressor associated with older adults’ mental health and personality development?

**RQ2.** What patterns characterize the personality development trajectories across different stages of the relocation transition (pre-move, at-move, post-move)?

**RQ3.** Do types of relocation, individual characteristics, and macro-level social contexts moderate the association between late-life relocation and personality development?

**Figure 1.1**

*Dissertation Framework and Overview of Research Questions by Chapter*



To systematically address the research questions outlined above, in Chapter 1, I introduced the current state of research on late-life relocation and personality development, along with the related theoretical mechanisms. In Chapter 2, I then assessed the anxiety levels

of 301 Chinese older adults who were involuntarily relocated from rural to urban areas due to the urbanization policy. I also explored the association between excessive reassurance-seeking and anxiety among these older adults, examining the mediating role of negative information attention bias and the moderating effect of resilience. In Chapter 3, using the large cross-national database (SHARE; Börsch-Supan et al., 2013), I investigated the association between accommodation type and personality among 48,298 older adults across 25 EU countries, as well as the effects of individual characteristics and macro-level national factors. In Chapter 4, the core longitudinal study of this dissertation, I explored the impact of community relocation and nursing home admission on trajectories of personality development among older adults, using event-centered piecewise linear mixed-model (PLMM) analyses based on nearly 20,000 nationally representative U.S. older adults. Moreover, given the limitations of existing macro-level longitudinal data, in Chapter 5 I proposed a prospective study protocol. This protocol aimed to investigate the micro-level dynamics of personality changes following nursing home relocation through intensive longitudinal assessments. Finally, in Chapter 6, I further integrated and discussed the findings from the three empirical studies. Based on a critical review of the strengths and limitations of the current research, and informed by the prospective study design presented in Chapter 5, I outlined future research directions. Furthermore, I discussed the implications of these findings for promoting successful adaptation to relocation among older adults and for informing relevant social policy development.

## CHAPTER 2

### **Excessive Reassurance-Seeking and Anxiety among Chinese New Urban Older Adults:**

#### **The Role of Attention to Negative Information and Resilience**

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#### **Abstract**

**Background:** Policy-driven relocation of older adults from rural to urban areas in China is a significant stressor that often exacerbates anxiety. The mechanisms through which excessive reassurance seeking (ERS) heightens anxiety in this population remain poorly understood.

**Methods:** A cross-sectional survey was conducted with 301 relocated older adults (aged 60–89 years; 52.5% women) in Jilin Province. Participants completed validated self-report measures assessing ERS, attention to negative information (ANI), resilience, and anxiety. Pearson correlations were used to assess bivariate relationships among the main variables. The PROCESS macro was employed to examine (a) the mediating role of ANI on the association between ERS and anxiety; (b) the moderating influence of resilience on the ERS-to-ANI path, thereby constituting a moderated-mediation model; and (c) the full-path robustness check of the model.

**Results:** Participants reported clinically meaningful levels of anxiety, which were positively associated with excessive reassurance seeking. The association between ERS and anxiety was mediated primarily through ANI. Further analysis found that the indirect effect of ERS on anxiety through ANI was more pronounced in the presence of higher levels of resilience.

**Conclusion:** ERS exacerbates anxiety mainly by amplifying negative attention bias. Even highly resilient individuals may experience more severe anxiety if they exhibit this attention bias. These findings emphasize that interventions should not only focus on fostering resilience, but also incorporate training to mitigate negative attention biases.

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## 2.1 Introduction

Over the past 40 years, China's rapid economic growth and social change have been accompanied by an accelerating rate of urbanization. By the end of 2022, approximately 921 million Chinese residents lived in urban areas. During this period, approximately 12 to 16 million people migrated annually from rural to urban areas (National Bureau of Statistics of China, 2021). Scholars have described this large-scale internal migration as one of the most extensive in human history (Johnson, 2013; Xu et al., 2017). At the same time, China's growing aging population is being reflected in the urbanization migration (Ye et al., 2022). A distinctive feature of China's urbanization process has been the government-driven land acquisition policies, which have relocated tens of millions of rural residents to urban areas (Wang et al., 2018). These internal migrants are re-registered as urban residents and collectively resettled into government-provided compensatory urban communities (Li et al., 2023). Nearly half of these new urban residents are aged 60 or over, and are often referred to as "new urban older adults", that is, emergent urban older residents who have been involuntarily relocated from rural areas to cities due to policy (Chun & Yang, 2014; Hou et al., 2019).

Some studies indicate that involuntary relocation in later life may trigger or exacerbate relocation stress syndrome, suicidal ideation, anxiety, and depression (de Mendonca Lima et al., 2021; Robinson, 2002; Wiyono et al., 2019; Zhang et al., 2013). These risks are particularly high when older adults are placed in unfamiliar environments, where they must navigate new social networks and potential stigma. Anxiety is considered the most prevalent negative emotion in late adulthood, with studies showing that it is nearly twice as common as depression

among older adults (Bryant et al., 2008; Singleton et al., 2003). Although multiple studies have explored potential mechanisms of anxiety among older adults (Balsamo et al., 2018; Bryant et al., 2008), research has yet to address why and how involuntary relocation may intensify anxiety in this population (Keister, 2006).

The loss of social networks due to relocation can have particularly negative effects on older adults (Wrzus et al., 2013), who are typically more motivated to maintain existing social relationships than younger individuals (Carstensen, 2021; Jiang et al., 2018). When confronted with abrupt disruptions in established social connections, older adults may experience threats to their self-integrity (Cohen & Sherman, 2014). This can prompt excessive reassurance-seeking behaviors for social validation, potentially heightening interpersonal tensions and anxiety (Coyne, 1976). Based on this background, the present study primarily investigates the association between excessive reassurance-seeking and anxiety among Chinese new urban older adults, as well as the underlying psychological mechanisms.

### ***2.1.1 Excessive Reassurance-Seeking and Anxiety***

In recent years, excessive reassurance-seeking (ERS) has been widely discussed as a significant contributor to anxiety (Cogle et al., 2012; Katz et al., 2020). ERS refers to a relatively stable tendency for individuals to continually seek reassurance from others that they are valuable, whether or not they have received this feedback repeatedly (Burns et al., 2006). Initially, Coyne's (1976) interpersonal theory linked ERS to depression through mechanisms of social exclusion, and more recent studies have extended this framework to anxiety disorders (Cogle et al., 2012). Scholars propose two potential mechanisms underpinning the ERS-

anxiety relationship. Specifically, ERS may strain interpersonal relationships, reducing or obstructing social support during critical or stressful periods (Coyne, 1976; Starr & Davila, 2008). Cognitively, ERS might intensify anxiety by reinforcing individuals' doubts about their self-efficacy (Katz et al., 2020). Nevertheless, whether ERS contributes to anxiety among Chinese new urban older adults remains unclear. And, it is not yet known what additional factors may influence this relationship. Therefore, this study explores the association between ERS and anxiety in this population and hypothesizes that ERS is positively associated with anxiety (*H1*).

### ***2.1.2 The Potential Mediating Role of Attention to Negative Information***

In cognitive theory (Beck et al., 1988), attention to negative information (ANI) is an essential mechanism for sustaining and exacerbating negative emotions. Under stressful conditions such as involuntary relocation, individuals tend to adopt a bottom-up processing style, focusing disproportionately on negative information (Mogg & Bradley, 2005). This attentional bias may serve as a bridging mechanism between ERS and anxiety in Chinese new urban older adults. For instance, older people who repeatedly seek reassurance without obtaining genuine satisfaction may consistently detect and amplify potential threats in their surroundings or interpersonal interactions, further exacerbating anxiety. Based on this, this study hypothesizes that anxiety among Chinese new urban older adults is influenced by attention to negative information during the reassurance-seeking process (*H2*). The mediating role of ANI is also examined.

### ***2.1.3 The Potential Moderating Role of Resilience***

Individual differences in vulnerability to anxiety are often significant when coping with

stressful situations (e.g., relocation). Resilience is widely regarded as a key protective psychological characteristic (Connor & Davidson, 2003; Ong & Bergeman, 2004). Individuals with higher resilience typically maintain emotional balance or recover quickly when exposed to negative situations (Li et al., 2020; Newman, 2005). To date, research findings on whether and how resilience moderates the ERS–ANI–anxiety pathway remain inconclusive. On the one hand, resilience may influence early cognitive processing stages; resilient individuals are typically better at regulating attention away from negative information (Billings et al., 2000). This cognitive regulatory ability could buffer or weaken the initial ERS–ANI pathway, making individuals less prone to maladaptive cognitive patterns like excessive negative attention bias under stress. On the other hand, resilience might moderate later emotional processing stages, directly weakening the ANI–anxiety relationship by reducing emotional reactivity to negative cognitive biases (Ong et al., 2006). Additionally, resilience could potentially moderate the direct ERS–anxiety relationship by mitigating the emotional distress associated with excessive reassurance-seeking behaviors (Li et al., 2020; Steinhardt & Dolbier, 2008).

However, empirical evidence on these specific moderated pathways remains limited and inconsistent. Moreover, existing theoretical frameworks have not clearly identified which segments of the ERS–ANI–anxiety pathway resilience may moderate. Given this theoretical ambiguity and the exploratory nature of existing findings, the present study explicitly adopted an exploratory analytic strategy. Specifically, we examined the potential moderating role of resilience across multiple segments of the mediation model (ERS–ANI, ANI–anxiety, and ERS–anxiety) linking ERS to anxiety via ANI, without a specific path was predetermined for

moderation. Therefore, prior to data analysis, we proposed an exploratory hypothesis that resilience would moderate the indirect effect of ERS on anxiety through ANI among new urban older adults (**H3**).

#### **2.1.4 The Present Study**

Although a growing body of research has examined the psychological effects of relocation, most studies have focused on international migrants or younger populations (Gao et al., 2021). Psychological consequences among older adults undergoing involuntary, policy-driven relocation within China's unique urbanization process have received limited scholarly attention. Guided by the interpersonal theory of excessive reassurance-seeking (ERS) and cognitive models of attentional bias (Coyne, 1976), we tested a moderated mediation model to examine the mechanisms underlying anxiety in this population. Specifically, we hypothesized that:

*Hypothesis 1 (H1):* With higher ERS, new urban older adults experience more anxiety.

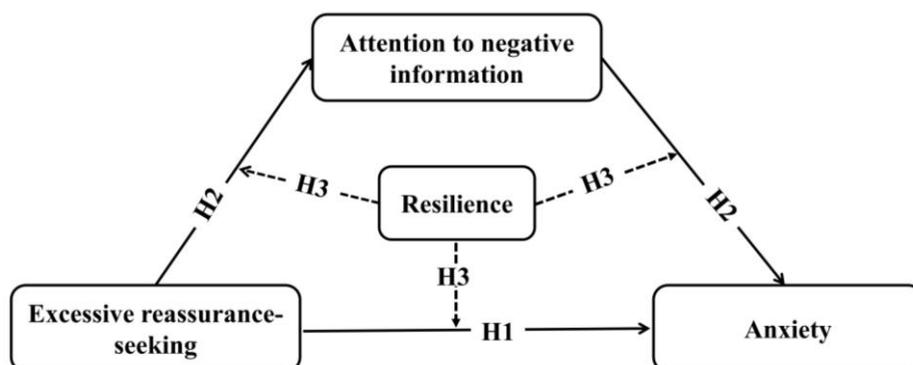
*Hypothesis 2 (H2):* ANI mediates the association between ERS and anxiety in new urban older adults.

*Hypothesis 3 (H3):* Higher resilience weakens the indirect effect of ERS on anxiety through ANI by moderating one or more of the paths among ERS–ANI, ANI–anxiety, and ERS–anxiety.

The hypothesized conceptual model is illustrated in Figure 2.1.

**Figure 2.1**

*Hypothesized Moderated Mediation Model*



*Note.* Solid arrows represent the hypothesized direct and mediated effects. H1 posits a direct association between ERS and anxiety. H2 posits that ANI mediates the relationship between ERS and anxiety. Dashed arrows represent the exploratory moderation hypothesis (H3), suggesting that resilience may moderate one or more segments of the pathways linking ERS, ANI, and anxiety.

**2.2 Methods**

**2.2.1 Participants**

The target population comprised older adults who had been involuntarily relocated from rural to urban areas under government-driven urbanization policies and were residing in government-provided resettlement communities. Data collection was conducted between May and August 2016 in a major city in southeastern Jilin Province, China.

To establish the sampling frame, we collaborated with two local committees responsible for managing these resettlement communities. These committees provided comprehensive, anonymized lists of all registered older adult residents who met our inclusion criteria. We then

used a convenience sampling method within this defined sampling frame. All eligible individuals were approached and invited to participate until the target sample size was achieved. The inclusion criteria were as follows: (1) aged 60 or above, (2) relocated from rural to urban areas, (3) living in urban resettlement communities due to government-driven urbanization policies, and (4) free from severe cognitive impairment, with the capability to independently read and write simple text.

A total of 302 new urban older adults took part in the survey. One respondent was excluded for not meeting the age criterion, leaving a final analytic sample of 301 new urban older adults. To assess the adequacy of our study design, we performed a post-hoc power analysis in G\*Power 3.1. Given the observed large effect size ( $f^2 = 0.35$ ), our sample size ( $N = 301$ ) yielded a computed power of  $(1 - \beta) = 1.00$ , which exceeds common recommendations of 0.80 (Cohen, 2013). These results indicate that our sample size was sufficient to support subsequent analyses.

### ***2.2.2 Data Collection Procedures***

This study was approved by the Ethics Committee of North China University of Science and Technology (Approval No. 17009), and conducted in accordance with the Declaration of Helsinki. Prior to the formal survey, a pilot study was conducted in February 2016 with three older adults from similar communities to assess wording clarity, skip-logic flow, and font size. As this pilot served purely qualitative purposes, no statistical analysis was performed and the pilot data were not included in the main dataset.

The survey was conducted using self-administered questionnaires. Participants were

informed about the purpose of the study and their rights, and provided written informed consent. Participants received sealed questionnaires and completed them at home or in community-based senior activity centers. Due to participants' advanced age and rural backgrounds, research assistants provided literacy support to 11 participants (3.64%), offering clarifications without influencing responses. At the end of the study, all participants received a non-monetary token of appreciation (e.g., a small potted plant).

After data collection, data screening was conducted using the following exclusion criteria: questionnaires with more than 20% missing data (none excluded), migration duration exceeding 10 years (none excluded), and age under 60 years (one case excluded).

### **2.2.3 Measures**

**Anxiety (Dependent variable).** Anxiety was measured using the anxiety subscale of the simplified Chinese version of the Depression Anxiety Stress Scale (DASS-21; Moussa et al., 2001). The subscale includes seven items assessing autonomic arousal, skeletal muscle effects, situational anxiety, and the subjective experience of anxious affect. The 4-point scale ranges from 0 (does not apply) to 3 (applies totally). Scores are summed and then multiplied by two, resulting a total scores ranging from 0 to 42. According to the diagnostic criteria proposed by Lovibond and Lovibond (1995), the scores range from 0–7 (normal); 8–9 (mild); 10–14 (moderate); 15–19 (severe); and 20 or more (extremely severe). In this study, the anxiety subscale exhibited excellent internal consistency (Cronbach's  $\alpha = .85$ ), indicating strong measurement reliability.

**Excessive reassurance-seeking (predictor).** Excessive reassurance-seeking (ERS) was

assessed using a validated 4-item subscale from the Depressive Interpersonal Relationships Inventory (DIRI-24; Coyne, 1976; Joiner & Metalsky, 2001). Items asked participants about their tendencies to seek comfort and their subjective feelings to feedback (e.g., “Do you frequently seek reassurance from the people you feel close to as to whether they really care about you?”). Responses were recorded on a 7-point Likert scale (0 = never, 6 = always). Participants’ ERS indexes were obtained by summing the scores of all items, with the total score ranging from 0 to 24. Higher total scores indicated a higher level of excessive reassurance-seeking. The ERS subscale demonstrated acceptable internal consistency (Cronbach’s  $\alpha = .71$ ) in this study.

**Attention to negative information (mediator).** Attention to negative information was measured using the 11-item scale derived from the Attention to Positive and Negative Information Scale (APNI; Noguchi et al., 2006). Participants rated how true each statement was from them (e.g., “I don’t forget when others do things that hurt me”) from 1 (very untrue of me) to 5 (very true of me). ANI scores were obtained by summing responses to all item, with higher scores indicating greater ANI. In this study, the ANI subscale showed acceptable internal consistency (Cronbach’s  $\alpha = .61$ ), which falls within the acceptable range for short psychological scales (Nunnally & Bernstein, 1994).

**Resilience (moderator variable).** Resilience was measured using the Chinese version of the 10-item Connor–Davidson Resilience Scale (CD–RISC–10), a widely used instrument for assessing resilience in China (Ye et al., 2017). The scale has been validated and meets established psychological standards for use in China (Notario–Pacheco et al., 2011; Ye et al.,

2017). Items were answered on a 5-point scale ranging from 0 (not at all) to 4 (fully agree). The total score ranged from 0 to 40; higher scores indicated a higher resilience. The CD-RISC-10 showed excellent internal consistency (Cronbach's  $\alpha = .88$ ) in this study.

**Demographic variables.** Age (years), gender (male = 1, female = 2), and relocation duration (in years) were self-reported using single-item questions developed for this study.

#### **2.2.4 Data Analysis**

All analyses were conducted using IBM SPSS Statistics (version 24.0). Prior to hypothesis testing, Harman's single-factor test was conducted to assess possible common method bias. We also evaluated the normality of key variables to ensure the validity of our regression models. A Shapiro-Wilk test of residual indicated a significant deviation from normality ( $p < .05$ ). This significant result of deviation might be partly attributable to the large statistical power for this test because, descriptive statistics showed skewness ranging from 0.03 to 0.33 and kurtosis ranging from -0.78 to 0.53, both within acceptable thresholds (Kline, 2011). Furthermore, our larger sample size ( $N = 301$ ) allowed reliance on the central limit theorem, rendering subsequent parametric analyses acceptable (Field, 2024).

After completing these preliminary checks, we performed descriptive analyses ( $M$ ,  $SD$ ) and Pearson correlation among key variables and relevant sociodemographic variables. To test our hypothesized mediation (Model 4) and moderated mediation (Model 7), we employed conditional process analysis using the PROCESS macro (version 4.2) developed by Hayes (2012). To verify the robustness of our moderated mediation results, we additionally performed analyses with Model 59, which simultaneously tested resilience as a moderator on all potential

moderation paths.

Following Preacher et al. (2007), the moderated mediation model was confirmed when the 95% confidence interval (CI) after 5,000 replicated simulations of the sample ( $N = 301$ ) using the bootstrap method did not contain zero and when further simple slope analysis showed that the 95% CI of the mediated path with plus or minus one standard deviation of the moderating variable, one contained zero and one did not contain zero. Finally, we used the Johnson–Neyman technique based on the second-order variance method to plot conditional process curves with confidence intervals.

## **2.3 Results**

### ***2.3.1 Common Method Bias Test***

Since all data in the current study were collected through self-reported questionnaires, we conducted Harman’s single-factor test to assess the potential common method bias. The analysis revealed that nine factors had eigenvalues greater than 1, and the first unrotated factor explained 19.06% of the total variance, significantly below the recommended threshold of 40% (Malhotra et al., 2006). Thus, severe common method bias is unlikely to be a concern in the present study.

### ***2.3.2 Participant Characteristics***

Table 2.1 presents the sociodemographic and relocation characteristics of the 301 new urban older adults. The gender distribution was relatively balanced, with 52.5% of participants being female. Participants were mainly recent migrants, with an average of 3.3 years since relocation ( $SD = 1.78$ ; range = 1–10). Most participants were in the younger–old age range, with

a mean age of 65.9 years ( $SD = 5.02$ ) and nearly four-fifths aged 60–69 years.

**Table 2.1**

*Sociodemographic Characteristics of Participants (N = 301)*

Characteristic	Statistic
Age (years)	
<i>M (SD)</i>	65.9 (5.02)
Age group	
60–69, <i>n (%)</i>	237 (78.7)
70–79, <i>n (%)</i>	59 (19.6)
≥ 80, <i>n (%)</i>	5.0 (1.7)
Gender	
Male, <i>n (%)</i>	143 (47.5)
Female, <i>n (%)</i>	158 (52.5)
Relocation Duration (years)	
<i>M (SD)</i>	3.3 (1.78)
Range	1–10

*Note.* *M* = Mean; *SD* = Standard Deviation; *n (%)* = frequency and percentage;

**2.3.3 Descriptive and Correlation Analysis**

Descriptive statistics and bivariate zero-order correlations among all key study variables are presented in Table 2.2. The mean score for anxiety was 15.61, which meets the criteria for severe anxiety on the DASS-21 scale. No validated cut-off scores exist for the remaining variables (including resilience, ERS, and ANI); therefore, their means are reported for descriptive purposes only. In addition, the correlation matrices indicated that anxiety was higher with greater ERS, attention to negative information, and was higher among the women. Anxiety was also higher with lower resilience and more recent the relocation, with higher ERS and ANI. Unexpectedly, participants with higher resilience also reported elevated levels of ERS and ANI. These results provided the basis for subsequent testing of the conditional process model.

**Table 2.2***Descriptive Statistics of Study Variables*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Anxiety	15.61	10.18	-.13*			
2. Resilience	22.12	6.58	-.02	-.17**		
3. Excessive reassurance-seeking	8.32	4.56	.07	.13*	.25**	
4. Attention to negative information	33.18	5.14	-.09	.21**	.30**	.30**

*Note.* Significance levels: \* $p < .05$ , \*\* $p < .01$ .

### 2.3.4 Mediation Effect Analysis

The PROCESS macro (Model 4) was used to examine the mediation model (Hypothesis 1 and 2). The results showed that the indirect effect of ERS on anxiety via ANI was significant. The mediation effect index was 0.05 (95% CI = [0.02, 0.10],  $p < .01$ ). By contrast, the direct effect of ERS on anxiety was not significant ( $\beta = 0.08$ ,  $t = 1.29$ , 95% CI = [-0.04, 0.19]), suggesting that ANI plays a key role in the link between ERS and anxiety. The total effect of ERS on anxiety through ANI was significant ( $\beta = 0.13$ ,  $t = 2.29$ , 95% CI = [0.02, 0.24]). The indirect effect of ANI accounted for approximately 41.73% of the total effect, indicating that ERS contributes to increased anxiety primarily through its influence on ANI. These findings support Hypotheses 1 and 2.

### 2.3.5 Moderated Mediation Model Analysis

We tested for the potential moderating effect of resilience on the mediation pathway, beginning with the first stage (“ERS–ANI”). Using PROCESS macro’s Model 7, we found that this first stage was moderated by resilience (see Table 2.3). The results of the first regression equation showed that ERS had a significant effect on ANI and that resilience and the interaction

of resilience and ERS both significantly predicted ANI (Table 2.3). Regression Equation 2 indicated that ERS no longer had a significant direct effect on anxiety when ANI was included in the model, whereas ANI predicted anxiety (Table 2.3; right column).

**Table 2.3**

*The Relationship Between Excessive Reassurance-Seeking and Anxiety: A Moderated Mediation Model*

Predictor Variable	Predicted Variable							
	ANI (mediator)				Anxiety (dependent variable)			
	$\beta$	<i>SE</i>	<i>t</i>	95% BCa CI	$\beta$	<i>SE</i>	<i>t</i>	95% BCa CI
ERS	0.14	0.06	2.50*	[0.03, 0.26]	0.08	0.06	1.29	[-0.04, 0.19]
ANI					0.18	0.06	3.12**	[0.07, 0.30]
Resilience	0.29	0.06	5.28**	[0.18, 0.40]				
ERS × Resilience	0.22	0.05	4.45**	[0.12, 0.32]				
$R^2$			0.19				0.05	
$F(df)$			23.83** (3, 297)				7.56** (2, 298)	

Note. Significance levels: \* $p < .05$ , \*\* $p < .01$ .

Further bias-corrected bootstrap analysis showed that the indirect effect of ERS on anxiety via ANI was moderated by resilience (Table 2.4). The mediating effect of ERS on anxiety through ANI was significant at average and high levels of resilience (+1 *SD*). However, it was non-significant for participants with low resilience (-1 *SD*). See Table 2.4 for detailed estimates at specific resilience levels.

Control analyses included gender, age, and relocation duration as covariates. Including these variables did not significantly alter the main results. In particular, no significant effects of age and gender were observed on the mediated ERS–ANI–anxiety pathway. Time since relocation showed a small association with anxiety ( $\beta = -0.14$ ,  $SE = 0.06$ ,  $p = .02$ ) but no

significant effect on the first stage of the moderated mediator pathway. (See: <https://osf.io/z8976/> for the control analyses).

Hayes (2015) argued that if the moderating effect in the moderated mediation model exists only in one segment of the mediated path, the mediating effect being moderated should be a mathematically linear function of the moderating variable. The slope of this function is equal to the product of the regression coefficient of the interaction term of the independent and moderating variables on the mediating variable and the regression coefficient of the mediating variable on the dependent variable. Therefore, if the 95% CI of this slope does not contain zero, it can be shown that a moderated mediation effect exists and that the moderating variable only moderates one segment of the mediating path. Hayes (2015) referred to this slope as the index of moderated mediation, which can be tested by bootstrapping, a method also known as the product of coefficients method. It has now been confirmed by the results of many studies to have significant advantages over previous analysis methods and has gradually become more widely recognized by scholars in recent years (Hayes, 2015). The results of our analysis using the PROCESS macro (Table 2.4) showed that there was a significant index of moderated mediation ( $\beta = 0.04$ ,  $SE = 0.02$ , 95% CI = [0.01, 0.08]), which suggested that we did not need to carry out further model tests to determine whether other mediated paths also had a mediating effect.

To ensure maximum robustness and to provide comprehensive empirical evidence, we conducted an additional robustness check using PROCESS Model 59. This model simultaneously tests for moderation on all possible pathways. Consistent with the primary

analysis, results indicated that only the first-stage moderation (ERS–ANI) was statistically significant, whereas moderation effects on the second-stage (ANI–Anxiety;  $\beta = 0.03, p = .58$ ) and direct paths (ERS–Anxiety;  $\beta = 0.09, p = .09$ ) remained non-significant. These findings empirically confirm that the moderated mediation effect operates exclusively through the ERS–ANI pathway. The full output for this robustness check is publicly available at: <https://osf.io/z8976/>.

**Table 2.4**

*Estimated Conditional Indirect Effect: ERS → ANI → Anxiety at Different Values of Resilience*

Conditional indirect effect	$\beta$	Boot SE	Boot LLCI	Boot ULCI
-1 SD resilience	-0.01	0.02	-0.05	0.02
Mean resilience	0.03	0.01	0.01	0.06
+1 SD resilience	0.07	0.03	0.02	0.12
<b>Index of moderated mediation</b>	0.04	0.02	0.01	0.08

*Note.* Conditional indirect effect = indirect (mediated) effect at the specified level of resilience.

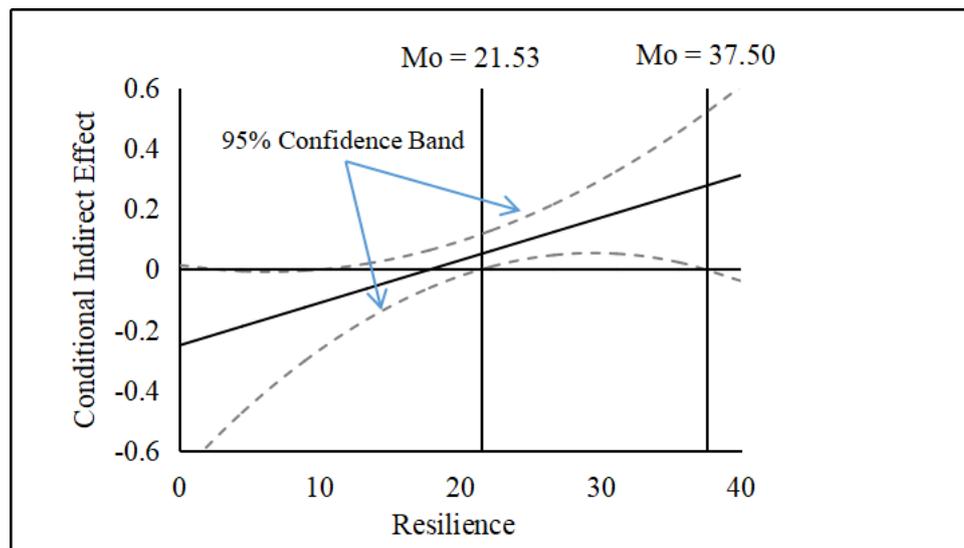
These results indicated that ANI mediated the relationship between ERS and anxiety, and this mediation was positively moderated by resilience at the first stage. The indirect effect (ERS–ANI–anxiety) was more pronounced with higher levels of resilience, which contradicted *H3*.

Figure 2.2 illustrates the conditional indirect effect, showing how resilience moderated the mediated role of ERS in the ERS–anxiety association. Following Preacher et al. (2007), we used the Johnson–Neyman technique based on second-order variance to plot the conditional indirect effect with a 95% confidence interval band. According to Figure 2.2, the indirect effect

of ERS on anxiety via ANI was significant when the resilience of the participants was scored between 21.53 and 37.50 (out of 40).

### Figure 2.2

*The Plot of the Indirect Effect of Excessive Reassurance Seeking on Anxiety via Attention to Negative Information in New Urban Older Adults Depending on Resilience (i.e., the Moderator)*



*Note.* The horizontal line denotes an indirect effect of zero. The vertical line represents the boundary of the region of significance. The dashed lines indicate the 95% confidence bands.

## 2.4 Discussion

The results of the current study support our research hypothesis (**H1** and **H2**). First, the results showed that some new urban older adults experience high levels of anxiety and ERS, and that greater ANI was associated with higher anxiety. This finding is consistent with prior studies among non-clinical younger adults, suggesting that ERS contributes to anxiety across different populations (Cogle et al., 2012). Rachman (2002) hypothesized that reassurance-seeking is the most common tendency and behavior among individuals seeking security in

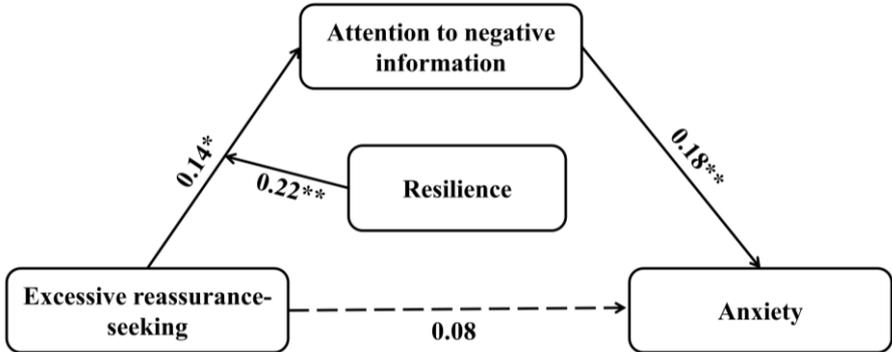
negative situations. Previous research has confirmed that relocation in later life can damage the physical and mental health of older people (Keister, 2006; Robinson, 2002; Wiyono et al., 2019). The involuntary relocation of new urban older adults due to policy mandates disrupted their existing, stable social support networks. This posed a great challenge given their declining physical and cognitive functioning. In the process, they often sought additional comfort from others in an effort to regain social support and psychological capital. This is consistent with previous research on the relationship between ERS and negative emotional disorders (e.g., depression). When individuals' social support networks are disrupted and interpersonal relationships deteriorate, they are more likely to engage in ERS and experience feelings of hopelessness and depressed (Joiner Jr et al., 1999; Timmons & Joiner Jr, 2008).

Furthermore, our study has shown that ANI mediated the relationship between ERS and anxiety in new urban older adults. This finding supports previous research (involving U.S. samples mainly) on the relationship between ERS, ANI, and anxiety (Bistricky et al., 2016; Mobini & Grant, 2007; Mogg & Bradley, 2005; Timmons & Joiner, 2008). Our findings suggest that ERS in new urban older adults does not necessarily cause anxiety; rather, it increases the potential for anxiety when there is an excessive focus on ANI.

Resilience is generally considered a psychological protective factor (Rutter, 1985; Steinhardt & Dolbier, 2008). In the present study, resilience partially moderated the mediating process of ERS–ANI–anxiety. Specifically, the moderating effect of resilience was observed only at the first stage of the model (see Figure 2.3).

Figure 2.3

Summary of the Moderated Mediation Model of Anxiety Among New Urban Older Adults



Note. Significance levels: \* $p < .05$ , \*\* $p < .01$ .

Contrary to *H3*, the results suggested that resilience increased the indirect effects of ERS on anxiety through ANI. While our findings differ from some previous studies (Luthar, 2015; Zhang, 2019), resilience is a dynamic process with both protective and potentially risk-enhancing facets. Future researchers should explore not only the positive effects but also the developmental mechanisms and contexts in which resilience may backfire. One potential explanation for the stronger ERS–ANI–anxiety among high resilience individuals is that these older adults were more likely to rely on both internal and external resources to cope with psychological distress caused by later-life relocation. They may have found that their existing social support network was impaired as they entered an unfamiliar environment and faced possible stigmatization. Such experiences might have led to stronger insecurity and increased attention to negative information during repeated reassurance-seeking, thereby creating a vicious cycle and further anxiety. This result is partly consistent with the resilience integration model (Kumpfer, 2002).

Additionally, our findings are consistent with the high-stress environment of involuntary relocation and its potential to activate interpersonal and cognitive vulnerabilities, as highlighted in the introduction section. From a theoretical perspective, the findings extend Coyne's (1976) interpersonal theory by suggesting that ERS can have an impairing effect not only through social exclusion, but also through attention bias toward negative information. And, the mediating role of ANI supports Beck et al.'s (1988) cognitive theory, suggesting that selective attention to threat exacerbates negative emotions, in the current study anxiety. Finally, this unexpected interaction with resilience suggests that the "protective" quality is not the only characteristic of resilience; under certain conditions, it may exacerbate maladaptive processes. This paradox corresponds with recent discussions on the complexity and dynamic of resilience (Luthar, 2015; Rutter, 2012).

From a practical perspective, many involuntarily relocated older adults may be unaware that their ERS is a maladaptive coping strategy. Such behavior may further damage their social networks and exacerbate anxiety, particularly as they tend to focus more on negative aspects of interpersonal interactions. To mitigate anxiety, older adults can be supported in strengthening and re-establishing meaningful social connections, while also learning strategies to reduce selective attention to negative information. Therefore, policymakers and mental health practitioners should cooperate in designing community programs that foster adaptive coping skills and provide sustainable social support. Interestingly, the paradoxical role of resilience indicates that some older adults who appear resourceful may still struggle to cope effectively, highlighting the importance of personalized assessments and interventions.

The present study has both strengths and weaknesses. First, it examined the underexplored psychological effects of involuntary relocation among older adults, using well-validated measures and a gender-balanced sample. The results may also inform policymakers and support older adults in other countries who are involuntarily retirement homes. Second, due to the cross-sectional design of the study, it is not possible to draw any causal inferences about the relationship between ERS and anxiety in new urban older adults. It is equally plausible that higher levels of anxiety lead to ERS and that bidirectional effects exist. Follow-up investigations and additional experimental designs will be needed if the strengths of the specific directional effects of the conditional process model proposed in the present study are to be disentangled. Although reliance on self-report questionnaires is common in aging research, it carries the risk of method bias. Mixed methods (e.g., involving the use of other reports of ERS and indirect measures of ANI) may help to mitigate this concern. Finally, the participants were drawn from a convenience sample in the northeastern region of China, so our results may not be generalizable to all relocated older adults and to other regions. Self-selection bias is also possible: either (a) individuals experiencing particularly high burdens, or (b) those with fewer adjustment problems, may have declined to participate. However, the range and standard deviations of our main variables (e.g., anxiety, resilience) indicate that a relatively broad range of participants was included. Still, regional variation in economic and resettlement policies may lead to differences in new urban older adults' adaptability and their levels of ERS, resilience, and anxiety. Future studies should consider recruiting participants from diverse geographical regions to enhance the generalizability of their findings.

## **2.5 Conclusion**

This study found that Chinese new urban older adults who experienced later-life relocation tended to exhibit higher anxiety, with ERS and ANI identified as significant contributing factors. By reducing ANI, it may be possible to reduce the risk of anxiety arising from ERS. In addition, the findings indicate that high levels of resilience might not be beneficial in all circumstances. Indeed, resilience can sometimes be associated with detrimental outcomes, such as increased attention to negative information. The findings also suggest that older adults with high levels of resilience may pay more attention to negative information during reassurance-seeking, thereby increasing/causing their anxiety. Therefore, psychological interventions should also consider targeting older adults with high resilience, as they may be at unexpected risk of anxiety due to maladaptive attentional patterns.

## CHAPTER 3

### **Personality Differences of Older Adults Living in Nursing Homes versus Private Homes in 25 European Union Countries**

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#### **Abstract**

Despite the population of older adults in nursing homes, personality traits remain understudied due to frequent exclusion from large-scale panel studies. Using data from the Survey of Health, Ageing, and Retirement in Europe (SHARE-W7), this study explored (a) personality trait differences between nursing home and private home residents; (b) whether age, gender, partnership, education, health, and activity limitations partially explained these differences, and (c) regional variations across Europe. Participants spanning 25 countries ( $N = 48,298$ ) completed the 10-item Big Five Inventory and reported their accommodation type. Using propensity score analyses, results demonstrated that nursing home residents scored lower in extraversion and conscientiousness compared to private home residents, which were partially explained by demographic and health-related factors. Multilevel analyses showed that the associations between accommodation type and personality traits varied by region, national economic development, and investments in nursing facilities. The findings suggest that only small differences in personality traits exist between nursing home and private home residents and they are attributable to age, socioeconomic, and health differences. The cross-sectional findings highlight the need to further explore the processes and timing of relocation to nursing homes on late-life personality development, as this living condition is likely to increase in future years.

Sun, Y., Teichmann, B., & Wrzus, C. (2025). *Personality Differences of Older Adults Living in Nursing Homes versus Private Homes in 25 European Union Countries*. [Manuscript submitted for publication]. Psychological Institute and Network Aging Research, Heidelberg University, Heidelberg, Germany.

### 3.1 Introduction

The knowledge of late-life personality mainly stems from convenience or panel samples that including people living in their private homes (PH). This creates a gap in current personality research because people living in nursing homes (NH) or long-term care (LTC) facilities are excluded. As the global population ages, an increasing number of older people require expert care that private homes cannot provide (Spillman & Lubitz, 2000; Szczepura, 2011). While most older people continue to reside in private homes, living in a nursing home in later life has become a common trend, particularly among the oldest-old or those with greater health needs (Gaertner et al., 2019). Currently, knowledge is limited about similarities and differences among people living in private vs. nursing homes as well as the impact of living in nursing homes on older people's psychology and personality. Other major life events in later life, such as retirement, widowhood, or health decline, have been widely examined for their effects on personality (Asselmann & Specht, 2021; Mueller et al., 2018; Schwaba & Bleidorn, 2019). In contrast, no study to date has considered the impact of living in nursing homes on personality traits. Large-scale panel studies, such as the German Socioeconomic Panel (SOEP), the British Household Panel Survey (BHPS), and the Midlife in the United States (MIDUS) have advanced research on the psychological and personality trajectories of older adults. However, these studies often exclude participants or lose track of them once they move into nursing homes, creating a gap in our understanding of personality traits within this specific subgroup (see reviews by Bleidorn et al., 2021; Roberts & Yoon, 2022). To address this gap, the present study examines differences in personality traits between older adults residing in nursing homes and

those residing in private homes using cross-sectional data covering 25 European Union countries. The data come from the Survey of Health, Ageing and Retirement in Europe (SHARE-Wave 7). Beyond this, we also separately explore the potential roles of individual-level factors (e.g., demographic and health characteristics) and country-level factors (e.g., European region, state indicators of elderly care) to better understand similarities and differences in older adults across different accommodation settings in different European regions.

### ***3.1.1 Living in Nursing Homes and Personality Traits***

Relocating to nursing homes is a comparatively widespread major life event in late adulthood; for example, approximately 4–5% of German and US citizens over 65 years and 11% of Germans over 80 years live in nursing homes, which sums up to several million people in Europe and the US (Gaertner et al., 2019; National Academy of Medicine, 2010). Moving into a nursing home significantly alters various aspects of an older adult's life. It changes their living environment, roles, and status, thereby reshaping their social relationships, goals, and behaviors (Lan et al., 2020; Yong et al., 2021). Such changes in environment and social interactions can have lasting impacts on emotions, thoughts, and behaviors, potentially leading to personality changes (Quintus et al., 2021; van Zalk et al., 2020; Wrzus & Roberts, 2017). This may result in differences in Big Five personality traits between nursing home residents and those in private homes. Studies on young adults, who have temporarily relocated to different environments (i.e., other regions and daily contexts) suggest that movers undergo different personality and identity changes compared to non-movers (Borschel et al., 2019; Schubach et al., 2016; Zimmermann

& Neyer, 2013).

At the same time, it is possible that people differ in personality traits even before moving to nursing homes. For example, people with strong desires for privacy might want to stay within the privacy of their homes, whereas more open-minded and extraverted older adults might be more willing to move to nursing homes. Past research has demonstrated such selection effects and has shown, for example, that more open-minded and extraverted young adults were more likely to go abroad (Zimmermann & Neyer, 2013). Since many relocations to nursing homes are not fully voluntary and result from needing substantial care, further personality traits such as neuroticism and conscientiousness could contribute indirectly to living in nursing homes. For example, individuals with higher neuroticism and lower conscientiousness tend to report more health problems (e.g., Luo et al., 2023; Strickhouser et al., 2017), potentially leading up to needing nursing home care. While little research has examined this, one prospective study found that older adults with higher neuroticism reported more frequent healthcare use, while those with higher agreeableness and lower conscientiousness were more likely to enter nursing homes (Friedman et al., 2013). Accordingly, this study expects that people living in a nursing home will exhibit differences in the Big Five personality traits compared to older adults in private homes. Still, some of these potential differences could be linked to additional factors such as age, health, and socioeconomic status.

### ***3.1.2 Individual-Level Factors Related to Accommodation Type and Personality Traits***

Older adults' accommodation choices and personality traits are often related to a range of socioeconomic and health-related factors. These factors may act as confounders or explain

personality differences between older adults in different accommodation types. Therefore, when analyzing the associations between accommodation type and personality traits, it is crucial to account for these factors, as they are systematically related with both accommodation choices and personality (Rakhshani et al., 2022; Wundrack et al., 2021). Consequently, this study includes the following six key demographic and health factors in its analysis to minimize confounding bias and provide a clearer understanding of the association between accommodation type and personality traits.

**Age.** As people age, their care needs often increase, and functional decline may raise the likelihood of nursing home admission. The average age of nursing home residents typically ranges from 83 to 86 (Ikuta et al., 2024; Power et al., 2023). Age is also associated with changes in mean levels of personality traits; for example, the average levels of most traits (conscientiousness, extraversion, and agreeableness) tend to decline in later life (Bleidorn et al., 2022).

**Gender.** Women generally have longer life expectancies and a higher likelihood of outliving their spouses. As a result, they are more likely to live alone and, eventually, transition into long-term care facilities (Cohen-Mansfield & Wirtz, 2007; Luy & Minagawa, 2014). Gender differences in personality have also been recorded, with women typically scoring higher in neuroticism, agreeableness, and openness (Costa et al., 2001; Schmitt et al., 2008).

**Partnership status.** Being single, widowed, or without a partner may increase one's reliance on formal care services, which can accelerate the transition to a nursing home (Cohen-Mansfield & Wirtz, 2007; Himes et al., 2000). Conversely, spousal and family support can serve

as a buffer, and individuals in romantic relationships often show higher emotional stability and conscientiousness (Asselmann & Specht, 2020).

**Education level.** Higher education is generally associated with greater socioeconomic resources and improved health management, which can delay or reduce older people's need for institutional care (Akter et al., 2024). Additionally, education is positively linked to cognitive engagement and traits such as openness and conscientiousness (Todd & Zhang, 2020).

**Self-perceived health.** Perceptions of one's health may not always align with clinical diagnoses, yet nursing home residents tend to report poorer self-perceived health (Cohen-Mansfield & Wirtz, 2007). A decline in self-perceived health is often associated with lower extraversion and openness (Löckenhoff et al., 2012).

**Activity limitation.** Physical or cognitive impairments strongly predict nursing home admission (Yong et al., 2021). Empirical studies have also found that such limitations influence older adults' personality traits, contributing to lower extraversion and higher neuroticism (Chereches et al., 2023).

In summary, these factors may partially explain the association between accommodation type and personality traits. Therefore, in this study, these factors were included as key covariates in the propensity score matching (PSM) analysis. Furthermore, we examined whether personality differences between nursing home residents and those in private homes remain significant after adjusting for these variables.

### ***3.1.3 Cross-Regional Perspectives and Country-Level Factors***

Beyond individual-level factors, older adults' personality and the likelihood of

transitioning into a nursing home may also be influenced by broader country-level factors, such as sociocultural norms, national policies, and economic development. In Europe, countries differ in their long-term care infrastructure, public spending, and cultural attitudes toward family versus institutional care, reflecting variations in economic development and cultural traditions (Stolz et al., 2019). For instance, countries with extensive LTC resources may accommodate a larger proportion of relatively healthy nursing home residents, while countries with limited LTC resources may prioritize admissions for only the most severe cases (Fischer et al., 2022). Country-level differences not only influence the likelihood and timing of nursing home admissions but may also shape older adults' personality traits, as individuals from different countries and regions develop in distinct sociocultural environments (Allik & McCrae, 2004; Wundrack et al., 2021). Thus, it is necessary to consider country-environmental characteristics (e.g., national economic status, expenditures on nursing home facilities, and elderly care policies) as well as the role of regional differences when aiming for a comprehensive understanding of the association between accommodation type and personality. Yet, most existing research on the psychological traits of nursing home residents has been limited to single-country studies, predominantly conducted in the US and Australia, and lacks datasets that allow cross-country or cross-regional comparisons.

The Survey of Health, Ageing and Retirement in Europe (SHARE) dataset, a large cross-country panel dataset covering the European Union (EU) and Israel, provides comprehensive observations on the health, socioeconomic status, and social network of older adults and their partners (Börsch-Supan et al., 2013). Hence, this study uses the SHARE-Wave

7 dataset, which includes data from 25 countries. Using the geographic classification of European regions (Eastern, Northern, Southern, and Western Europe) defined by the United Nations Statistics Division (1999), we conduct regional comparisons to examine the association between accommodation type and personality traits among older adults and explore cross-regional similarities and differences. Furthermore, we investigate key country-level factors, including the number of LTC beds per 100,000 people aged 65 and over, the pension system (Kozuń-Cieślak & Zdrazil, 2021), public LTC expenditure as a percentage of GDP, and the Human Development Index (HDI; Sagar & Najam, 1998), to assess their moderating effects on the relationship between accommodation type and personality traits.

This multilevel, cross-national, and cross-regional approach provides a comprehensive framework for exploring personality patterns in diverse cultural and economic contexts. By integrating individual-level and country-level factors, this study aims to offer a more comprehensive understanding of how personality traits of older adults differ between nursing home residents and those living in private homes.

#### ***3.1.4 The Current Research***

At present, few studies have focused on late-life relocation and have primarily examined daily adjustment rather than personality traits (Lan et al., 2020; Yong et al., 2021). Given the limited knowledge on the impact of nursing home residency on personality in later life, this study utilizes a representative European sample (SHARE) to examine the association between accommodation type and personality traits. Additionally, we explore potential individual-level explanatory factors and conduct regional analyses across the EU to assess the role of country-

level moderators. Due to the limited number of individuals in the SHARE dataset who have undergone repeated personality assessments before and after moving into a nursing home, this study is unable to examine the longitudinal impact of such transitions (see Limitations section). Nevertheless, this study provides novel and significant insights into the personality traits of nursing home residents, an area that has been largely overlooked by personality research on old age, and offers directions for future research.

Three research questions guide the current study:

***RQ1:*** Do older people who live in nursing homes or in private homes differ in Big Five personality traits?

***RQ2:*** What demographic and health-related factors contribute to explaining the association between accommodation type and personality traits?

***RQ3:*** Do the associations between accommodation type and personality traits differ across European regions? Which country-level characteristics are associated with older people's accommodation preferences and personality traits?

## **3.2 Method**

We report all data-screening criteria and measures used in this study. See Supplementary Figure S3.1 for the sample selection flowchart. The preregistration (including any deviations), supplementary materials for the manuscript, and R scripts necessary to reproduce the results of this study are available at <https://osf.io/7zjs6/>.

### **3.2.1 Sample**

This study is a cross-sectional analysis of available data from Wave 7 of the Survey of

Health, Ageing and Retirement in Europe (SHARE), conducted in 2017 (Bergmann et al., 2019; Börsch-Supan et al., 2008). The final study sample ( $N = 48,826$ ) consists of older people aged 50 years and over ( $M_{\text{age}} = 69.28$ , 57.1% female) from 25 EU countries, including individuals living in nursing homes ( $N_{NH} = 528$ ) and private homes ( $N_{PH} = 48,298$ ). Of 528 participants in nursing homes, 213 older people moved from private homes to nursing homes within the past two years (i.e., between W6 and W7, with unknown date of relocation), 187 older adults were living in a nursing home during SHARE W6 and W7, and for another 128 older adults, their previous accommodation type was not reported. Table 3.1 reports further sample characteristics.

SHARE is a biennial longitudinal survey with data from 27 EU countries and Israel, which investigates the health status, demographic, socioeconomic, and social characteristics of older adults (aged  $\geq 50$  years) and their spouses. The survey collects data mainly through computer-assisted personal interviews (CAPI) and paper-based questionnaires, and is kept as nationally representative samples. Further details of the study and its protocol can be found in Börsch-Supan et al. (2013). SHARE-Wave 7 was approved by the Ethics Committee of the Max Planck Society. The data cannot be shared publicly but can be requested from <https://share-eric.eu>.

### 3.2.2 Measures

**Accommodation type.** The type of accommodation in which older people reside was recorded as a dichotomous variable (0 = private home; 1 = nursing home).

**Big Five personality traits.** The 10-item Big Five Inventory (BFI-10; self-rating scale) was used to assess the big five personality traits agreeableness, conscientiousness, extraversion,

neuroticism, and openness to experience (Rammstedt & John, 2007). The BFI-10 is a well-established personality inventory that measures each dimension using two items, which are answered on a 5-point scale (1 = does not apply to 5 = applies fully). Levinsky et al. (2019) conducted dimensionality analyses on data from SHARE Wave 7, showing high consistency ( $C = .94$ ) between the theoretical Big Five personality structure and actual scores from the SHARE Wave 7 data.

**Individual-level covariates.** Following theoretical and empirical rationales outlined in the introduction, we included the following six individual-level covariates: chronological age, gender (0 = male, 1 = female), and partnership status (0 = not single, 1 = single). Education was coded according to the International Standard Classification of Education (ISCED-97; United Nations Educational, Scientific and Cultural Organization, 1999) framework, ranging from 0 (pre-primary education) to 6 (second stage of tertiary education) (United Nations Educational, 1999). Health variables included participants' self-perceived health status (SPHUS), which was measured on a five-point scale from 1 (excellent) to 5 (poor) (Ware & Gandek, 1998), and activity limitation level, assessed using the Global Activity Limitation Index (GALI), coded as 1 (severely limited) to 3 (not limited) (Robine et al., 2003). For more details on these measures, refer to Börsch-Supan et al. (2013).

**Country-level and regional indicators.**

**Four geographic regions.** The 25 countries included in Wave 7 of SHARE were grouped into four geographic regions (United Nations Statistics Division, 1999): Northern Europe ( $k = 5$  countries, e.g., Denmark, Sweden), Eastern Europe ( $k = 5$  countries, e.g., Poland,

Hungary), Southern Europe (k = 8 countries, e.g., Spain, Italy), and Western Europe (k = 7 countries, e.g., France, Germany). The number of participants per country ranged from 2 to 4,357 (for frequencies per country, see Supplementary Table S3.2).

***Country-level long-term care indicators.*** We retrieved data on the number of LTC beds per 100,000 adults aged 65+, public LTC expenditure as a percentage of GDP, and the type of pension system (1=Bismarck, 2 = Beveridge; Kozuń-Cieślak & Zdrazil, 2021).

***Human Development Index (HDI).*** To approximate a country's overall socioeconomic development level, we used the HDI, which integrates information on education, health, income, and general living conditions (Sagar & Najam, 1998). HDI scores for all countries included in SHARE-Wave 7 were obtained from the Human Development Reports database, provided by the United Nations Development Programme (2013). Scores ranged from .81 for Bulgaria to .95 for Switzerland, with higher scores indicating higher level of national development.

For additional details and data sources, see Supplementary Table S3.10.

### ***3.2.3 Data Analysis Strategy***

Data processing and screening were conducted using IBM SPSS Statistics (version 27.0), while all subsequent analyses were performed in R (version 4.2.2; R Core Team, 2022) using RStudio (Version 2022.12.0; RStudio Team, 2022). Statistical analyses and visualizations were primarily conducted using the MatchIt, lme4, lmerTest, and ggplot2 packages. We addressed our three main research questions through the following sequential analyses: descriptive and correlation analyses, propensity score matching (PSM), linear regression analyses, and hierarchical linear modeling (HLM).

**Descriptive statistics and correlation analyses (pre-matching).** We first examined the initial dataset ( $N = 48,826$ ,  $N_{NH} = 528$ ) to assess sample characteristics, evaluate potential differences between nursing home and private residents, and explore preliminary correlations among the study variables. Specifically, we calculated means, standard deviations, and bivariate correlations for demographic factors (age, gender, education, partnership), health indicators (self-perceived health, activity limitation), Big Five personality traits, and accommodation type. Additionally, we computed the effect size (Cohen's  $d$ ) for differences in Big Five personality traits between nursing home residents and private residents.

**Propensity score matching (PSM).** To create a private home sample comparable to the nursing home group, we conducted propensity score matching (Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1983). Specifically, we estimated the probability of nursing home residency using logistic regression, incorporating six key individual-level covariates. We then computed propensity scores based on the predicted log-odds (logit) and implemented nearest-neighbor matching with a caliper width of  $0.1 \times SD$  of the logit distance. Based on real-world prevalence rates of NH and PH residents, we set the matching ratio to 1:91. Since PSM requires complete data, missing values in covariates were imputed using the estimated data provided by the SHARE-W7 dataset (De Luca et al., 2015; De Luca & Rossetti, 2019). After matching, we assessed covariate balance between NH and PH groups and retained the matched dataset ( $N_{post-match} = 18,640$ ,  $N_{NH} = 526$ ).

Using the matched sample, we conducted both simple and multiple linear regression analysis to assess the impact of accommodation type before and after controlling for individual-

level covariates.

**Analyzing country-level factors using hierarchical linear modelling (HLM).** Finally, we conducted region-specific regression analyses across four European regions (Eastern, Northern, Southern, and Western Europe) to examine potential regional differences in the relationship between accommodation type and personality traits. Given the nested data structure (individuals nested within countries), we employed hierarchical linear modelling (HLM; Hoffman, 2015) to better capture country-level influences and control for cross-national differences. Following best-practice recommendations (Aguinis et al., 2013; Hoffman & Walters, 2022), we tested random slopes and retained them only if likelihood ratio tests indicated significantly improved model fit. In more complex models (Models 3 and 4), including random slopes led to convergence issues (boundary problems). To ensure model stability, we therefore included only random intercepts.

**Model 1 (Null Model)** estimated the proportion of variance in each personality trait attributable to country-level differences using intraclass correlation (ICC).

$$\text{Trait}_{ij} = \gamma_{00} + u_{0j} + e_{ij}$$

**Model 2** added accommodation type (NH vs. PH) as a fixed effect.

$$\text{Trait}_{ij} = \gamma_{00} + \gamma_{10}(\text{AccommodationType}_{ij}) + u_{0j} + e_{ij}$$

**Model 3** introduced cross-level interactions with region (Eastern, Northern, Southern, and Western Europe) to assess whether the accommodation-personality link varies across broad regional groupings.

$$\begin{aligned} \text{Trait}_{ij} = & \gamma_{00} + \gamma_{10}(\text{Accommodation Type}_{ij}) + \sum \gamma_{01\kappa}(\text{Region Dummy}_j) \\ & + \sum \gamma_{11\kappa}(\text{Accommodation Type}_{ij} \times \text{Region Dummy}_j) + u_{0j} + e_{ij} \end{aligned}$$

**Model 4** incorporated country-level indicators (LTC beds, pension system, LTC expenditure, HDI), examining whether these country-level factors moderate the effect of accommodation type on personality. We standardized continuous country-level predictors for interpretability.

$$\begin{aligned} \text{Trait}_{ij} = & \gamma_{00} + \gamma_{10}(\text{Accommodation Type}_{ij}) + \gamma_{01}(\text{LTC beds}_j) + \gamma_{02}(\text{Pension System}_j) \\ & + \gamma_{03}(\text{LTC Expenditure}_j) + \gamma_{04}(\text{HDI}_j) + \gamma_{11}(\text{Accommodation Type}_{ij} \times \text{LTC beds}_j) \\ & + \gamma_{13}(\text{Accommodation Type}_{ij} \times \text{LTC Expenditure}_j) + \gamma_{14}(\text{Accommodation Type}_{ij} \times \text{HDI}_j) \\ & + u_{0j} + e_{ij} \end{aligned}$$

### 3.3 Results

#### 3.3.1 Differences between Nursing Home and Private Home Residents in Personality Traits

Table 3.1 presents the means, standard deviations, and correlations for all the main variables. These pre-matching descriptive results indicate differences between nursing home and private home residents, particularly in age and health-related variables (Table 3.1). Concerning RQ1, the bivariate correlations between accommodation type and personality traits were small ( $|r| < .10$ ), with nursing home residency significantly associated with lower conscientiousness ( $r = -.02$ , 95% CI =  $[-.03, -.01]$ , Cohen's  $d = -.19$ ) and extraversion ( $r = -.01$ , 95% CI =  $[-.02, -.00]$ ; Cohen's  $d = -.12$ ). Given these initial differences between people living in nursing homes and private homes regarding age and health, we confirmed that applying PSM to reduce selection bias for comparing personality traits was appropriate.

**Table 3.1***Descriptive Information and Bivariate Correlations among Study Variables (Pre-matching)*

Variable	<i>M (SD)</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age	69.28 (9.46)											
2. Gender	0.57 (0.49)	-.02**										
3. Partnership	0.29 (0.45)	.25**	.20**									
4. Education	2.84 (1.49)	-.21**	-.07**	-.08**								
5. Self-perceived health	3.24 (1.03)	.23**	.03**	.12**	-.19**							
6. Activity limitation	2.37 (0.74)	-.21**	-.04**	-.12**	.09**	-.56**						
7. Accommodation type	0.01 (0.10)	.13**	.02**	.13**	-.03**	.05**	-.08**					
8. Agreeableness	3.68 (0.81)	.04**	.05**	.03**	.00	-.07**	.04**	.01				
9. Conscientiousness	4.11 (0.79)	-.03**	.04**	-.05**	.01*	-.11**	.09**	-.02**	.16**			
10. Extraversion	3.48 (0.93)	-.05**	.02**	-.03**	.06**	-.10**	.04**	-.01**	.16**	.17**		
11. Neuroticism	2.66 (1.01)	-.02**	.12**	-.01	-.11**	.18**	-.12**	.00	-.20**	-.12**	-.22**	
12. Openness	3.30 (0.96)	-.08**	.05**	.00	.23**	-.07**	.03**	-.01	.02**	.08**	.14**	-.07**

*Note.*  $N = 48,826$  ( $N_{NH} = 528$ ,  $N_{PH} = 48,298$ ). Accommodation Type: 0 = private home, 1 = nursing home. Gender: 0 = male, 1 = female. Partnership:

0 = not single, 1 = single. Education: 0 = pre-primary education to 6 = second stage of tertiary education. Self-perceived health: 1 = excellent to 5

= poor. Activity limitation: 1 = severely limited to 3 = not limited. \* $p < .05$ ; \*\* $p < .01$ .

**3.3.2 Role of demographic and health-related factors in explaining associations between accommodation type and personality traits**

Table 3.2 demonstrates the Propensity Score Matching efficacy and shows the means of demographic and health-related factor in nursing home and private home residents pre- and post-matching. Overall, the standardized mean differences (SMD) for individual-level covariates and propensity scores between NH group and PH group were substantially reduced post-matching, with most achieving an SMD of approximately 0.00-0.02. Figure 3.1 visually illustrates the improved covariate balance. Additionally, Supplementary Figure S3.2 presents the distribution of propensity scores before and after matching for both groups (NH vs. PH). These results indicate that the matched samples achieved adequate covariate balance and were suitable for further regression analyses.

**Table 3.2**

*Balance Table for Propensity Score Matching Analysis*

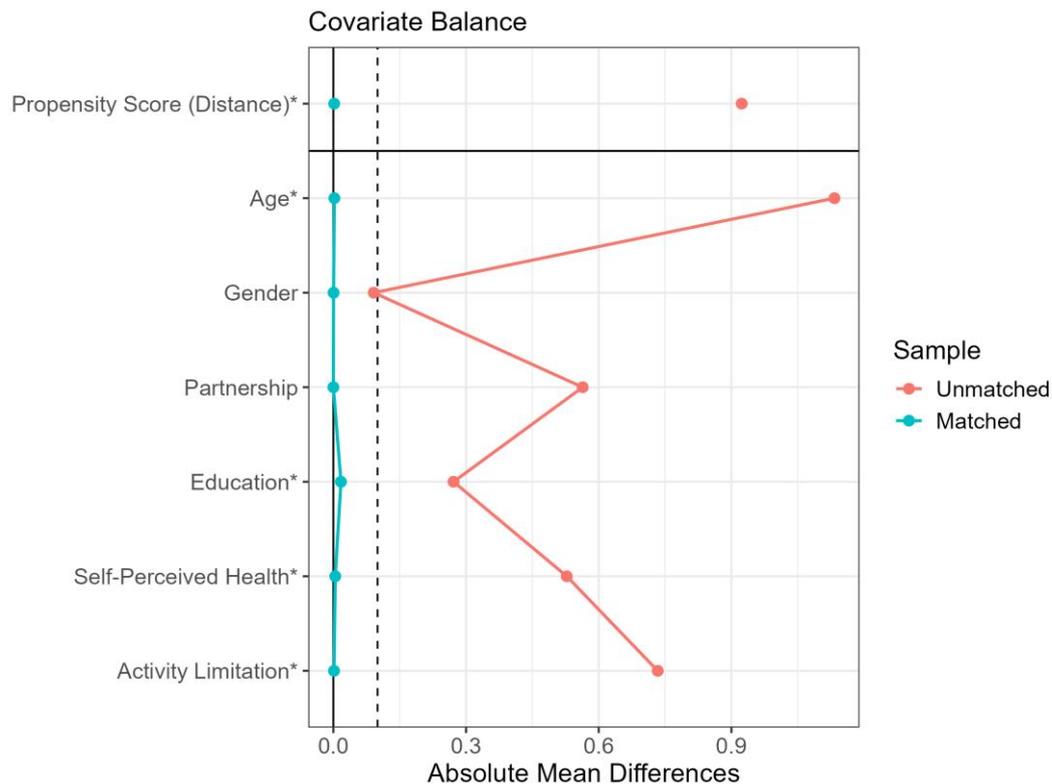
Variable	Pre-Match (N = 48,826)			Post-Match (N = 18,640)		
	W. Mean (PH)	W. Mean (NH)	SMD	W. Mean (PH)	W. Mean (NH)	SMD
Propensity score (distance)	0.01	0.07	0.92	0.07	0.07	0.00
Age	69.15	81.17	1.13	81.12	81.14	0.00
Gender	0.57	0.66	0.19	0.66	0.66	-0.00
Partnership	0.28	0.85	1.57	0.85	0.85	0.01
Education	2.84	2.42	-0.27	2.40	2.42	0.02
Self-perceived health	3.23	3.74	0.53	3.74	3.75	0.00
Activity limitation	2.37	1.77	-0.73	1.78	1.78	0.00

*Note.* N = 18,640 ( $N_{NH} = 526$ ,  $N_{PH} = 18,114$ ). W. Mean = weighted mean; SMD = standardized mean difference. Gender: 0 = male, 1 = female. Partnership: 0 = not single, 1 = single. Education:

0 = pre-primary education to 6 = second stage of tertiary education. Self-perceived health: 1 = excellent to 5 = poor. Activity limitation: 1 = severely limited to 3 = not limited.

**Figure 3.1**

*Covariate Balance Plot (Pre- and Post-Match)*



*Note.* The vertical dashed line indicates an SMD value of 0.1—a benchmark commonly used to denote acceptable covariate balance. SMD values below this threshold suggest minimal differences between groups, illustrating the improvement in balance after matching.

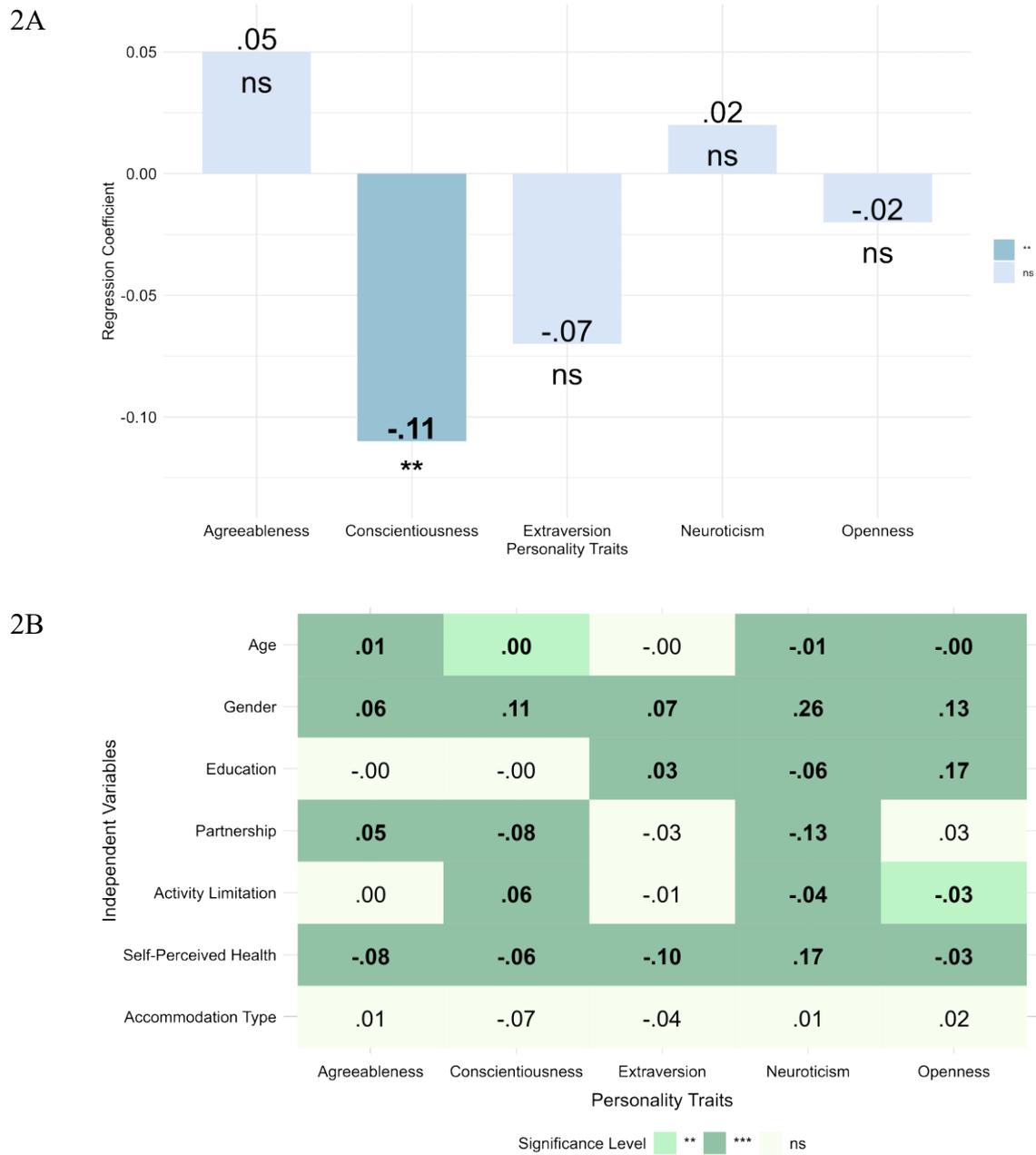
To re-address RQ1 how older people living in nursing homes and private homes differ from each other on personality traits after accounting for socioeconomic and health-related factors, and thus RQ2, we conducted linear regression analyses of how accommodation type predicted the Big Five personality traits, as well as multiple regression analyses controlling for

key individual-level covariates. The regression results (Figure 3.2A) were consistent with the correlation analysis, indicating that nursing home residents reported significantly lower conscientiousness ( $\beta = -.11, p < .001$ ). Prior to the multiple regression analyses, we conducted a Variance Inflation Factor (VIF) test, confirming the absence of multicollinearity among the variables (VIF values for all explanatory variables were below 1.6 for all examined personality traits, with detailed results in Supplementary Document Table S3.6).

Multiple regression results (Figure 3.2B) showed that after additionally controlling for all relevant covariates (age, gender, partner status, education level, self-perceived health, and activity limitation), the effect of accommodation type on personality traits weakened and no longer significantly predicted any Big Five trait. Additionally, the regression analyses highlighted the effects of covariates on Big Five traits, particularly gender and self-perceived health, both of which were significantly associated with all personality traits. Full regression results are presented in Supplementary Tables S3.5 and S3.7.

**Figure 3.2**

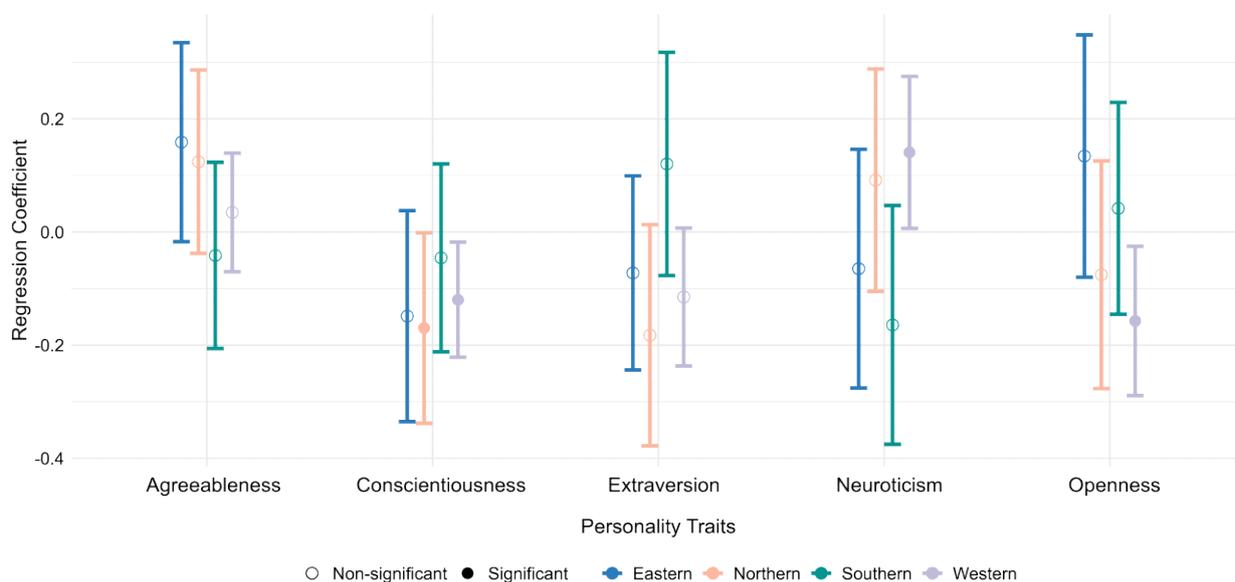
*Regression of (A) Accommodation Type and (B) Accommodation Type and Covariates on Personality Traits*



Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

### ***3.3.3 Country-Level Differences in the Associations between Accommodation Type and Personality Traits***

To explore RQ3, we conducted separate regression analyses for four European regions (Eastern, Northern, Southern, and Western Europe) to examine regional differences in the association between accommodation type and Big Five traits. The results were summarized in a comprehensive plot for visual cross-regional comparisons. Figure 3.3 illustrates that the relationship between accommodation type and personality traits varied across regions. Specifically, in Western Europe, accommodation type, that is, living in nursing homes was significantly associated with lower conscientiousness, lower openness, and higher neuroticism. In Northern Europe, accommodation type was only linked to significantly lower conscientiousness. In Eastern and Southern Europe, accommodation type did not explain individual differences in Big Five traits. These findings suggest that the effect of accommodation type on personality traits varies by region (detailed regression coefficients are reported in Supplementary Table S3.8).

**Figure 3.3***Regional Differences in the Association between Accommodation Type and Personality Traits*

*Note.* Sample sizes varied by region due to population differences: Eastern Europe ( $n = 2,555$ ,  $N_{NH} = 76$ ), Northern Europe ( $n = 4,007$ ,  $N_{NH} = 119$ ), Southern Europe ( $n = 5,878$ ,  $N_{NH} = 87$ ), and Western Europe ( $n = 6,200$ ,  $N_{NH} = 247$ ). Non-significant effects are represented by open circles, while significant effects ( $p < .05$ ) are represented by filled circles.

For formally testing regions as moderators of the associations between accommodation type and personality traits in Hierarchical Linear Models, we introduced dummy-coded regional variables (Eastern, Northern, and Southern Europe, with Western Europe as the reference). Interactions between region and accommodation type were specified to assess whether the relationship between accommodation type and personality differed by region (Tables 3.3 and 3.4). For extraversion, the main effect of accommodation type was negative and marginally significant ( $\hat{\gamma} = -0.12$ , 95% CI = [-0.24, 0.00],  $p = .053$ ). Compared to Western Europe, Northern Europe was associated with higher extraversion ( $\hat{\gamma} = 0.29$ , 95% CI = [0.07, 0.50]), whereas

Eastern and Southern Europe did not significantly differ from Western Europe. For the remaining four traits, several main effects of region emerged (e.g., lower agreeableness and conscientiousness in Eastern Europe compared to Western Europe,  $ps < .01$ ). However, the interactions between accommodation type and region were non-significant ( $ps > .05$ ) for all traits. Overall, these results suggest that while baseline personality trait levels vary across European regions, the relationship between accommodation type and personality does not significantly differ by region.

Finally, in Model 4, we incorporated the country-level indicators LTC beds, pension system, LTC expenditure, and HDI, and tested their cross-level interactions with accommodation type to explore whether country-level characteristics moderated the relationship between accommodation type and traits. Results (Tables 3.5 and 3.6) showed that after controlling for main effects of country-level indicators, nursing home residency remained significantly associated with lower extraversion ( $\hat{\gamma} = -0.20$ , 95% CI = [-0.32, -0.07]). Importantly, LTC beds and HDI significantly moderated this association. Specifically, LTC beds availability positively moderated the negative association ( $\hat{\gamma} = 0.26$ , 95% CI = [0.09, 0.43]), indicating that in countries with greater LTC bed availability, the negative association between nursing home residency and extraversion was weaker. Conversely, HDI negatively moderated this relationship ( $\hat{\gamma} = -0.19$ , 95% CI = [-0.32, -0.06]), suggesting that in countries with higher human development levels, nursing home residency was more strongly associated with lower extraversion. For other traits, nursing home residency remained significantly negatively associated with conscientiousness ( $\hat{\gamma} = -0.15$ , 95% CI = [-0.25, -0.04]), though country-level

indicators did not moderate this relationship. The association between nursing home residency and neuroticism ( $\hat{\gamma} = 0.13$ , 95% CI = [0.00, 0.27]) was attenuated by LTC beds availability ( $\hat{\gamma} = -0.18$ , 95% CI = [-0.36, -0.00]). And overall, pension system and LTC expenditure did not significantly moderate the relationship between accommodation type and personality traits (Tables 3.5 and 3.6).

**Table 3.3**

*Multilevel Results for Accommodation Type-by-Region (Eastern / Northern / Southern) Predicting Personality Traits (Part I: Agreeableness, Conscientiousness, and Extraversion)*

Parameter	Agreeableness			Conscientiousness			Extraversion			
	$\hat{\gamma}$	95% CI	<i>t</i>	$\hat{\gamma}$	95% CI	<i>t</i>	$\hat{\gamma}$	95% CI	<i>t</i>	<i>p</i>
Intercept, $\gamma_{00}$	3.70	[3.55, 3.84]	16.48	4.19	[4.11, 4.28]	17.33	3.44	[3.31, 3.57]	17.79	< .001
Accommodation type, $\gamma_{10}$	0.02	[-0.08, 0.13]	18571.94	-0.12	[-0.23, -0.02]	18556.30	-0.12	[-0.24, 0.00]	18534.60	.053
Eastern, $\gamma_{01}$	-0.38	[-0.62, -0.14]	18.23	-0.22	[-0.37, -0.08]	18.49	-0.21	[-0.44, 0.01]	19.31	.076
Northern, $\gamma_{02}$	0.20	[-0.04, 0.43]	18.62	-0.15	[-0.29, -0.01]	18.20	0.29	[0.07, 0.50]	19.57	.019
Southern, $\gamma_{03}$	0.00	[-0.20, 0.20]	17.35	-0.10	[-0.21, 0.02]	17.96	-0.06	[-0.24, 0.13]	18.63	.547
Accommodation type × Eastern, $\gamma_{11}$	0.10	[-0.11, 0.31]	13002	-0.01	[-0.23, 0.21]	17081.97	0.02	[-0.22, 0.27]	15210.53	.867
Accommodation type × Northern, $\gamma_{12}$	0.07	[-0.11, 0.25]	8598.88	-0.06	[-0.25, 0.12]	12800.83	-0.07	[-0.29, 0.14]	10481.09	.500
Accommodation type × Southern, $\gamma_{13}$	-0.09	[-0.30, 0.12]	3154.49	0.00	[-0.21, 0.21]	6458.11	0.12	[-0.12, 0.36]	3976.65	.332

*Note.* Western region was the reference category in the analyses.  $\hat{\gamma}$  = estimated coefficient; CI = confidence interval.

**Table 3.4**

*Multilevel Results for Accommodation Type-by-Region (Eastern / Northern / Southern) Predicting Personality Traits (Part 2: Neuroticism and Openness)*

Parameter	Neuroticism				Openness			
	$\hat{\gamma}$	95% CI	<i>t</i>	<i>p</i>	$\hat{\gamma}$	95% CI	<i>t</i>	<i>p</i>
Intercept, $\gamma_{00}$	2.63	[2.46, 2.81]	20.42	< .001	3.42	[3.27, 3.57]	19.34	< .001
Accommodation type, $\gamma_{10}$	0.12	[-0.01, 0.25]	18578.99	.069	-0.15	[-0.27, -0.02]	18489.08	.021
Eastern, $\gamma_{01}$	0.20	[-0.09, 0.49]	22.54	.197	-0.26	[-0.51, -0.01]	21.14	.059
Northern, $\gamma_{02}$	-0.33	[-0.61, -0.04]	23.01	.036	-0.13	[-0.37, 0.12]	21.53	.331
Southern, $\gamma_{03}$	0.23	[-0.01, 0.47]	21.50	.076	-0.28	[-0.49, -0.07]	20.31	.016
Accommodation type × Eastern, $\gamma_{11}$	-0.20	[-0.46, 0.06]	14292.36	.139	0.22	[-0.04, 0.48]	14679	.092
Accommodation type × Northern, $\gamma_{12}$	0.01	[-0.22, 0.24]	10644.38	.947	0.13	[-0.10, 0.35]	10284.27	.270
Accommodation type × Southern, $\gamma_{13}$	-0.18	[-0.45, 0.08]	3835.37	.171	0.13	[-0.12, 0.38]	4012.66	.321

*Note.* Western region was the reference category in the analyses.  $\hat{\gamma}$  = estimated coefficient; CI = confidence interval.

**Table 3.5**

*Multilevel Results for Accommodation Type × Country-Level Predictors Predicting Personality Traits (Part 1: Agreeableness, Conscientiousness, and Extraversion)*

Parameter	Agreeableness			Conscientiousness			Extraversion					
	$\hat{\gamma}$	95% CI	<i>t</i>	$\hat{\gamma}$	95% CI	<i>t</i>	$\hat{\gamma}$	95% CI	<i>t</i>	<i>p</i>		
Intercept, $\gamma_{00}$	3.60	[3.49, 3.70]	16.35	< .001	4.10	[4.02, 4.17]	16.86	< .001	3.45	[3.33, 3.58]	22.14	< .001
Accommodation type, $\gamma_{10}$	0.05	[-0.05, 0.16]	1577.55	.328	-0.15	[-0.25, -0.04]	3025.84	.007	-0.20	[-0.32, -0.07]	1929.92	.002
LTC beds, $\gamma_{01}$	0.08	[-0.04, 0.19]	21.19	.195	0.05	[-0.03, 0.14]	20.79	.218	-0.02	[-0.16, 0.11]	28.83	.750
Pension system, $\gamma_{02}$	0.25	[0.05, 0.44]	20.52	.022	0.01	[-0.14, 0.15]	20.13	.928	-0.03	[-0.27, 0.21]	27.90	.819
LTC expenditure, $\gamma_{03}$	0.03	[-0.11, 0.18]	18.10	.654	-0.05	[-0.16, 0.05]	18.18	.347	0.04	[-0.14, 0.21]	24.58	.701
HDI, $\gamma_{04}$	0.05	[-0.06, 0.15]	17.67	.406	0.02	[-0.06, 0.09]	17.64	.680	0.07	[-0.05, 0.20]	24.04	.267
Accommodation type × LTC beds, $\gamma_{11}$	0.05	[-0.10, 0.19]	419.86	.523	0.08	[-0.06, 0.22]	670.75	.258	0.26	[0.09, 0.43]	539.20	.002
Accommodation type × Pension system, $\gamma_{12}$	-0.10	[-0.33, 0.13]	466.68	.402	-0.04	[-0.26, 0.18]	731.44	.742	0.11	[-0.16, 0.38]	599.01	.436
Accommodation type × LTC expenditure, $\gamma_{13}$	-0.04	[-0.20, 0.12]	945.90	.658	0.01	[-0.15, 0.17]	1643.72	.896	0.01	[-0.18, 0.20]	1161.64	.939
Accommodation type × HDI, $\gamma_{14}$	-0.02	[-0.13, 0.09]	5009.39	.713	-0.10	[-0.21, 0.22]	8734.3	.094	-0.19	[-0.32, -0.06]	5928.71	.004

*Note.*  $\hat{\gamma}$  = estimated coefficient; CI = confidence interval.

**Table 3.6***Multilevel Results for Accommodation Type × Country-Level Predictors Predicting Personality Traits (Part 2: Neuroticism and Openness)*

Parameter	Neuroticism					Openness				
	$\hat{\gamma}$	95% CI	<i>t</i>	<i>p</i>	$\hat{\gamma}$	95% CI	<i>t</i>	<i>p</i>		
Intercept, $\gamma_{00}$	2.65	[2.52, 2.79]	21.11	<.001	3.26	[3.17, 3.16]	19.34	<.001		
Accommodation type, $\gamma_{10}$	0.13	[0.00, 0.27]	1935.55	.048	-0.07	[-0.20, 0.05]	2877.18	.246		
LTC beds, $\gamma_{01}$	0.00	[-0.15, 0.15]	27.72	.987	0.11	[0.01, 0.22]	24.03	.050		
Pension system, $\gamma_{02}$	0.05	[-0.21, 0.31]	26.80	.720	-0.02	[-0.20, 0.16]	23.28	.843		
LTC expenditure, $\gamma_{03}$	-0.09	[-0.29, 0.10]	23.53	.359	-0.19	[-0.33, -0.06]	20.94	.010		
HDI, $\gamma_{04}$	-0.11	[-0.24, 0.04]	23.00	.158	0.14	[0.04, 0.23]	20.35	.011		
Accommodation type × LTC beds, $\gamma_{11}$	-0.18	[-0.36, -0.00]	536.69	.048	-0.05	[-0.21, 0.12]	661.53	.589		
Accommodation type × Pension system, $\gamma_{12}$	-0.24	[-0.53, 0.05]	609.05	.108	0.14	[-0.12, 0.40]	746.60	.299		
Accommodation type × LTC expenditure, $\gamma_{13}$	0.17	[-0.03, 0.37]	1149.30	.095	0.05	[-0.13, 0.24]	1574.34	.576		
Accommodation type × HDI, $\gamma_{14}$	0.06	[-0.08, 0.20]	5520.49	.412	-0.06	[-0.20, 0.07]	8325.55	.372		

*Note.*  $\hat{\gamma}$  = estimated coefficient; CI = confidence interval.

### **3.4 Discussion**

With the aggravation of population aging, an increasing number of older people are moving to nursing homes for better care, especially when family or friends cannot provide such care. Data from the 2019 EU-22 survey show that 30.9% of people aged 65 and over living in private households want to move to long-term care facilities (Social Protection Committee and the European Commission, 2021). Moreover, accessibility to LTC for older adults varies significantly across the EU, caused by unequal national socioeconomic development, differences in public spending on LTC as well as pension systems (Stolz et al., 2019). This study reports on the associations between accommodation type and the Big Five traits and other potential explanatory factors among older adults in the EU, and provides a preliminary exploration of the regional manifestations and correlates of the association between accommodation type and Big Five traits. It offers a basis and direction for further research on the effects of late-life relocation on personality development.

#### ***3.4.1 Personality Trait Differences when Living in Nursing Homes***

Our initial correlation analyses demonstrate that older people's accommodation type associates with conscientiousness and extraversion. Further regression analyses based on propensity-score matched samples revealed that nursing home residents had lower conscientiousness compared to those living in private homes, but this difference was no longer significant after relevant demographic factors were included. This suggests that differences in personality traits between nursing home residents and private home residents may primarily reflect demographic and health disparities rather than socialization effects resulting from

nursing home residency. Living in a nursing home means a shift in social roles, wherein older adults transition from managing their own household and daily life to becoming passive recipients of care. Prior research has shown that such role transitions—particularly those related to responsibility and work (i.e., household chores)—contribute to lower conscientiousness in older adults (Asselmann & Specht, 2021; Löckenhoff et al., 2009; Schwaba & Bleidorn, 2019). However, advanced age, severe health issues, and activity limitations are often primary reasons for nursing home admission. This suggests that for most nursing home residents, the shift from “caregiver” to “care recipient” may have occurred before their relocation. Consequently, lower conscientiousness observed among nursing home residents may be an amplification of preexisting traits rather than a direct consequence of the nursing home environment.

Interestingly, when incorporating country-level predictors into multilevel models, we found significant small negative effects of nursing home residency on conscientiousness and extraversion. One possible explanation is that hierarchical models reduce unexplained within-country heterogeneity, thereby better capturing cross-national differences (Hoffman & Walters, 2022). This approach can account for subtle institutional environmental effects—such as well-equipped facilities and the professionalism of caregivers—that may restrict daily activities, or reduce social engagement, consequently influencing conscientiousness and extraversion (Quintus et al., 2021). In summary, while individual-level characteristics play a dominant explanatory role, residual associations between nursing home residency and certain traits may persist, becoming more apparent in a multilevel framework.

These results address our first two research questions. Further longitudinal studies are

necessary to explore the causes and timing of personality differences between nursing home and private home residents, to obtain a complete understanding of the effects of relocating to nursing homes on personality development. We will also discuss these issues as directions for future research.

### ***3.4.2 Personality Traits of Nursing Home Residents in Different EU Regions***

Our third research question examined whether the association between accommodation type and personality varied across major European regions and whether country-level factors moderated this relationship. Regional regression analyses produced inconsistent patterns, with significant associations primarily observed in Western Europe but not in Southern or Eastern Europe. However, when transitioning to a more robust HLM framework, cross-level interactions between region and accommodation type were no longer significant. This discrepancy suggests that regional regression analyses may be influenced by small nursing home subsamples within specific regions and unaccounted-for cross-national heterogeneity within these broad geographic clusters (Aguinis et al., 2013).

More notably, we found that country-level resources and socioeconomic conditions—particularly the availability of LTC beds and the HDI—significantly moderated the association between accommodation type and certain personality traits. In countries with greater LTC bed availability, the association between nursing home residency and lower extraversion weakened, while the positive association with higher neuroticism was attenuated. This may reflect increased flexibility and better staff-to-resident ratios in well-resourced long-term care settings, allowing for higher-quality care that enhances residents’ emotional stability and provides

greater opportunities for social engagement. Conversely, in countries with higher HDI, nursing home residency was associated with even lower values in extraversion, suggesting that “hardware abundance” does not necessarily translate into sufficient “soft support” (e.g., social interaction and psychological care). These findings highlight the need for high HDI countries to complement investments in LTC infrastructure with robust social support systems to mitigate the potential negative effects of nursing home residency on personality traits.

These cross-level interactions align with prior research indicating that personality traits are often shaped by broader societal contexts (e.g., Bleidorn et al., 2013), with country-level factors closely related to variations in the Big Five personality traits. Additionally, our findings provide preliminary empirical support for the necessity of conducting cross-national and cross-cultural studies when examining the relationship between personality and life events, particularly those influenced by cultural and social environments.

### ***3.4.3 Limitations and Future Directions***

The current study analyzed personality differences among people living in nursing or private homes with cross-national, large sample data from 25 European countries (SHARE). The findings are therefore not limited to a specific country and one type of long-term care system, but generalize to populations with different economic and cultural backgrounds. However, several limitations must be acknowledged. First, although SHARE is a longitudinal study, personality traits were assessed only in Waves 7–9. Unfortunately, tracking nursing home residents over time faces the challenge of high attrition rates, especially in the group of nursing home residents. Additionally, due to the COVID-19 pandemic, SHARE experienced substantial

participant loss in Wave 8, again particularly among nursing home residents. According to statistics, only 15 nursing home residents participated in at least two surveys and reported on their personality traits. This limited sample size precludes robust longitudinal analyses of changes in residential status and personality over time, restricting our ability to draw causal inferences. As we discussed in the introduction, personality differences might have existed before adults moved to nursing homes, and reciprocal effects are also possible.

Second, personality traits in SHARE were assessed using the BFI-10, a brief measure that has demonstrated acceptable psychometric properties in large-scale surveys (Rammstedt et al., 2021). According to the methodological report of SHARE-W7, although the pooled data show a strong congruence ( $C = .94$ ) with an idealized Big Five structure, formal tests of measurement invariance using confirmatory factor analysis and exploratory structural equation modeling indicated that the BFI-10 does not achieve metric invariance consistently across countries (Bergmann et al., 2019). Furthermore, although the questionnaire was administered in each country's official language, these discrepancies suggest that cultural and linguistic differences may affect response patterns, potentially biasing the results of our cross-national comparisons. Future research could follow up on these initial findings, examine the longitudinal effects of transitioning to nursing homes on personality traits, in-depth understanding the potential role of physical health, daily activities, stress, and social relationships. Moreover, such research should include larger samples of nursing home residents (i.e., oversampling this population group), use more comprehensive and culturally validated personality measures, and explicitly test for measurement invariance when conducting cross-national comparisons.

Despite these limitations, these findings are of both scientific and societal relevance. Most existing longitudinal panel studies of older adults, such as SOEP, MIDUS, and the Household, Income, and Labor Dynamics in Australia (HILDA) survey, exclude individuals living in nursing homes due to high sample dropout rates and tracking difficulties. Here, we provide several possible directions and insights for further research. Additionally, existing studies focusing on nursing home residents have largely overlooked changes in personality traits. Our findings provide the first indication of the association between late-life relocation and personality traits, yet further longitudinal research is needed to explore the mechanisms how relocating to nursing homes affects personality development in late adulthood, as well as the onset and persistence of the effects. According to the TESSERA framework, it is inferred that some of the changes brought about by moving to nursing homes may be transient and frequently perceived by older adults at the beginning of relocation, and we suggest that the change trajectory of personality traits can be better captured by using ecological momentary assessment at the beginning of relocation (Quintus et al., 2021; Wrzus & Roberts, 2017).

Additionally, according to the niche-picking principle and personality's selection effect (Neyer et al., 2014; Roberts & Caspi, 2003), people tend to select environments that maintain their existing personality traits, and changes in personality traits resulting from people's anticipation and preparation for a move may occur prior to the move, so longitudinal studies need to measure older people's personality traits in multiple settings before and after the relocation. Moreover, people's reactions to life events tend to change according to a pattern of selection, anticipation, immediate post-event year and gradual socialization, and this range of

68

reactions influences personality development (Asselmann & Specht, 2020; Denissen et al., 2019; Wundrack et al., 2021). Therefore, in addition to observing personality changes before and in the early post-temporal period, relatively long-term follow-up tests should be established to understand the duration of the effects of relocation on personality development.

Finally, different people will choose different ways of coping and adapting to the same life event (Schwaba & Bleidorn, 2019). One way to quantify this developmental heterogeneity is to consider the full range of moderating factors where possible. The current findings provide a number of starting points. Firstly, adequate attention is given to individual-level moderators such as age, gender, health problems, and daily activity constraints, applying appropriate modelling techniques (e.g., latent growth curve models) to separate interpersonal differences from intra-personal processes. Secondly, by giving due consideration to country-level moderators, such as the cultural context in which individuals are living, the economic and social development level of their region or country, etc., further cross-country and/or cross-regional studies can help to increase the generalizability of the findings. These future directions will help advance our understanding of the complex relationship between late-life relocation and personality traits.

### **3.5 Conclusion**

In summary, we examined the association between accommodation type and personality traits in late life and explored a set of individual and country-level factors that may explain differences in personality traits across accommodation types. Through these analyses, we extend previous research on later life events on personality development, with late-life

relocation as one understudied event, that is likely to increase in future years. The initial findings and factors examined provide directions and insights for further studies on the impact of relocation to nursing homes on the personality traits of older adults.

## CHAPTER 4

### Temporary Shake and Long-term Shift: Different Types of Late-Life Relocation Shape

#### Older Adults' Personality and Life Satisfaction

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#### Abstract

Late-life relocation is common yet its impact on personality remains unclear. Using data from the Health and Retirement Study (HRS), we analyzed two relocation types with repeated assessments of Big Five personality traits and life satisfaction. The community sample included 4,238 movers and 12,028 matched controls; mover's mean baseline age was 69.1 years and observations spanned 2006 to 2022. The nursing home sample included 645 movers and 13,396 controls; movers' mean baseline age was 81.0 years and observations spanned 2006 to 2014. We balanced 13 baseline covariates between movers and controls using propensity score overlap weighting and fit event-centered piecewise linear mixed-effects models to capture and distinguish pre-event selection effects, the immediate jump of relocation, and post-event linear or nonlinear changes. Results showed that community movers differed from controls before relocating, yet the relocation led to no substantially different personality development patterns, only a positive jump and stronger increase in life satisfaction compared to matched controls. By contrast, nursing home entrants showed marked personality changes before the relocation that differed distinctively from matched controls. Also, the post-relocation jump as well as socialization were substantial, specifically for neuroticism, openness, conscientiousness, and life satisfaction. Community relocation appears psychologically mild and beneficial for long-term life satisfaction, whereas nursing home admission marks a high-risk transition with substantial and enduring personality change alongside decreased life satisfaction. Findings delineate boundary conditions on late-life personality plasticity and highlight the need for multiphase psychosocial support during institutional transitions.

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## 4.1 Introduction

Many people relocate several times throughout their lives. This often occurs in young adulthood and again in old age, when people move closer to family members, to a more age-friendly community or into a nursing home. How do changes in the environment contribute to changes in people, that is, their personality traits? Or do we always “take ourselves with us” as the saying suggests? Based on previous research on lifespan personality in developmental contexts, the current study examines selection and socialization effects of two relocation types, which occur frequently in late adulthood: community relocation and nursing home admission. Other life events (e.g., marriage, unemployment, widowhood) have been studied extensively with respect to personality development (Bühler et al., 2023); yet so far, knowledge about late-life relocation is scarce despite its frequency.

Personality traits are typically defined as relatively stable patterns of thoughts, feelings, and behaviors (Lucas & Donnellan, 2011). In recent years, increasing evidence has shown that personality continues to develop across the lifespan, including later adulthood (Bleidorn et al., 2022; Wagner et al., 2016). Several researchers argue that major life events are key drivers of personality development (e.g., contextual theories; Bleidorn et al., 2013). Life events can be interpreted as “a categorical variable that indicates the occurrence of a qualitative change in life circumstances” (Denissen et al., 2019, p. 612), usually accompanied by changes in social status, roles, and relationships. These new roles and environments often bring new behavioral expectations and environmental demands, prompting individuals to adjust thoughts, feelings, and behavior, which may eventually alter personality trajectories (B. W. Roberts, 2018; Roberts

& Jackson, 2008; Wrzus & Roberts, 2017). Although research on life events in early adulthood (e.g., marriage, parenthood) is relatively well established (Asselmann & Specht, 2020), research on later life remains scarce and mostly focuses on rather normative transitions such as retirement and widowhood (Recksiedler et al., 2018; Schwaba & Bleidorn, 2019). This restriction limits a more complete understanding of how different event types relate to personality development and hinders the evaluation and improvement of theories of personality development in later adulthood.

Late-life relocation is a common and influential non-normative life event among older adults. It typically involves systematic changes in the residential environment, social networks, access to resources, and availability of support services, all of which may contribute to substantial changes in personality and well-being. At present, only a few studies have examined the association using cross-sectional data (Sun et al., 2023) or have investigated how personality characteristics predict relocation (Verspeek et al., 2024). However, longitudinal studies that describe dynamics before relocation, immediately after relocation, and adaptations over the following years are currently missing. Moreover, life satisfaction, the global subjective evaluation of life, typically varies with life events somewhat more than personality traits (Bühler et al., 2023). Thus, examining both personality traits and life satisfaction jointly provided a comprehensive analysis of people's psychological response to this common late-life event. Such knowledge could inform theories of lifespan personality development and provide practical advice for people planning or undergoing late-life relocation.

To address this gap, we analyzed a representative U.S. sample of older adults from the

Health and Retirement Study (HRS) spanning 16 years, using an event-centered prospective design to systematically examine changes in the Big Five personality traits and life satisfaction before and after relocation. To capture heterogeneity, we distinguished two types: community relocation, that is, moving from one private residence to another within a community, and nursing home admission, that is, moving from a private residence into a nursing home. We focus on a three-phase transition structure: pre-relocation, reflecting selection and anticipation; event-time change, reflecting the immediate response; and post-relocation, describing long-term adaptation and socialization. By comparing movers with matched non-movers over several years, we are able to identify event-related changes and conceptually distinguish between temporary shakes and long-term shifts. Through these analyses, this study extends previous work on personality development in later life and provides a first comprehensive account of how late-life relocation relates to personality change and continuity.

#### ***4.1.1 Late-Life Relocation and Personality Traits***

Although older adults usually report stronger community attachment and tend to prefer “aging in place” (Badawy et al., 2019), statistical data indicate that late-life relocation is a relatively common life event. For example, approximately 5% of people aged 65 and older in the United States relocate to a different residence each year (U.S. Census Bureau, 2016). Recent event-related research has emphasized the critical role of event valence and type in determining psychological outcomes. Even within the same life domain, different subtypes of events may differ significantly in their direction, strength, and duration of effects (Bleidorn et al., 2018; Luhmann et al., 2021; Schwaba et al., 2023). For relocation research, moves have been

classified by voluntariness (voluntary vs. involuntary; Brownie et al., 2014; Sun et al., 2020) or by purpose and residential type (community vs. nursing home relocation; Lam et al., 2023; Sergeant et al., 2010). This study adopts the latter distinction, allowing more direct comparisons of differences in institutional environment intensity, situational control, and person–environment fit within a unified theoretical framework.

**Study part 1: community relocation and personality development.** Community relocation typically involves moving from one private residence to another within the broader community. Such relocations are often voluntary and driven by lifestyle considerations, such as downsizing, moving closer to family, or seeking a more comfortable living environment (Cho & Smith, 2023; Sergeant et al., 2010). However, community relocation disturbs social networks and necessitates rebuilding social contacts, imposing core developmental challenges for older adults (Badawy et al., 2019; Wrzus et al., 2013). Based on the social convoy model (Antonucci et al., 2014; Antonucci & Akiyama, 1987) and continuity theory (Atchley, 1989), older adults prefer to maintain stable social ties. Therefore, disruptions in social ties caused by relocation may have serious consequences for older adults, potentially influencing personality development, particularly traits related to sociability and emotional stability (Mund & Neyer, 2016; Pfund & Allemand, 2024).

When older adults relocate to a new community and have to rebuild their social networks, the transition may stimulate adaptive changes in personality. Specifically, we hypothesize that community relocation may increase extraversion and agreeableness as individuals strive to integrate into new communities and establish new relationships. Evidence

from other life transitions supports this view, for example, in new environments (e.g., studying abroad; Zimmermann & Neyer, 2013), individuals often exhibit increased extraversion and agreeableness during preparation and initial transition stages to establish belonging. Also, relocation tends to be stressful for older people, disrupting their continuity and sense of security (Wiyono et al., 2019). In the short term, leaving familiar environments and routines often triggers anxiety, sadness, or irritability, which are all signs of increased neuroticism. An earlier cross-sectional study on involuntary late-life relocation showed that a high proportion of older people experienced severe anxiety and depression after relocation (Sun et al., 2020). Based on this work, we further hypothesize that neuroticism will show a short-term increase after community relocation, as movers adjust to new routines and reconfigure their social networks.

**Study part 2: nursing home admission and personality development.** Part 2 focuses on the more intense transition associated with nursing home admission. Admission to nursing homes is typically involuntary transitions, often triggered by significant declines in health and functional independence (Sury et al., 2013; Yong et al., 2021). This event usually represents a fundamental life change, characterized by the loss of established social roles (e.g., from caregiver to care recipient) and a sharp increase in environmental constraints (e.g., structured daily routine and reduced autonomy; Brownie et al., 2014; Verspeek et al., 2024). According to role transition theory (Roberts et al., 2005) and interpersonal adaptation theory (van Vianen, 2018), this transition may affect personality traits related to autonomy and self-regulation. Reduced need for planning and organizing daily activities may lead to a decline in conscientiousness during the nursing home transition. Restricted social environments and

limited engagement opportunities for nursing home residents may contribute to a decline in extraversion. Additionally, role withdrawal, dependence on caregivers, and unfamiliarity with the new environment may contribute to a sustained increase in neuroticism (Caspi & Moffitt, 1993). Taken together, we hypothesize that nursing home admission will be associated with decreases in extraversion and conscientiousness, alongside increases in neuroticism.

#### ***4.1.2 Methodological Strategies to Examine Longitudinal Relocation Effects***

To approximate causal explanations from observational longitudinal data such as HRS, this study followed recent methodological guidelines for causal analysis in life event research (e.g., Lawes et al., 2025). We constructed a multilayered methodological framework to ensure validity and robustness of the research findings.

First, personality changes may occur before relocation, as people usually anticipate and prepare for the transition. The personality–relationship transactions perspective emphasizes the dynamic interdependence between personality and events (Bühler et al., 2024; Neyer & Asendorpf, 2001). Previous studies show that personality traits can predict both the occurrence and direction of life events, including residential environment choice (i.e., selection effects; Bühler et al., 2024; Jackson & Wright, 2024). At the same time, life events are considered to drive personality trait changes “from the bottom up” via short-term changes in states and daily behaviors (i.e., socialization effects; Asselmann & Specht, 2020, 2021; Denissen et al., 2019). Therefore, a full understanding of the relationship between relocation and personality development requires examining all phases before and after the event. To capture this complexity, we employed piecewise linear mixed models (PLMMs; Lawes et al., 2025), an

event-centered framework that decomposes relocation effects into distinct components: (a) pre-relocation trajectories reflecting potential dynamic selection effects; (b) the immediate “jump” at the event; and (c) post-relocation adaptation trajectories.

Second, personality development after relocation may follow a nonlinear trajectory. Previous studies have shown that deviations from trait baselines induced by life events may offset over time (Ormel et al., 2017). This “shock–recovery” process is typically reflected in curvilinear patterns, such as a U-shaped recovery curve. To test this possibility, our analytic strategy included an examination of nonlinear adaptation. Specifically, we estimated and compared two nested PLMMs: one with only a linear long-term effect and another adding a quadratic term for relocation duration and its interaction with group. We used likelihood-ratio tests to determine the best-fitting model of long-term adaptation in personality following relocation.

Third, to better separate relocation effects from normative personality development, we established a matched control group (non-movers). Personality development is shaped not only by relocation but also by age-related biological changes and other contextual factors, making careful adjustment for confounders essential in observational research. Traditional propensity score matching (PSM) is often used for this purpose, but discarding many unmatched samples can weaken statistical power and estimation precision (Lawes et al., 2025; Li, 2013). To overcome this limitation, we adopted the propensity score weighting (PSW), specifically overlap weighting, as advocated by Lawes et al. (2025). This method assigns case-specific weights to create a balanced pseudo-population without excluding any participants (Desai &

Franklin, 2019). As Li et al. (2018) noted, overlap weighting offers several advantages over matching: (a) it targets the subgroup with the greatest covariate overlap (i.e., those who could realistically either relocate or remain), improving interpretability of effect estimates; (b) it minimizes the asymptotic variance of the average treatment effect among balancing weights, resulting the most statistically efficient estimates; and (c) when propensity scores are estimated by logistic regression, overlapping weights can achieve precise mean balance across covariates, supporting unbiased estimation.

In both study parts, we included 13 theoretically informed covariates measured at the last pre-relocation wave because they were associated with both the exposure (i.e., relocation) and the outcomes (i.e., Big Five traits and life satisfaction). Specifically, age and gender predict relocation, especially into nursing homes, and are also related to average trait levels and trajectories (Bleidorn et al., 2022; Gaugler et al., 2007). Health and functional status are strong reasons of relocation and closely correlate with both life satisfaction and personality (Mueller et al., 2018; Verspeek et al., 2024). Family and social resources also matter: being partnered and having children reduce the likelihood of institutionalization or change the timing and direction of relocation (Noel-Miller, 2010) and contribute to trait stability and higher life satisfaction (Asselmann & Specht, 2020; Chen et al., 2021). Education and economic resources correlate with life satisfaction, and receipt of Social Security benefits (highly prevalent among U.S. older adults) serves as an indicator of institutional care access (Costa-Font et al., 2017). Ethnicity and region (urbanicity) shape relocation patterns and post-move quality of life; controlling for them reduces structural confounding (Riley et al., 2016; Thomeer et al., 2014).

Religious affiliation is robustly associated with higher agreeableness, conscientiousness, and emotional stability, as well as greater life satisfaction (Gebauer et al., 2014; Lodi-Smith & Roberts, 2007). Finally, veteran status provides access to a distinct set of residential and long-term care options through the VA system (e.g., Community Living Centers, contracted nursing homes), which influences relocation probability and destination (Intrator et al., 2021). Following best practices for causal inference in life event research, we included only pre-event covariates that could plausibly affect both exposure and outcome, using directed acyclic graphs (DAGs) to avoid conditioning on mediators or consequences of the outcome.

Fourth, to facilitate effective comparisons of development trajectories, we employed an event-time alignment strategy (cf. Krämer & Rodgers, 2020; van Scheppingen & Leopold, 2020). Using the average relocation time among movers as reference, we created a “pseudo-relocation point” for each non-mover. This “artificial time” places all participants on a common relative time axis, enabling direct and fair comparisons of their development trajectories around the (pseudo) event (Lawes et al., 2025).

Finally, our analytic framework was designed to relax the strict assumptions of traditional difference-in-differences (DiD) models. Traditional DiD requires that pre-event trajectories between treatment and control groups be strictly parallel. However, given potential personality selection effects, assuming parallel pre-event trends is inconsistent with the theoretical framework of this study and with empirical evidence from other life events (e.g., Bühler et al., 2024). Thus, the PLMM framework employed in this study was designed specifically not to require reliance on this parallel trend assumption. By including the

interaction between relocation group variables and pre-event time, we can statistically test and quantify any possible pre-event trajectory differences, providing a robust and unbiased estimate of the net relocation effect. Moreover, this framework not only provides core between-group comparisons (the net effect of relocation), but also enables precise estimation of within-group changes, offering a comprehensive description of personality development before and after relocation.

#### ***4.1.3 The Present Study***

Building on the theoretical and methodological considerations outlined above, the present study has two overarching aims: (a) to examine the trajectories of change in the Big Five personality traits and life satisfaction surrounding community relocation and nursing home relocation, covering the pre-relocation, immediate post-relocation, and longer-term adaptation phases within a unified life event framework; and (b) to demonstrate and evaluate an event-centric piecewise modeling strategy designed to address challenges of selection bias and dynamic trajectory identification. Without presupposing the outcomes, we propose the following directional hypotheses:

##### **Study part 1: community relocation**

***H1.*** Older adults who relocate between community dwellings will show increases in extraversion, agreeableness, and neuroticism, as reflected in both within-person changes over time and between-group differences compared to non-movers.

***H2.*** Changes in extraversion, agreeableness, and neuroticism will be smaller among older adults with longer relocation durations compared to those with shorter durations.

**Study part 2: nursing home admission**

*H3.* Older adults who transition into nursing homes will show decreases in extraversion and conscientiousness, and increases in neuroticism, as reflected in both within-person changes over time and between-group differences compared to remain community-dwelling older adults.

*H4.* The effects of nursing home admission on extraversion, conscientiousness, and neuroticism will decrease as the duration of nursing home residence increases.

**4.2 Method****4.2.1 Transparency and Openness**

All hypotheses and analyses were preregistered before data access (Open Science Framework: <https://osf.io/jnesz/>). The full preprocessing and statistical code (R, version 4.2.3), together with annotated output files, are available on the same OSF project page to enable full reproducibility. After accessing the data, we learned that Hypotheses 2a and 2b could not be tested because insufficient data on relocation distance and frequency were available (see Supplemental Table S4.1, which explains the deviation for the preregistration). The study relied exclusively on secondary data from the Health and Retirement Study (HRS; Sonnega et al., 2014; Sonnega & Smith, 2017). The HRS protocol was approved by the University of Michigan Institutional Review Board; no additional ethical approval was required for the present secondary analysis. Deidentified HRS data can be obtained free of charge upon application at <https://hrs.isr.umich.edu/about>.

**4.2.2 Data Source and Overall Design**

The HRS is a nationally representative longitudinal panel of U.S. adults aged 50 years

and older, launched in 1992 with biennial core interviews (Sonnega et al., 2014; Sonnega & Smith, 2017). Beginning in 2006, the Leave-Behind Questionnaire (LBQ) assessed psychosocial constructs, including the Big Five traits and life satisfaction. We therefore drew on the 2006–2022 public-release waves. Because the HRS discontinued follow-up of institutionalized respondents after 2014, analyses involving nursing home admission (Part 2) were restricted to 2006–2014 (five waves of follow-up), whereas community relocation (Part 1) could be tracked through 2022 (nine waves). An event-centered, piecewise design aligned each participant’s timeline such that  $T = 0$  marked the assessment year of the first observed relocation (or a matched reference time for non-movers).

#### 4.2.3 *Participants*

**Study part 1: community movers.** Panel data were extracted from Waves 8 to 16. Inclusion criteria were: (a) age  $\geq 50$  years; (b) at least one valid assessment of any Big Five trait or life satisfaction; (c) no nursing home stay reported in any wave; and (d) availability of the HRS sampling-cluster identifier. Of 21,880 eligible respondents, we classified individuals as community movers if they reported a residential change between community dwellings at any wave. We excluded participants lacking a valid relocation date, lacking pre-move observations (dependent variables), or (for controls) lacking complete residential histories. The final sample comprised 4,238 community movers and 12,028 non-movers (total  $N = 16,266$ ).

**Study part 2: nursing home movers.** Panel data were extracted from Waves 8 to 12 and processed analogously to part 1. Inclusion criteria were: (a) age  $\geq 50$  years; (b) at least one valid assessment of any Big Five trait or life satisfaction; (c) no community relocation in any

wave; and (d) a valid HRS sampling-cluster identifier. Of 14,247 eligible participants, those who reported a first nursing home admission were labeled nursing home movers. We excluded participants without their admission date, without pre-admission observations on the dependent variables, or (for controls) with incomplete residential histories. The resulting sample contained 645 nursing home movers and 13,396 non-movers (total  $N = 14,041$ ).

#### 4.2.4 Measures

##### **Event indicators.**

**Community relocation (study part 1).** In this study, community relocation was defined as any transition between two private residences that did not involve entry into a nursing or other institutional facility. At every biennial core interview, respondents were asked whether they had changed their primary residence since the previous wave (or “in the last two years”) and, if so, to report the month and year of the move. A move was coded as a community relocation when the respondent first answered “yes” during the study period and the new residence was explicitly identified as non-institutional. For analytic clarity, we created a dichotomous summary variable (1 = moved at least once between 2006 and 2022, 0 = never reported a community move) to index overall relocation status across the study waves.

**Nursing home admission (study part 2).** Nursing home admission was defined as first entering a nursing home during the observation period, 2006–2014. At each biennial interview, HRS respondents were asked, “Are you now living in a nursing home or other long-term care facility? (0 = No, 1 = Yes)?”, and, if so, to specify the month and year of admission. This approach follows previous HRS-based research that defines nursing home admission as

ongoing residence in a facility that provides 24-hour assistance and supervised care (Verspeek et al., 2024).

**Dependent variables.**

**Personality traits.** The Big Five traits (neuroticism, extraversion, agreeableness, conscientiousness, and openness) were assessed with the Midlife Development Inventory adjective checklist (MIDI; Lachman & Weaver, 1997), widely used in large adult surveys. Respondents rated 26 trait descriptors from 1 (“not at all”) to 4 (“a lot”). Extraversion, agreeableness, and conscientiousness were each represented by five adjectives; neuroticism by four; openness by seven. Trait scores were computed as item means, with higher values indicating stronger endorsement. Across all waves in this study, Cronbach’s  $\alpha$  ranged from .66 to .80.

**Life satisfaction.** Life Satisfaction was measured with the five-item Satisfaction with Life Scale (SWLS; Diener et al., 1985). Items (e.g., “The conditions of my life are excellent”) were rated from 1 (“strongly disagree”) to 7 (“strongly agree”) and averaged. Cronbach’s  $\alpha$  ranged from .87 to .89 across waves.

**Covariates.** The following baseline covariates were included in the propensity score models: Age in years; gender (0 = female, 1 = male); years of education, marital status (0 = other, 1 = partnered); number of living children, veteran status (0 = no, 1 = yes); race/ethnicity (1 = White/Caucasian, 2 = Black/African American, 3 = other); region (1 = urban, 2 = suburban, 3 = exurban); self-rated health (1 = poor to 5 = excellent); number of limitations in activities of daily living (ADL, range 0–6) and instrumental ADL (range 0–5); receipt of Social Security

benefits (0 = no, 1 = yes); and religious affiliation (1 = Protestant, 2 = Catholic, 3 = Jewish, 4 = none/no preference, 5 = other).

#### 4.2.5 Analytic Strategy

All analyses were pre-specified in the study preregistration and conducted in R (R Core Team, 2022) using the packages *mice*, *WeightIt*, *cobalt*, *lme4*, *lmerTest*, and *multcomp*, among others.

**Multiple imputation.** Because propensity score weighting is incompatible with missing values, we performed multiple imputation for baseline covariates using predictive mean matching ( $m = 20$ ). All subsequent propensity score analyses were then conducted on the first of these complete datasets. Baseline refers to the last measurement wave before (pseudo) relocation.

**Propensity-score overlap weighting (PSW-OW).** For each part, separate logistic models predicted relocation status from the 13 covariates listed above (demographic, socioeconomic, and health information). Propensity scores were estimated within the first imputation dataset and converted to overlap weights (Li et al., 2018). Overlap weighting gives greatest influence to observations whose covariate profiles are well represented in both groups and down-weights non-overlapping cases, yielding near-exact balance on weighted means. Balance was evaluated using absolute standardized mean differences (SMDs) and effective sample size (ESS); SMDs  $< 0.10$  were considered acceptable.

**Piecewise linear mixed models (PLMMs).** To examine the trajectories of personality and life satisfaction surrounding relocation, we applied a series of PLMMs to each outcome,

separately for Study Part 1 and Study Part 2. Time ( $T$ , in years) was centered at each respondent's first recorded relocation. For non-movers, the reference point ( $T = 0$ ) was defined as the mean relocation wave of movers in the same study part to account for period effects in longitudinal analyses (Study Part 1: 2014.23; Study Part 2: 2011.22). Four piecewise variables captured the trajectory: (a) *TimePre* (negative values = years before relocation, 0 = at and after relocation), (b) a binary Post Relocation Dummy (PostDummy, 0 = before relocation, 1 = after relocation), (c) *TimePost* (0 = before relocation, positive values = years after relocation), and (d) *TimePostSq* (quadratic trend for post-relocation change). Each time term was moderated by the group variable *Mover* (0 = Control, 1 = Mover), producing a fully specified two-group piecewise model.

Two nested random-intercept models were fit for every outcome and for each part:

***Model 1 (Linear Model):***

$$Y_{ij} = \beta_0 + \beta_1 \text{TimePre}_{ij} + \beta_2 \text{PostDummy}_{ij} + \beta_3 \text{TimePost}_{ij} + \beta_4 \text{Mover}_i + \beta_5 (\text{TimePre}_{ij} \times \text{Mover}_i) + \beta_6 (\text{PostDummy}_{ij} \times \text{Mover}_i) + \beta_7 (\text{TimePost}_{ij} \times \text{Mover}_i) + u_{0j} + e_i$$

***Model 2 (Quadratic Model):***

$$Y_{ij} = \beta_0 + \beta_1 \text{TimePre}_{ij} + \beta_2 \text{PostDummy}_{ij} + \beta_3 \text{TimePost}_{ij} + \beta_4 \text{Mover}_i + \beta_5 (\text{TimePre}_{ij} \times \text{Mover}_i) + \beta_6 (\text{PostDummy}_{ij} \times \text{Mover}_i) + \beta_7 (\text{TimePost}_{ij} \times \text{Mover}_i) + \beta_8 \text{TimePostSq}_{ij} + \beta_9 (\text{TimePostSq}_{ij} \times \text{Mover}_i) + u_{0j} + e_i$$

where  $u_{0i} \sim \mathcal{N}(0, \tau_{00})$  and  $e_{ij} \sim \mathcal{N}(0, \sigma^2)$ .

Model 1 directly tested between-group differences (movers vs. non-movers) via interactions reflecting dynamic selection effects ( $\beta_4, \beta_5$ ), the “jump” at relocation ( $\beta_6$ ), and the

linear post-relocation slope ( $\beta_7$ ). Model 2 added an interact quadratic term ( $\beta_9$ ) to capture acceleration or deceleration as residence lengths. Positive values indicate higher scores for movers than non-movers; negative values indicate lower scores or faster decline. Pre-move differences, relocation jumps, linear post-move slopes, and—when present—quadratic curvature together describe the full trajectory of personality or life satisfaction around each relocation type.

Both models were estimated by restricted maximum likelihood (REML; maximum number of function calls =  $2 \times 10^5$ ). Likelihood-ratio tests (LRTs) compared Model 1 and Model 2 for each outcome; quadratic terms were retained only when  $\alpha < .05$  and Model 2 showed a lower AIC. Because pilot runs with random slopes failed to converge for several outcomes, all final models include a random intercept only. We report unstandardized coefficients ( $B$ ) with 95% bootstrap confidence intervals (1,000 resamples), unless noted otherwise.

To interpret the internal structure of trajectories among movers, we conducted a series of planned linear contrasts (post hoc tests). These tests estimated the following within-group effects among movers: the immediate intercept shift at the time of relocation (jump =  $\beta_2 + \beta_6$ ), the linear post-relocation slope ( $\beta_3 + \beta_7$ ), and, when applicable, the quadratic post-relocation curvature ( $\beta_8 + \beta_9$ ).

### 4.3 Results

#### 4.3.1 Study Part 1: Community Relocation

##### Baseline characteristics and propensity score weighting (PSW-OW).

**Table 4.1**

*Description and Balance of Baseline Covariates (Pre-Relocation)*

Baseline Covariates	Community Movers ( <i>M/SD</i> )	Control Group ( <i>M/SD</i> )	SMD
Age	65.05 (10.31)	69.05 (10.96)	0.38
Gender	0.37 (0.48)	0.45 (0.50)	0.16
Education	12.95 (3.02)	12.50 (3.21)	0.14
Marital Status	0.52 (0.50)	0.65 (0.48)	0.29
Ethnicity	1.38 (0.64)	1.32 (0.59)	0.11
Region	1.68 (0.82)	1.77 (0.85)	0.11
Number of Children	3.12 (2.09)	3.06 (2.03)	0.03
Veteran Status	0.15 (0.35)	0.21 (0.41)	0.16
Religion	1.72 (1.12)	1.65 (1.00)	0.07
Social Security	0.83 (0.38)	0.84 (0.36)	0.04
Self-Rated Health	3.07 (1.09)	3.04 (1.10)	0.04
ADL	0.38 (1.01)	0.45 (1.13)	0.06
IADL	0.26 (0.73)	0.30 (0.84)	0.06

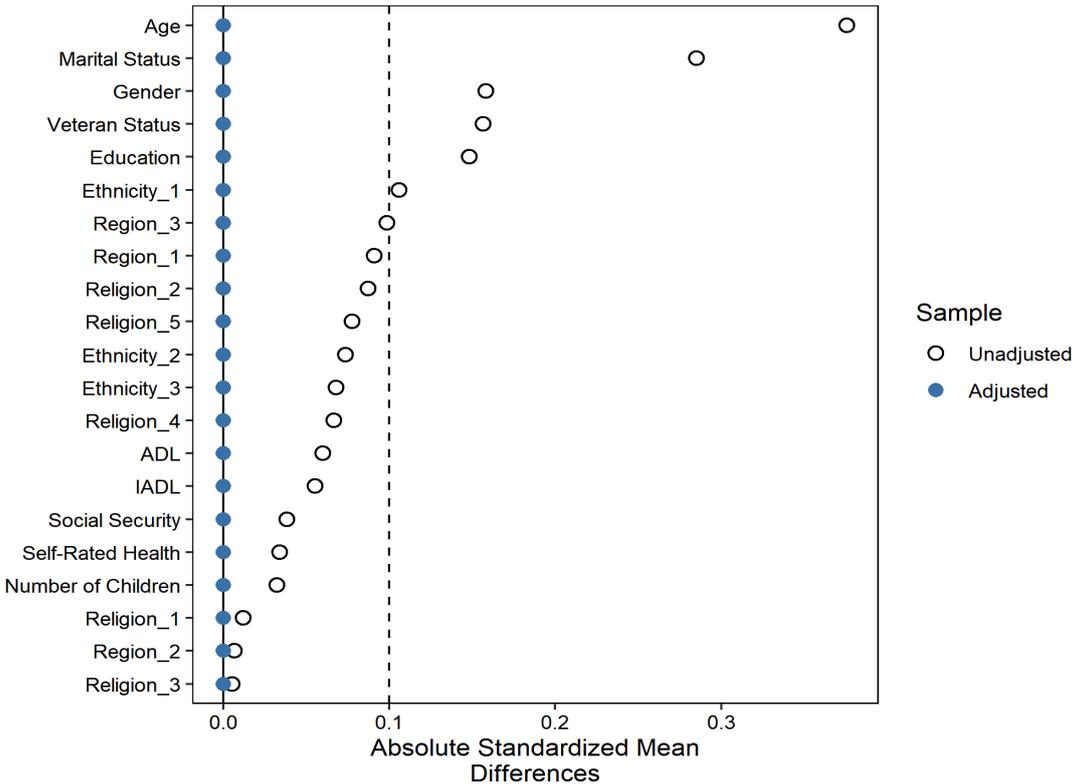
*Note.*  $N = 16,266$  (Community movers = 4,238; Control group = 12,028). Means are unweighted (proportions for binaries). SMD = absolute standardized mean difference.

For Study Part 1, the analytic sample included 16,266 participants (4,238 community movers; 12,028 controls). Table 4.1 shows unweighted means (or proportions for binary variables) and standardized mean differences (SMDs) for all baseline covariates. At baseline (i.e., the last wave prior to [pseudo] relocation), movers were on average younger than controls (SMD = 0.38) and less likely to be married (SMD = 0.29). Smaller imbalances were observed for veteran status, gender, and education, whereas other covariates showed minimal differences (all SMDs  $\leq 0.11$ ).

We applied propensity score overlap weighting to balance these baseline covariates between movers and controls. After weighting, all absolute SMDs fell below 0.10, indicating near-exact balance across groups (see Figure 4.1, Love plot). The weighted effective sample size (ESS) was 14,307, retaining 88.0% of the original sample size ( $N = 16,266$ ). This indicates that balance was achieved without substantial loss of precision and supports the robustness of the subsequent PLMM analyses.

**Figure 4.1**

*Love Plot: Covariates Balance with PSW-OW*



*Note.* Each dot is a covariate (or category indicator for multi-category variables). The dashed line marks  $SMD = 0.10$ .

### **Piecewise linear mixed models (PLMMs).**

To test our hypotheses, we conducted a series of PLMMs for community relocation. The best-fitting model for each outcome was selected via Likelihood-ratio tests (LRTs). Table 4.2 presents unstandardized coefficients ( $B$ ) and 95% confidence intervals (CIs) for the final models, and Figure 4.2 depicts the predicted trajectories.

***Pre-relocation trajectories and selection effects.*** We first tested pre-relocation group differences to assess selection effects. As shown in Table 4.2, movers and non-movers differed at the time when movers relocated ( $T = 0$ , see row “Baseline Difference”,  $\beta_4$ ). Movers scored higher in neuroticism ( $B = 0.075$ , [0.053, 0.098]), extraversion ( $B = 0.045$ , [0.025, 0.066]), agreeableness ( $B = 0.047$ , [0.029, 0.065]), and openness ( $B = 0.081$ , [0.061, 0.101]), but lower in life satisfaction ( $B = -0.385$ , [-0.444, -0.332]). We also observed small but significant differences in pre-event changes (Table 4.2, row Pre-slope Difference  $\beta_5$ ) for neuroticism ( $B = 0.008$ , [0.005, 0.011]), extraversion ( $B = 0.003$ , [0.000, 0.005]), conscientiousness ( $B = -0.005$  [-0.008, -0.003]), and life satisfaction ( $B = -0.040$ , [-0.047, -0.032]), indicating that before the relocation movers changed somewhat less in neuroticism, extraversion, and life satisfaction compared to controls, but decreases in conscientiousness were slightly more pronounced (Figure 4.2). These results demonstrate the presence of selection effects of people who relocate to another community later.

***Immediate effects of relocation (Jump at  $T = 0$ ).*** We next evaluated the immediate effects of relocation (intercept jump at  $T = 0$ , Table 4.2 row “Immediate Jump Difference”,  $\beta_6$ ). Compared with controls, movers showed a significant but small difference in the jump in

conscientiousness ( $B = 0.029$ , [0.013, 0.047]), and a substantial jump in life satisfaction ( $B = 0.097$ , [0.042, 0.148]). As demonstrated in Figure 4.2 and Table 4.2, differences in jumps in conscientiousness were due to immediate decreases among non-movers ( $B = -0.028$ ,  $p < .001$ ), whereas movers indeed showed a jump in life satisfaction (Jump = 0.119,  $p < .001$ ). These findings suggest small immediate shocks associated with relocation.

***Post-relocation trajectories and long-term adaptation.*** Finally, we examined whether post-relocation changes were linear or nonlinear. LRTs indicated that quadratic models only provided a better fit for neuroticism ( $\chi^2(2) = 7.32$ ,  $p < .05$ ) and extraversion ( $\chi^2(2) = 7.08$ ,  $p < .05$ ; see Table S4.2). For neuroticism, movers showed a more negative post-event linear slope than controls ( $B = -0.012$ , [-0.020, -0.003]). The between-group difference (mover–control quadratic) was not statistically reliable, but the within-mover curvature was small but significant (quadratic = 0.001,  $p < .05$ ; Figure 4.2). The results showed a shallow U-shape with an initial decline followed by stabilization and a slight rebound, paralleling the pattern of non-movers. For extraversion, both the linear between-group difference ( $B = -0.016$ , [-0.023, -0.009]) and the quadratic difference ( $B = 0.002$ , [0.001, 0.002]) were significant. This pattern indicates a somewhat sharper initial decline among movers, followed by deceleration and a mild rebound, consistent with the U-shaped trajectory shown in Figure 4.2. Estimates more than 10 years after relocation should be interpreted cautiously given wider confidence intervals (Figure 4.2).

Post-relocation changes in agreeableness, conscientiousness, and openness were well described with a linear trend. Compared with controls, movers showed slightly steeper declines in conscientiousness ( $B = -0.004$ , [-0.006, -0.002]) and openness ( $B = -0.004$ , [-0.007, -0.002]),

albeit on a higher level, whereas agreeableness showed no reliable post-event slope difference (Figure 4.2). Finally, consistent with its immediate positive jump, life satisfaction continued to increase more rapidly among movers than controls ( $B = 0.012, [0.005, 0.019]$ ).

Table 4.2

*Piecewise Linear Mixed Models Assessing Personality and Life Satisfaction Trajectories: Community Mover versus Control Comparisons*

Predictor	Neuroticism	Extraversion	Agreeableness	Conscientiousness	Openness	Life Satisfaction
	<i>B</i> [95% CI]					
<b>Control Group</b>						
Baseline Level ( $t = 0, \beta_0$ )	1.997 [1.983, 2.012]	3.143 [3.129, 3.157]	3.487 [3.475, 3.499]	3.363 [3.352, 3.376]	2.880 [2.866, 2.894]	4.966 [4.928, 5.003]
Pre-relocation Slope ( $\beta_1$ )	-0.010 [-0.012, -0.008]	-0.008 [-0.009, -0.006]	-0.004 [-0.005, -0.002]	-0.000 [-0.001, 0.001]	-0.009 [-0.010, -0.007]	0.056 [0.051, 0.061]
Immediate Jump ( $\beta_2$ )	-0.020 [-0.035, -0.006]	0.010 [-0.002, 0.021]	-0.010 [-0.020, 0.000]	-0.028 [-0.038, -0.019]	0.001 [-0.010, 0.011]	0.022 [-0.010, 0.055]
Post-relocation Slope ( $\beta_3$ )	-0.006 [-0.012, -0.000]	0.005 [-0.000, 0.010]	-0.002 [-0.003, -0.000]	-0.002 [-0.003, -0.001]	-0.002 [-0.003, -0.001]	0.013 [0.009, 0.018]
Quadratic Effect Difference ( $\beta_8$ )	0.000 [-0.000, 0.001]	-0.001 [-0.002, -0.001]	-	-	-	-
<b>Selection Effects (Mover vs. Control)</b>						
Baseline Difference ( $\beta_4$ )	0.075 [0.053, 0.098]	0.045 [0.025, 0.066]	0.047 [0.029, 0.065]	0.004 [-0.015, 0.022]	0.081 [0.061, 0.101]	-0.385 [-0.444, -0.332]
Pre-slope Difference ( $\beta_5$ )	0.008 [0.005, 0.011]	0.003 [0.000, 0.005]	0.001 [-0.001, 0.004]	-0.005 [-0.008, -0.003]	0.002 [-0.001, 0.004]	-0.040 [-0.047, -0.032]
<b>Relocation Effects (Mover vs. Control)</b>						
Immediate Jump Difference ( $\beta_6$ )	-0.000 [-0.024, 0.023]	-0.000 [-0.022, 0.020]	-0.005 [-0.022, 0.011]	0.029 [0.013, 0.047]	0.001 [-0.017, 0.019]	0.097 [0.042, 0.148]
Post-relocation Slope Difference ( $\beta_7$ )	-0.012 [-0.020, -0.003]	-0.016 [-0.023, -0.009]	-0.000 [-0.003, 0.002]	-0.004 [-0.006, -0.002]	-0.004 [-0.007, -0.002]	0.012 [0.005, 0.019]
Quadratic Effect Difference ( $\beta_9$ )	0.000 [-0.000, 0.001]	0.002 [0.001, 0.002]	-	-	-	-
<b>Random Effects (Variance)</b>						
Intercept Variance ( $\tau_{00}$ )	0.231	0.214	0.146	0.147	0.216	10.197
Residual Variance ( $\sigma^2$ )	0.053	0.040	0.035	0.035	0.040	0.398

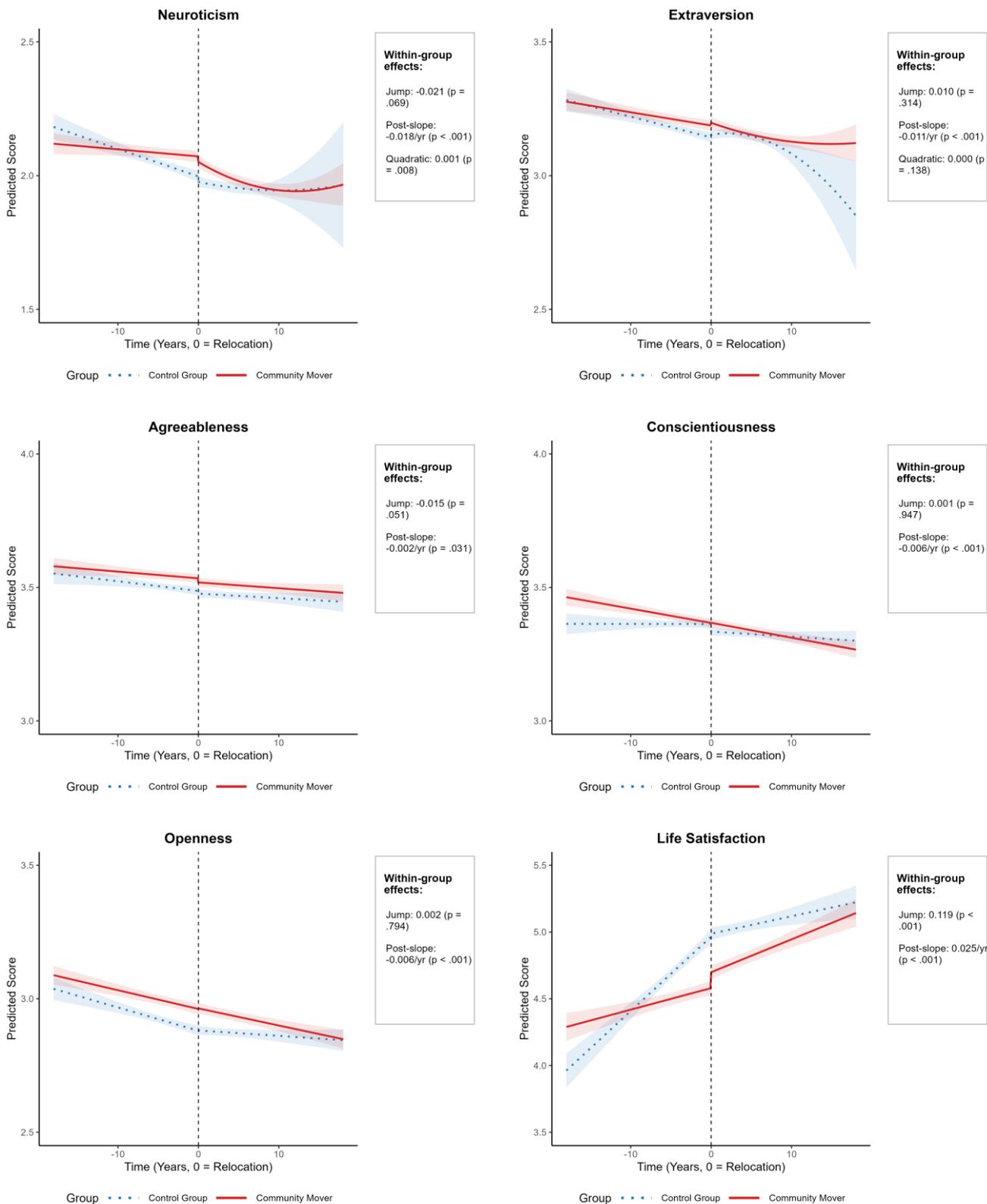
*Note.* This table presents unstandardized coefficients (B) and 95% confidence intervals (CI) from the best-fitting PLMMs. For each dependent variable, the quadratic model is reported if it provided a significantly better fit than the linear model ( $p < .05$ ); otherwise, the more parsimonious linear model is reported. The

Control Group section reports estimated intercepts and slopes for non-movers. The Selection Effects and Relocation Effects represent group differences between the relocation group and control group at key phases of the trajectory. Specifically, Jump ( $\beta_2, \beta_6$ ) indicates an intercept shift at the relocation anchor ( $T = 0$ ); Pre/Post Slope ( $\beta_1, \beta_3, \beta_5, \beta_7$ ) reflect linear change before or after relocation; and Quadratic ( $\beta_8, \beta_9$ ) terms assess duration-based nonlinear changes after relocation.

Random effects refer to between-person ( $\tau_{00}$ ) and within-person ( $\sigma^2$ ) variance.

**Figure 4.2**

*Predicted Trajectories of Personality Traits and Life Satisfaction for Community Movers and Control Group*



*Note.* Predicted scores were derived from PLMMs, centered on the relocation event ( $T = 0$ ). Each panel shows fitted trajectories for the community relocation group (solid line) and the control group (dotted line), with shaded regions indicating 95% confidence intervals. Displayed estimates for Jump, Post-slope, and Quadratic effects reflect within-group linear contrasts for the relocation group, derived via post hoc testing of model parameters. These values indicate the immediate change at relocation, linear post-relocation slope, and its curvature (if significant). See Table 4.2 for full model parameters and significance comparisons between groups.

### 4.3.2 Study Part 2: Nursing Home Admission

#### Baseline balance and propensity score weighting (PSW-OW)

**Table 4.3**

*Description and Balance of Baseline Covariates (Pre-Relocation)*

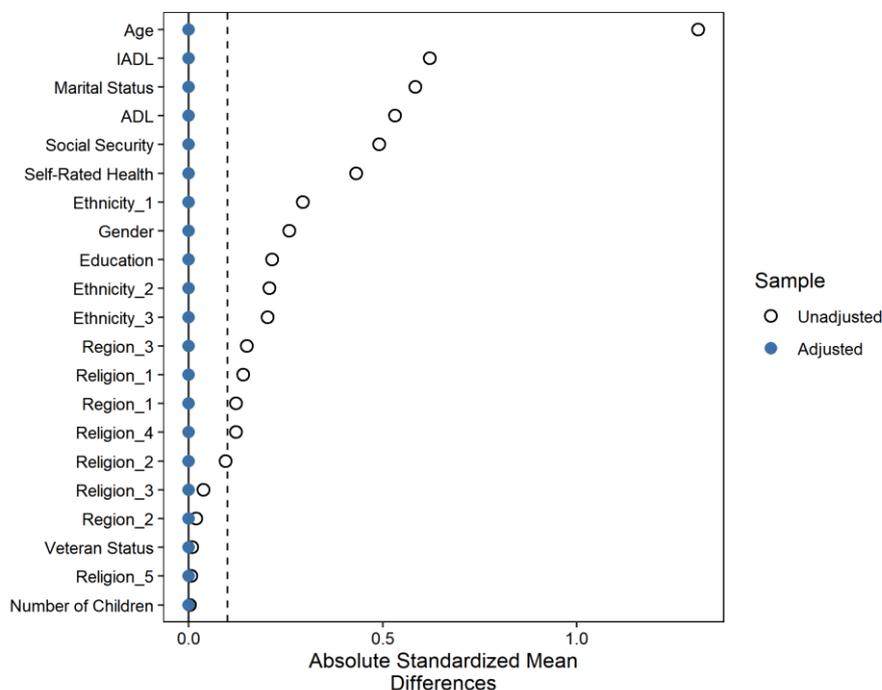
Baseline Covariates	Nursing Home Movers(M/SD)	Control Group(M/SD)	SMD
Age	81.03 (9.01)	67.87 (10.93)	1.31
Gender	0.31 (0.46)	0.44 (0.50)	0.26
Education	11.96 (3.03)	12.49 (3.19)	0.17
marital Status	0.38 (0.49)	0.66 (0.47)	0.58
Ethnicity	1.15 (0.41)	1.30 (0.58)	0.31
Region	1.90 (0.88)	1.77 (0.85)	0.15
Number of Children	3.04 (2.17)	3.05 (2.02)	0.01
Veteran Status	0.21 (0.41)	0.21 (0.40)	0.01
Religion	1.51 (0.92)	1.64 (1.00)	0.13
Social Security	0.99 (0.10)	0.87 (0.34)	0.49
Self-Rated Health	1.12 (1.61)	0.40 (1.05)	0.53
ADL	2.64 (1.09)	3.11 (1.09)	0.43
IADL	0.92 (1.34)	0.25 (0.73)	0.62

*Note.*  $N= 14,041$  (nursing home movers = 645; control group = 13,396). Means are unweighted (proportions for binaries). SMD = absolute standardized mean difference.

In Part 2, the analytic sample included 14,041 participants (645 nursing home movers; 13,396 controls). Table 4.3 reports unweighted means (or proportions for binaries) and SMDs for all baseline covariates. At baseline, movers were substantially older than controls (SMD = 1.31) and less likely to be married (SMD = 0.58). Large imbalances were also evident for health and functional indicators, including self-rated health (SMD = 0.53), IADL (SMD = 0.62), and ADL (SMD = 0.43). Additionally, moderate imbalances appeared for Social Security receipt (SMD = 0.49), ethnicity (SMD = 0.31), gender (SMD = 0.26), education (SMD = 0.17), and region (SMD = 0.15). Veteran status and number of children were essentially comparable across

groups (all  $SMD \leq .009$ ). These patterns underscore the strong selection effects into nursing home admission.

We again used overlap weighting to achieve covariate balance, reducing all SMDs below the 0.10 threshold (Figure 4.3). A key finding from this analysis was the substantial but asymmetric impact on the effective sample size (ESS). The total ESS decreased to 4,285 (30.5% of the original  $N = 14,041$ ). This reduction was driven almost entirely by the down-weighting the large control group, whose ESS dropped from 13,396 to 3,654 (27.3% retention). In contrast, the smaller mover group retained 97.8% of its original statistical information (ESS = 631 of 645). This finding highlights the large initial dissimilarities between the two groups and underscores that balance was achieved with both groups being now more comparable, both in terms of characteristics and size. Our subsequent PLMM analyses were thus robust in terms of balance and still had an effective sample of 4,285.

**Figure 4.3***Love Plot: Covariates Balance with PSW-OW*

*Note.* Each dot is a covariate (or category indicator for multi-category variables). The dashed line marks  $SMD = 0.10$ .

### **Piecewise linear mixed models (PLMMs).**

Following the Study Part 1 approach, we fitted similar event-centered PLMMs to test hypotheses related to nursing home admission. Table 4.4 presents the best-fitting models, and Figure 4.4 shows the predicted trajectories. All slopes are changes per year.

***Pre-admission trajectories and selection effects.*** Before admission, movers differed markedly from controls at the time of relocation ( $T=0$ ) and in pre-relocation trends: Movers showed higher neuroticism ( $B = 0.136$ , [0.091, 0.175]) but lower extraversion ( $B = -0.104$ , [-0.143, -0.065]), agreeableness ( $B = -0.108$ , [-0.143, -0.077]), conscientiousness ( $B = -0.191$ , [-

0.229, -0.154]), openness ( $B = -0.123$ , [-0.164, -0.081]), and life satisfaction ( $B = -0.750$ , [-0.852, -0.657]). Pre-event slopes also diverged: movers showed faster increases in neuroticism ( $B = 0.027$ , [0.022, 0.032]) and steeper declines in other personality traits and life satisfaction. These sizable baseline and pre-event trend differences confirm strong selection effects among people who relocate to nursing homes.

***Immediate effects of admission (jump at  $T = 0$ ).*** At admission, movers exhibited significant discontinuities (intercept jump at  $T = 0$ ). Compared with controls, movers showed a sharp immediate increase in neuroticism ( $B = 0.097$ , [0.051, 0.144]) and significant decreases in agreeableness ( $B = -0.066$ , [-0.096, -0.035]), conscientiousness ( $B = -0.104$ , [-0.148, -0.057]), and openness ( $B = -0.212$ , [-0.261, -0.162]). There were no significant differences in extraversion within and between groups. For life satisfaction, movers experienced a sharp decline, but not as strong as controls (Jump = -0.185,  $p < .001$ ); as the mover–control contrast was positive ( $B = 0.218$ , [0.090, 0.347]; Figure 4.4). Above results indicate that nursing home admission exerts an immediate negative shock on most traits (except extraversion) and on life satisfaction.

***Post-admission trajectories and long-term adaptation.*** After admission to nursing homes, movers and controls showed divergent long-term trajectories. LRTs suggested that quadratic models fit better for neuroticism, extraversion, conscientiousness, openness, and life satisfaction, whereas agreeableness was best described by a linear model ( $\chi^2$  values in Table S4.3).

Trait-specific patterns emerged. For neuroticism, movers displayed steeper declines

than controls ( $B = -0.118, [-0.159, -0.076]$ ) but greater curvature ( $B = 0.022, [0.013, 0.031]$ ), consistent with a shallow U-shape: an initial decline of the heightened neuroticism immediately after admission, stabilization, and slight rebound (Figure 4.4). Extraversion had no significant between-group differences in post-trends (linear and quadratic), but within-group trajectories showed for both groups an initial decline followed by deceleration and a slight rebound (Post-slope =  $-0.065$ , Quadratic =  $0.007$ ;  $ps < .01$ ; Figure 4.4). Agreeableness and conscientiousness declined more strongly among movers than controls after admission (Table 4.4; Figure 4.4). Finally, for openness, movers and controls diverged sharply. Unlike the U-shaped trajectory of controls, movers exhibited a significantly less negative post-event slope than controls ( $B = 0.137, [0.094, 0.179]$ ), but a significantly more negative quadratic trend ( $B = -0.033, [-0.042, -0.025]$ ), which combined to describe an accelerated decline trajectory (Figure 4.4).

Regarding life satisfaction, controls showed continued increases post-event, but movers experienced a U-shape change, with an initial decline followed by a gradual increase. Movers' life satisfaction initially declined sharply (Post-slope =  $-0.123$  per year; Figure 4.4), significantly different from the positive slope in controls ( $B = -0.170, [-0.270, -0.070]$ ). Over time, movers' life satisfaction began to rise yearly, and between-group differences in the quadratic term were no longer significant.

**Table 4.4**

*Piecewise Linear Mixed Models Assessing Personality and Life Satisfaction Trajectories: Nursing Home Mover versus Control Group*

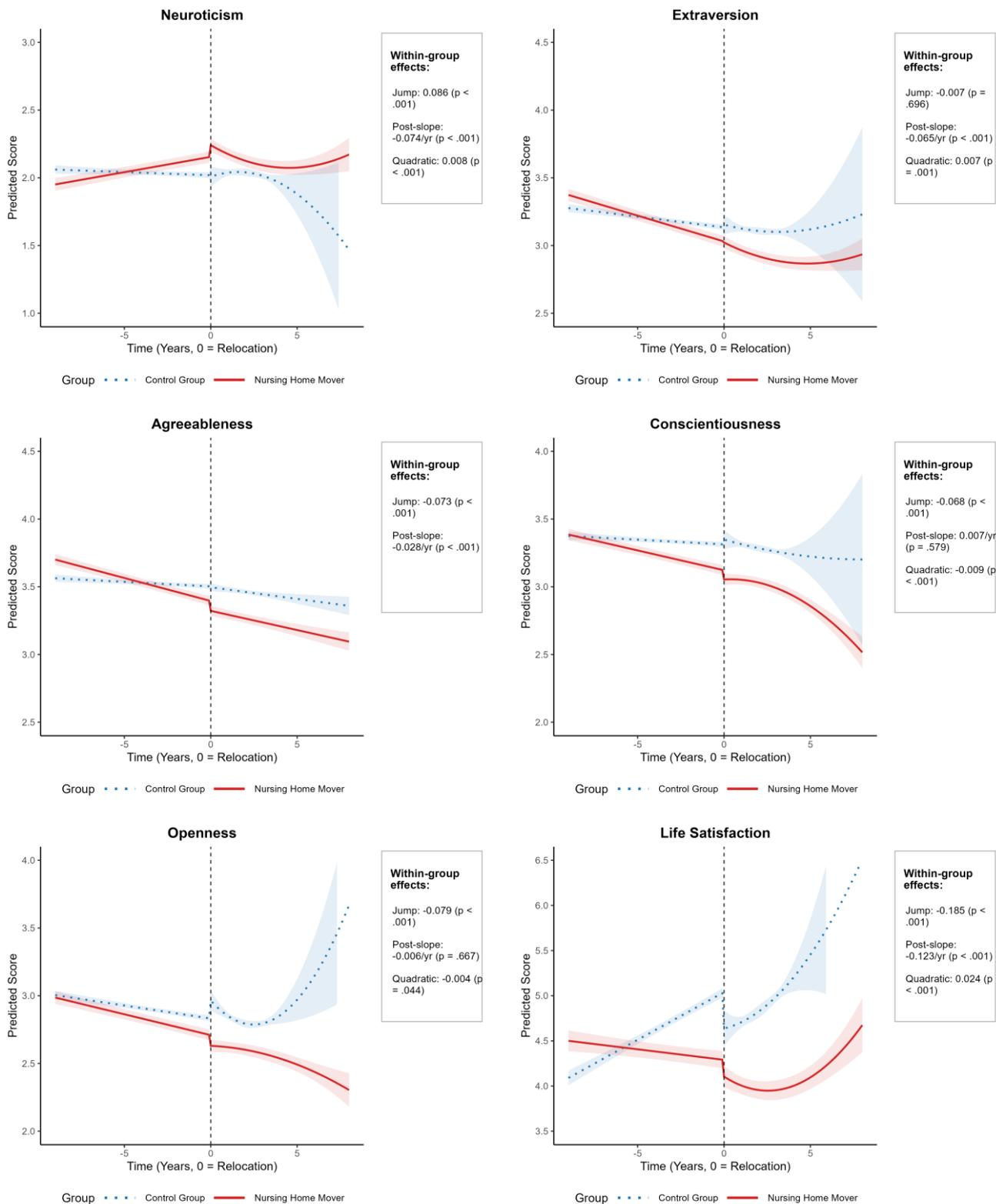
Predictor	Neuroticism	Extraversion	Agreeableness	Conscientiousness	Openness	Life Satisfaction
	<i>B</i> [95% CI]					
<b>Control Group</b>						
Baseline Level ( $\gamma = 0, \beta_0$ )	2.090 [2.007, 2.032]	3.134 [3.123, 3.147]	3.503 [3.492, 3.513]	3.313 [3.302, 3.324]	2.832 [2.819, 2.844]	5.040 [5.011, 5.067]
Pre-relocation Slope ( $\beta_1$ )	-0.005 [-0.006, -0.003]	-0.016 [-0.017, -0.014]	-0.007 [-0.008, -0.005]	-0.007 [-0.008, -0.005]	-0.019 [-0.021, -0.018]	0.106 [0.101, 0.110]
Immediate Jump ( $\beta_2$ )	-0.011 [-0.040, 0.019]	0.020 [-0.007, 0.047]	-0.006 [-0.017, 0.005]	0.035 [0.006, 0.064]	0.133 [0.103, 0.161]	-0.403 [-0.482, -0.329]
Post-relocation Slope ( $\beta_3$ )	0.044 [0.011, 0.077]	-0.034 [-0.064, -0.003]	-0.017 [-0.021, -0.013]	-0.036 [-0.067, -0.005]	-0.143 [-0.174, -0.110]	0.046 [-0.034, 0.131]
Quadratic Effect Difference ( $\beta_8$ )	-0.014 [-0.021, -0.007]	0.005 [-0.002, 0.012]	-	0.002 [-0.005, 0.009]	0.029 [0.021, 0.036]	0.023 [0.004, 0.042]
<b>Selection Effects (Mover vs. Control)</b>						
Baseline Difference ( $\beta_4$ )	0.136 [0.091, 0.175]	-0.104 [-0.143, -0.065]	-0.108 [-0.143, -0.077]	-0.191 [-0.229, -0.154]	-0.123 [-0.164, -0.081]	-0.750 [-0.852, -0.657]
Pre-slope Difference ( $\beta_5$ )	0.027 [0.022, 0.032]	-0.022 [-0.027, -0.018]	-0.027 [-0.032, -0.023]	-0.022 [-0.027, -0.018]	-0.012 [-0.017, -0.006]	-0.129 [-0.141, -0.116]
<b>Relocation Effects (Mover vs. Control)</b>						
Immediate Jump Difference ( $\beta_6$ )	0.097 [0.051, 0.144]	-0.028 [-0.073, 0.017]	-0.066 [-0.096, -0.035]	-0.104 [-0.148, -0.057]	-0.212 [-0.261, -0.162]	0.218 [0.090, 0.347]
Post-relocation Slope Difference ( $\beta_7$ )	-0.118 [-0.159, -0.076]	-0.030 [-0.068, 0.007]	-0.011 [-0.022, -0.002]	0.043 [0.006, 0.081]	0.137 [0.094, 0.179]	-0.170 [-0.270, -0.070]
Quadratic Effect Difference ( $\beta_9$ )	0.022 [0.013, 0.031]	0.001 [-0.007, 0.009]	-	-0.012 [-0.020, -0.004]	-0.033 [-0.042, -0.025]	0.001 [-0.020, 0.022]
<b>Random Effects (Variance)</b>						
Intercept Variance ( $\sigma_0^2$ )	0.218	0.196	0.140	0.152	0.196	1.057
Residual Variance ( $\sigma^2$ )	0.008	0.007	0.006	0.007	0.008	0.055

*Note.* This table presents unstandardized coefficients (*B*) and 95% confidence intervals (CI) from the best-fitting PLMMs. For each dependent variable, the quadratic model is reported if it provided a significantly better fit than the linear model ( $p < .05$ ); otherwise, the more parsimonious linear model is reported. The

Control Group section reports estimated intercepts and slopes for non-movers. The Selection Effects and Admission Effects represent group differences between the relocation group and control group at key phases of the trajectory. Specifically, Jump ( $\beta_2, \beta_6$ ) indicates an intercept shift at the relocation anchor ( $T = 0$ ); Pre/Post Slope ( $\beta_1, \beta_3, \beta_5, \beta_7$ ) reflect linear change before or after relocation; and Quadratic ( $\beta_8, \beta_9$ ) terms assess duration-based nonlinear changes after relocation. Random effects refer to between-person ( $\tau_{00}$ ) and within-person ( $\sigma^2$ ) variance.

**Figure 4.4**

*Predicted Trajectories of Personality Traits and Life Satisfaction for Nursing Home Movers and Control Group*



*Note.* Predicted scores were derived from PLMMs, centered on the relocation event ( $T = 0$ ). Each panel shows fitted trajectories for the nursing home admission group (solid line) and the control group (dotted line), with shaded regions indicating 95% confidence intervals. Displayed estimates for Jump, Post-slope, and Quadratic effects reflect within-group linear contrasts for the relocation group, derived via post hoc testing of model parameters. These values indicate the immediate change at relocation, linear post-relocation slope, and its curvature (if significant). See Table 4.4 for full model parameters and significance comparisons between groups.

#### 4.4 Discussion

Using an event-centered prospective design, we trace complete trajectories of change in the Big Five traits and life satisfaction before and after two distinct late-life relocation events: community relocation and nursing home admission. The findings reveal two contrasting patterns and provide a novel, nuanced understanding of the psychological effects of these late-life events. Community relocation represents a mild, continuous psychological transition. Nursing home admission, in contrast, led to an immediate shock and a deeper long-term shift, resulting in a complex and enduring process of psychological adaptation. In addition, whereas small differences in psychological changes before the relocation occurred for community movers compared to non-movers, people moving to nursing homes demonstrated unique developmental patterns years before the relocation. We discuss the implications of these novel findings for late-life development with a particular focus on the temporal dynamics uncovered in this study spanning decades and their implications for theories on personality development.

##### *4.4.1 Community Relocation: Personality Selection and a Mild Transition*

Study Part 1 showed that the links between community relocation and personality traits were driven more by selection into relocation than by event-driven personality change. We hypothesized (*H1*) that movers would show adaptive increases in extraversion and agreeableness, accompanied by a transient rise in neuroticism, as they integrated into a new environment. This hypothesis was not supported by the observed post-relocation changes in the respective traits. Instead, movers and non-movers already differed at baseline and in pre-event trends. Prior to the move, movers were slightly more extraverted, agreeable, and open, but also

less emotionally stable and less satisfied with their life, which could represent both personal resources and a need to change the living environment, consistent with the dynamic selection perspective (Bühler et al., 2024; Wundrack et al., 2021). Since community relocation is typically voluntary and anticipated, individuals often prepare for the transition well in advance (Verspeek et al., 2024). Personality-linked adjustments may therefore begin during the preparatory phase (Wundrack et al., 2021).

Community relocation itself did not produce immediate, large-scale effects on personality traits. Post-event trajectories for movers and controls differed significantly but only modestly ( $|B| \leq .016$ ) and were largely parallel, indicating substantial resilience in older adults' personality traits. In addition, we hypothesized (**H2**) that the relocation effect would be time-dependent, which was partially confirmed. Extraversion showed a significant U-shaped pattern as a function of time since the relocation. Neuroticism displayed a late, nonlinear “rebound” within movers, but this curvature did not differ from that of non-movers, pointing to an age-graded trend rather than a relocation-specific effect. Finally, a noteworthy finding emerged in life satisfaction. Movers, who were less satisfied relative to controls before the relocation, exhibited a significant positive “jump” immediately after the relocation and a stronger increase in life satisfaction, eventually reaching the level of the comparison group. This uptick may reflect relief and immediate improvements early in the transition, for example, solving problems in the early residence or holding positive expectations for the new setting (Robinson, 2002; Zhang, 2019). To summarize, for the more autonomous community relocation, personality appears to play a prominent role in environmental selection, and anticipatory preparation

supports a comparatively smooth transition. The psychological benefits of this late-life relocation seem most pronounced in immediate as well as long-term gains in life satisfaction.

#### ***4.4.2 Nursing Home Admission: Multi-phase Upheaval and Turning Points***

In stark contrast to the relatively stable transition observed during community relocation, Study Part 2 revealed marked turbulence in personality trajectories surrounding nursing home admission. First, the strong selection effects signal the severity of this transition. Years before nursing home admission, future residents already exhibited a highly vulnerable psychological profile as well as apparently functional decline in personality traits. This pattern included significantly higher neuroticism and steeper increases in neuroticism, together with lower levels and steeper declines in all other traits and in life satisfaction. This trend suggests that nursing home admission might be understood as the culmination of a prolonged decline rather than an isolated, abrupt event. Prior work indicates that many older adults enter nursing homes from hospitals or day-care wards (Berete et al., 2022; Palese et al., 2016). Against this backdrop, the marked pre-admission declines in all traits may reflect earlier changes that emerged years before, possibly within constraining hospital contexts. Though it is highly plausible that behavioral and personality changes co-occur with health declines years before nursing home admission (Mueller et al., 2018), these changes have been overlooked so far.

Second, the nursing home admission itself brought an immediate shock to personality traits, consistent with ***Hypothesis 3***. At the point of admission, movers experienced a sharp rise in neuroticism, which is clinically described as relocation stress syndrome, a state of severe psychological distress and maladjustment after relocation to care facilities (Brownie et al., 2014;

Melrose, 2004). At the same time, agreeableness, conscientiousness, and openness dropped sharply at admission, potentially reflecting the impact of structured daily routines and role loss. This pattern parallels evidence on personality change surrounding retirement, where role exit is also associated with trait declines (Schwaba & Bleidorn, 2019).

A noteworthy nuance concerns life satisfaction. Relative to controls, movers showed a positive between-group “jump” at admission, which does not necessarily imply improved well-being. Within-group contrasts indicated a significant decline in movers’ life satisfaction at admission. The positive mover–control difference arose because the matched control group (community-dwelling peers in similarly fragile health) experienced an even steeper ongoing deterioration during the same time. Therefore, admission led to an immediate decline in life satisfaction, although this decline was smaller than the chronic decline observed among equally vulnerable non-movers.

Finally, adaptation of personality after admission was protracted and nonlinear, supporting *H4*. With the exception of agreeableness, all Big Five traits and life satisfaction exhibited complex nonlinear changes after admission. Emotional stability (the inverse of neuroticism) and conscientiousness showed short-term recovery following the initial shock, but both eventually declined again. As argued by (Denissen et al., 2019), these “adaptive traits” might be especially responsive to stressful life events: they react strongly early on, but may recover as individuals cope and adapt. For nursing home residents, receiving better care and gradually adapting to institutional routines can support temporary gains in emotional stability and conscientiousness. Over the longer term, however, persistent role loss and shrinking social

networks can erode these improvements. The continued downward trend in agreeableness, the sharp decline in openness, and the enduring U-shaped curve in life satisfaction jointly characterize a multi-year period of difficult adjustment. In summary, pre-admission continuous differences, the admission shock, and long post-admission adaptation process jointly and profoundly change personality traits and life satisfaction trajectories.

#### ***4.4.3 Theoretical Mechanisms of Late-Life Relocation***

This study has multiple implications for personality development theories and our broader understanding of psychological aging. Guided by the personality–relationship transactions framework (Bühler et al., 2024), we examined how different phases of late-life relocation relate to personality. The results support and extend this framework, highlighting both selection effects and nonlinear socialization effects. Evidence from both community relocation and nursing home admission points to substantial personality-based selection and personality–environment socialization processes, which are more pronounced for nursing home admission compared with private home—despite similar disruptions in social and daily life contexts. Additional theoretical perspectives provide complementary explanations. Person–environment fit theory (Kahana et al., 2003) and continuity theory (Atchley, 1989) help explain the distinct dynamics of the two types of relocation. Community relocation can be viewed as an agentic process in which individuals actively choose a new environment to maintain or improve their fit, while also preserving both internal continuity (i.e., personality traits) and external continuity (i.e., core relationships). This process supports adaptation in line with preexisting personality characteristics and accounts for the relative stability of personality in

this context (Atchley, 1989; Neyer et al., 2014). In contrast, nursing home admission represents a somewhat forced adaptation to the environment and can be considered a “discontinuity event” (Yong et al., 2021). It severs physical and emotional ties to home, disrupts daily and social routines built across the lifespan, and poses strong contextual demands that have the potential to elicit similar behavioral changes (Neyer et al., 2014). These disruptions and strong situational demand likely contribute to the more profound Big Five traits changes observed after admission.

Finally, although we did not observe the assumed increases in extraversion and agreeableness after community relocation, the absence of these effects is also theoretically meaningful. It may indicate a shift in social goals among older adults when facing major transitions, consistent with socioemotional selectivity theory (SST; Carstensen, 2021; Carstensen & Hershfield, 2021). SST suggests that when individuals perceive that future time is limited (e.g., due to old age or “terminating events”, such as relocation), they prioritize emotionally meaningful goals. Following relocation, older adults may therefore focus on deepening emotional connections with family and long-standing friends rather than expanding their broader social networks, consistent with prior reviews of aging and social networks (Sander et al., 2017; Wrzus et al., 2013). The temporary decline in extraversion observed here may represent such an adaptive withdrawal and change in social motivation.

#### ***4.4.4 Strengths, Limitations, and Future Directions***

The present study has several notable strengths. First, the coverage of almost two decades of individuals’ lives in old age, combined with methodological rigor, enhances the credibility of the findings. The use of a large, nationally representative sample (HRS) improves

the external validity and generalizability of the results. The event-centered PLMM design allowed us to disentangle relocation effects into selection processes, immediate shocks, and long-term adaptation, thereby providing a comprehensive account of personality change before and after relocation. In addition, by constructing a comparison group that was highly balanced on relevant baseline covariates (e.g., family status, socioeconomic status, health), we reduced selection biases and improved the internal validity of causal inferences (Lawes et al., 2025).

Despite these strengths, several limitations should be acknowledged. One concern is the measurement interval. In the HRS, psychological constructs were assessed every four years, which may obscure more rapid fluctuations surrounding relocations. This limitation could bias estimates of both the exact timing and magnitude of immediate shocks. Our modeling approach, which took the time between relocation and personality assessment into account, partially mitigated the effects of the wide spacing. Evidence for short-term discontinuities underscores the need for intensive designs, consistent with recent calls in personality development research (Bühler et al., 2023; Jackson & Wright, 2024). The sparsity of HRS data did not allow us to examine within-person changes in the immediate pre- and post-relocation days and weeks, which would require repeated, dense daily life assessments (Wrzus & Neubauer, 2022). A second limitation is the lack of attention to individual differences in trajectories. Despite the relatively large sample, analyzing whether trajectories differ, for example with perceived controllability or (un)pleasantness of relocation, would require even larger samples and also information on the subjective relocation experiences that have been repeatedly shown to moderate event effects (Luhmann et al., 2021; Schwaba et al., 2023). A third limitation is

selective attrition, which is a persistent challenge in large panel surveys and particularly salient in the more physically frail nursing home residents. Over time, participants experiencing the greatest psychological distress or poorest health may be more likely to drop out, which could lead us to underestimate the long-term negative effects of nursing home admission. Finally, analyses of nursing home admission were limited to the years 2006–2014 in HRS. Subsequent changes in long-term care practices may constrain the generalizability of our findings to contemporary contexts.

To address these limitations, future research should conduct prospective cohort projects could extend the present work by directly targeting open questions on short-term changes and longer-term adaptations before and after nursing home admission (e.g., Sun & Wrzus, 2025). High-density measurement-burst designs with daily and monthly assessments would capture how short-term personality fluctuations after admission evolve into long-term trait change and would enable systematic assessment of moderators (e.g., subjective perceptions). Such studies could reveal the developmental process of short-term states towards long-term traits in the context of institutional relocation, represent a logical progression from macro-level causal inference to micro-level mechanism testing and serving as a model for future event-based research (Sun & Wrzus, 2025).

#### **4.5 Conclusion**

By conducting detailed longitudinal analyses of two distinct late-life relocation events, this study examined critical boundary conditions for understanding the plasticity and stability of personality in later adulthood. The findings showed that community relocation, as a more

agentic form of contextual change, exerts relatively mild psychological effects that are primarily driven by selection. Older adults' personality traits demonstrate strong continuity during this transition. By contrast, nursing home admission is characterized by profound personality change: a prolonged pre-admission decline, a short-term shock at admission, and a long, complex adaptation process. Both types of relocation predicted changes Big Five traits in broad and meaningful ways. The present study contributes theoretically by deepening our understanding of personality–environment transactions in late adulthood and methodologically by demonstrating how causal inference designs can be applied to capture the dynamic effects of major life events. Together, the findings also highlight important practical implications: nursing home admission represents a high-risk transition that calls for multi-phase psychosocial support focused on maintaining autonomy and dignity. Such efforts are critical for mitigating the severe negative effects of institutionalization and for promoting subjectively successful adaptation to this common late-life transition.

## CHAPTER 5

### **My New Home: Study Protocol for a Prospective Cohort Study on the Long-Term Personality Development and Short-Term Processes During Transitions into Nursing Homes**

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#### **Abstract**

**Background:** Personality is a crucial predictor of many life outcomes, including successful aging. The proportion of nursing home residents is increasing annually among older populations. Relocation to nursing homes affect multiple aspects of older people's lives, including their living environment, social interactions, and daily arrangements, which may indirectly affect their personality development. However, there is currently a lack of comprehensive assessments of how transitioning into a nursing home impacts personality development among older adults. This knowledge gap impedes our understanding of personality development in nursing home residents and also prevents our gaining insights into the related mechanisms and influences on personality development in later adulthood.

**Methods:** "My New Home" will be a prospective cohort study designed to recruit 120 participants (age  $\geq 60$ ), including 60 older adults who will be relocating to a nursing home. This study will employ a series of longitudinal measurements, including a baseline measurement before relocation, daily measurements during the initial transition phase (for 28 days after moving), and monthly assessments during the adaptation phase (for 6 months). These measurements will comprehensively track the short-term state changes and long-term trait developments of personality before and after the older people's relocations. Older adults' personality traits will be assessed with the Big Five Inventory-2-Short. Additionally, this study will explore the moderating effects of older people's age, gender, health status, cognitive function and subjective perceptions of living in nursing homes on the impact of relocation on personality traits. Furthermore, the study will test the hypothesis that the effects of relocations on personality traits are mediated through repeated influences on personality states, social activity, and daily routines.

**Discussion:** We expect this study to provide a comprehensive and in-depth exploration of the mechanisms and processes by which relocations to nursing homes impact older people's personalities. To our knowledge, this research will represent the first prospective cohort study

that focuses on the personality development of nursing home residents. The research findings hopefully contribute to enhancing our understanding of the relationships between major life events and later life personality development.

Sun, Y., & Wrzus, C. (2025). My new home: Study protocol for a prospective cohort study on the long-term personality development and short-term processes during transitions into nursing homes. *BMC Geriatrics*, 25, 640. <https://doi.org/10.1186/s12877-025-06300-1>

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## 5.1 Introduction

As global fertility rates continue to decline and life expectancy increases, an increasing number of older adults will move to nursing homes in their final stages of life if no adult children can provide (sufficient) care. While some older individuals choose to reside in nursing homes for better care, a greater number are essentially forced to relocate to these facilities due to rapid deteriorations in their physical and cognitive functions (Iudici et al., 2022), and maintaining and improving the well-being of residents in these institutions has become a significant societal concern (Costa-Font et al., 2017; Yong et al., 2021). However, the adjustment to such new life environments also depends on people's personality traits, and a major life event such as a late-life relocation may lead to personality changes (Mueller et al., 2017; Sun et al., 2023). Personality traits are commonly defined as relatively stable individual differences in emotion, behavior, and/or cognition (Johnson, 1997), and are strongly associated with important life outcomes, including health, longevity, and successful aging (Roberts et al., 2007; Soto, 2019). Extensive empirical findings have indicated that personality development and change occur throughout the lifespan, with life events playing a critical role in driving personality development (Bleidorn et al., 2018; Bühler et al., 2023; Denissen et al., 2019). Recent theories of personality development emphasize that major life events drive personality development in a bottom-up way through repetitive short-term processes like changes in state and daily behavior (B. W. Roberts, 2018; Tucker-Drob & Briley, 2019; Wrzus & Roberts, 2017). Despite this, the impact of moving to a nursing home on personality development in later life have not been examined. However, this major life event directly affects older people's living

environments, identities, and daily behaviors (Bangerter et al., 2017; Iudici et al., 2022; T. J. Roberts, 2018). Overall, little is known about the process of personality development during transitions to nursing homes. This gap limits the evaluation and validation of theories on personality development in middle and old age and hinders a comprehensive assessment of the impacts of transitions to nursing homes. Considering this research gap, this study, using a series of specific measures related to personality development processes (both long-term and short-term), will thoroughly examine whether and how relocating to a nursing home in later life impacts personality development among older adults.

### ***5.1.1 The Long-Term Development of Personality During Transitions to Nursing Homes***

Examining the long-term mean changes in trait levels is key to investigating the impacts of life events on personality development (Wagner et al., 2016). Relocating to a nursing home is considered one of the most stressful life events an older adult can experience, and it affects almost every aspect of the older adult's life, including daily routines, social engagements, and networks (Hertz et al., 2016). The relationship between this life event and personality traits is likely bidirectional, influencing and being influenced by personality traits both directly and indirectly. On one hand, according to the five-factor theory (FFT; McCrae & Costa, 2008), personality traits can influence older people's decisions to move to nursing homes. This theory assumes that personality traits predispose individuals to experience specific life events and choose particular environments. For instance, previous research has indicated that higher agreeableness and lower conscientiousness are associated with a greater likelihood of using long-term care facilities (Friedman et al., 2013).

On the other hand, changes in living environments, substantial reductions in social engagements, shrinking social networks, and increased life uncertainty after moving into nursing homes can all potentially serve as a pivotal point for a person's development. The paradoxical theory of personality coherence (Caspi & Moffitt, 1993) suggests that individuals face unfamiliar situations, where past experiences do not aid in adapting to new environments. They may use environmental cues to guide and change their behavior, potentially leading to personality changes. As older adults transition from their previous living environments to nursing homes, their time previously used for existing social networks and daily routines significantly declines, and much of their time is spent interacting with caregivers and other residents. This change can introduce substantial environmental stress, requiring new residents to live in a more cooperative and accommodating manner, which might further increase their agreeableness, aligning with the "corresponsive principle" of personality development (Roberts & Caspi, 2003). Similarly, based on this principle and the previous finding (Friedman et al., 2013), it is reasonable to hypothesize that relocating to nursing homes will decrease older adults' conscientiousness, as fewer daily (household) tasks must be accomplished. Additionally, extensive research on nursing home residents has indicated that during transitions to such facilities, individuals often exhibit lower emotional stability due to stressors experienced during relocations and in their new environments (Brose et al., 2013; Sun et al., 2021). Thus, we propose that relocation to nursing homes may lead to higher neuroticism in older adults. Overall, the current study will primarily investigate the first hypothesis (*H1*) that "Relocation to nursing homes in later life leads to changes in Big Five personality traits, especially increases in

agreeableness, decreases in conscientiousness, and increases in neuroticism.”

### ***5.1.2 Methodological and Moderators in the Study of Relocations to Nursing Homes on Personality Development***

Building on recommendations from previous researchers (Schwaba & Bleidorn, 2019), this study will address four methodological issues to deepen our understanding of personality development during life events, especially during nursing home transitions, (a) accounting for the timing of the event (relocation) and charting the trajectory of trait changes; (b) considering pre-existing differences between individuals who do and do not relocate (Jackson et al., 2012; Lüdtke et al., 2011); (c) considering potential moderating factors that might influence the impact of the relocation on personality development to better assess the independent effect of the target event (Bühler et al., 2023); and (d) emphasizing the timing of “change,” exploring potential short-term processes in personality development (Luhmann et al., 2014; Wrzus & Roberts, 2017).

Specifically, we will utilize a prospective cohort study design, recording the relocation time and incorporating this into model testing. Older people’s personality traits will be measured on multiple occasions (e.g., before relocation, and during transition and adjustment phases) to capture the trajectory of trait changes. Additionally, by establishing a control group of people remaining in private residences, we might better distinguish the impacts of moving to nursing homes on traits from the general development patterns of personality in this age group. Some previous research indicated that individuals often respond differently to the same life transitions (Roberts & Mroczek, 2008; Schwaba & Bleidorn, 2018). Individual differences

might be key to explaining the variable impacts of the same life events on personality traits (Schwaba & Bleidorn, 2019; Schwaba et al., 2023); considering and quantifying potential moderating variables is one method to address this developmental heterogeneity. We hope to extend previous research findings by including and hypothesizing that a resident's age, gender, health status, cognitive function, and subjective perception of residing in nursing homes moderate the impact of relocations on older adults' personality traits (**H2**).

**Age.** Typically, residents in nursing homes are over 65 years old, but in reality, their ages span a broad range, with some residents aged over 100 years, showing significant age variability (Brucksch et al., 2018). Even among older age groups, the personality development trajectories of young-old adults (65–85 years) and oldest-old adults (85+ years) differ (Baltes & Smith, 2003; Mueller et al., 2018). Comparatively, younger older adults have stronger psychosocial reserves, showing higher personality plasticity and better adjustment to unfamiliar environmental impacts, whereas oldest-old adults are more directly impacted by unfamiliar environments due to widespread age-related functional limitations that limit their ability to adjust and cope with new changes, potentially weakening the driving effect of relocation to nursing homes on their personality development.

**Gender.** We will also hypothesize that relocating to nursing homes might more significantly impact the personality development of older female adults. In previous research on environmental adaptation and psychological adjustment of nursing home residents, female residents often exhibited higher levels of psychological adjustment and environment adaptability (Davila et al., 2022), and this cumulative adjustment process aimed at adapting to

the new environment might further promote the personality development of female residents (Costa et al., 2001; Helson & Moane, 1987).

**Health status.** Extensive research has indicated that the deterioration of health status in later life is associated with a broad decline in the Big Five personality traits, including extraversion, agreeableness, conscientiousness, openness, and emotional stability. (e.g., Mueller et al., 2016; Mueller et al., 2018; Sutin et al., 2013). Older adults often move into nursing homes due to health issues and functional limitations, and their health status may potentially influence the link between relocation and personality development.

**Cognitive Function.** Decline in cognitive function is a common factor contributing to nursing home admission, as well as a key predictor of how well individuals adjust after relocation (Sury et al., 2013). Empirical studies have shown that impaired cognitive function reduces older adults' ability to maintain their established lifestyles and adapt to new environments. It is also significantly associated with declines in personality traits that reflect psychological maturity, such as emotional stability and conscientiousness (Mueller et al., 2016; Stanek & Ones, 2023). We hypothesize that older adults with relatively intact cognitive function will adapt more easily to the transition into a nursing home, and that any negative impact on their personality traits—particularly emotional stability—will be less pronounced.

**Subjective perceptions of residing in nursing homes.** Recent research has highlighted the importance of measuring individuals' subjective perceptions of events, as different perceptions of the same event can partly explain the different impacts of the same event on personality development (see reviews by Luhmann et al., 2021; Schwaba et al., 2023).

Examining the moderating effect of older adults' subjective perceptions of residing in nursing homes in this study should allow for a more comprehensive and systematic exploration of the mechanisms by which relocations impact personality development in later life.

Finally, considering that the repeated momentary changes in trait-related states, daily routines, and social activity after the event (relocation) might be key factors in the long-term development of older adults' personalities (Back et al., 2023; Wrzus & Roberts, 2017), we will record and examine the short-term changes in states, daily routines, and social activity during the initial phase of transition to nursing homes (within 28 days after relocation) and explore their associations with long-term personality development. Next, we detail the necessity and feasibility of examining the aforementioned short-term changes.

### ***5.1.3 Short-Term Processes of Personality Change During Relocation Transitions: States, Daily Routines, and Social Activity***

Life events may impact personalities in ways both direct and immediate, often reflected swiftly in changes in personality states and alterations in behavior, emotions, and cognition following events (Fleeson & Jayawickreme, 2015; Magidson et al., 2014). However, isolated life events alone are insufficient to induce personality changes; the actual catalysts for trait modification are the changes in social roles, interactions, and daily routines triggered by these events (Lüdtke et al., 2011). To comprehensively understand the process of personality change caused by life events, it is crucial to consider the role of transient states and immediate changes that result from events. Consequently, this study will assess the personality states, social activity, and daily routines of older adults after moving into nursing homes to explore whether and how

relocation influences long-term personality development through the associated repeated short-term processes.

Personality states refer to the transient patterns of behavior, emotions, and cognition an individual exhibits at specific times and in specific situations, considered to be momentary expressions of personality traits (Fleeson & Gallagher, 2009). Benefiting from the widespread application of experience sampling methodology (EMA) in personality research, researchers have been able to more accurately describe the relationship between personality states and traits (Fleeson & Gallagher, 2009; Hennecke et al., 2014; Hutteman et al., 2015). Earlier frameworks like the sociogenomic model of personality (Roberts & Jackson, 2008), the framework for self-regulated personality development (Hennecke et al., 2014), as well as the more recent TESSERA framework (*triggering situations, expectancies, states and state expressions, and reactions*; Wrzus, 2021; Wrzus & Roberts, 2017), emphasize that the recurrent short-term states following exposure to trait-relevant situations are a prerequisite for long-term personality development. According to the TESSERA framework, the relocation to a nursing home in later life disrupts the familiar life routines and social environments of the new residents, potentially acting as a triggering situation for changes in personality traits. Observing the immediate changes in personality states (e.g., social activity and daily routines) post-relocation and their interplay could provide valuable insights into the underlying mechanisms of personality trait development during transitions to nursing homes. Notably, a change in one state does not only lead to a change in the corresponding trait (Geukes et al., 2018). According to network theory (Cramer et al., 2012), a change in one central state, due to its centrality in the individual's

personality network, will not only directly affect its corresponding traits but may also affect the stability and change of states in other domains through the network's connectivity pathways. For example, increased agreeableness might be achieved by increasing social interaction and interpersonal trust, which in turn enhance extraversion, or by reducing neuroticism manifested from social anxiety. Such changes in state can form a chain reaction throughout personality development, evolving over time and exhibiting different characteristics at different life stages or under various environmental factors. Thus, we will further hypothesize that relocating to nursing homes triggers changes in the Big Five personality states of older adults, and that the interactions among these states will collectively contribute to the long-term development of personality traits across domains.

Personality is closely linked to social activity, with the structure of the Big Five personality traits reflecting reliable correlations, particularly with agreeableness and extraversion in social contexts (Nezlek et al., 2011). From the perspective of the personality-relationships transaction (Neyer et al., 2014), the association between life events and personality change can be seen as a result of the interaction between social activity and personality. Research has shown that a later life relocation, resulting in decreased social activity, correlates with lower extraversion and increased neuroticism among residents (Wang et al., 2002). Moreover, according to the personality and social relationships framework (PERSOC; Back et al., 2011), changes in state-level personality and social activity, and their interactions, provide mechanisms for the long-term development of personality traits.

Disruptions of daily routines and a reduction in the diversity of daily life are among the

most direct impacts of relocations to nursing homes for older adults (Yong et al., 2021; Zisberg & Gur-Yaish, 2017). In nursing home environments, many routines, like dining and social activities, are strictly managed externally. The uniform routine practices of nursing homes often do not match the previous lifestyle habits of older people, making it difficult for them to maintain their original daily routines. Additionally, health status, facility conditions, and standardized schedules limit the diversity of daily routines available for the older adults. An individual's daily routine is often a specific reflection of their personality, and daily routines may provide opportunities for or impose restrictions on the expression of certain states (Lindner et al., 2024). Disruptions in daily routines and reductions in routine diversity can subtly influence personality traits. These cumulative subtle changes may be an important process by which life events, such as relocating to a nursing home, change personality traits through a bottom-up mechanism.

Overall, we will hypothesize that during the transition to nursing homes, the changes in personality states, social activity, and daily routines and their interactions constitute short-term processes of trait development (*H3*). These repetitive short-term processes subsequently influence the long-term development of personality traits.

#### **5.1.4 Summary**

With this study we hope to conduct a comprehensive and in-depth longitudinal investigation of the long-term development and short-term processes of personality change during transitions to nursing homes in old age, as illustrated in our research framework (Figure 5.1). We hope to provide new and reliable insights regarding personality development in old

age and guide further personality interventions to enhance the well-being of nursing home residents. In summary, this study will explore the following questions and hypotheses:

***RQ1:*** Does relocation to a nursing home affect the personality traits of older adults?

***H1:*** Relocation to nursing homes will significantly impact the personality traits of older adults, resulting in higher agreeableness and neuroticism, and lower conscientiousness.

***RQ2:*** How do age, gender, health status, cognitive function, and subjective perceptions about the relocation moderate these effects?

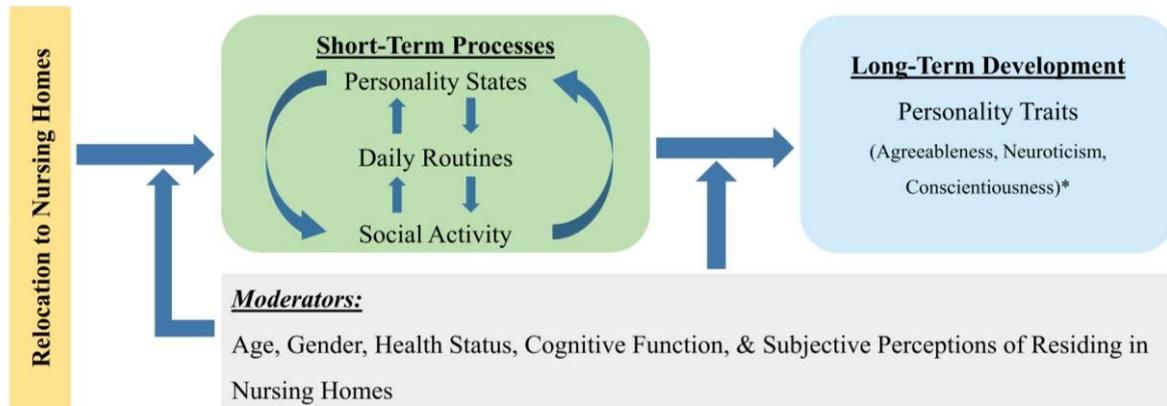
***H2:*** The impact of relocation on personality traits will be moderated by age, gender, health status, cognitive function, and subjective perceptions of the relocation.

***RQ3:*** Through what mechanisms does relocation to nursing homes affect personality traits?

***H3:*** The long-term development of personality traits will be mediated by changes in personality states, social activity, and daily routines post-relocation.

**Figure 5.1**

*Research Framework*



**5.2 Methods**

**5.2.1 Participants**

This study plans to recruit 120 participants aged 60 years and above. The sample size estimation is based on previous related studies and determined through a power analysis using G\*Power (version 3.1.9.7). It is anticipated that including 109 participants in this study will achieve 80% power at the 0.05  $\alpha$  level, with an expected medium effect size ( $f^2 = 0.15$ ). Ten percent, that is, 11 additional participants will be included to account for potential attrition and ensure robust statistical analysis. The participants will be recruited from two groups: a relocation group (experimental group), consisting of 60 older adults who will move into a nursing home, and a control group, consisting of 60 older people who have not relocated in the past 2 years and continue to reside in their private homes.

**Recruitment.** To ensure the representativeness of the sample and minimize selection bias, this study will use a purposive sampling strategy to recruit older people including those of

different ages, genders, and health statuses. Recruitment will be conducted through multiple concurrent channels, aiming to maximize the diversity and representativeness of the sample, covering different socioeconomic backgrounds and residential situations. Major recruitment channels include online advertisements, email lists, flyers, news articles, and acquaintance referrals. These channels will be used for recruiting participants for both the experimental and the control group. Additionally, considering that most nursing home residents are either directly transferred from hospitals or registered on waiting lists before admission to nursing homes, this study will also collaborate with local hospitals and nursing homes to send recruitment information to potential participants. This study is currently in the initial phase of collaborator recruitment, and participant recruitment has not yet begun.

**Eligibility criteria.** After providing informed consent, all potential participants will be screened for eligibility. Inclusion criteria are being at least 60 years old and having sufficient cognitive functioning to independently complete all study assessments. Cognitive functioning will be evaluated in two stages. First, individuals with a medically confirmed diagnosis of severe cognitive impairment will be excluded at recruitment. Second, all participants will complete the Montreal Cognitive Assessment (MoCA) during the baseline assessment. The MoCA is a widely used instrument for evaluating overall cognitive functioning in older adults. A score below 18 will be considered indicative of moderate to severe cognitive impairment and insufficient capacity to complete the intensive follow-up survey (Canadian Task Force on Preventive Health et al., 2016). These individuals will not proceed to the follow-up phase of the study. To reduce potential confounding effects related to recent residential changes, participants

in the control group must not have relocated within the past two years.

### **5.2.2 Design**

This study will use a prospective cohort design with three main phases (see Figure 5.2), including a baseline assessment, a daily diary assessment for 28 days, and a monthly assessment for 6 months. For older adults relocating to nursing homes (i.e., experimental group), these phases correspond to the transitional stages of entering a care facility: preparation, initial transition, and adaptation. Each phase will include specific measurement points to capture the psychological and social dynamics associated with transitioning into a care facility. All data collection will be carried out by trained researchers to ensure data consistency and accuracy. The study protocol has been reviewed and approved by the Ethics Committee of the Institute of Psychology at Heidelberg University (Approval No: AZ Sun 2023 1/2).

### **5.2.3 Procedures**

Before the commencement of the study, all eligible respondents will be informed about the general nature and objectives of the research. After providing informed consent, participants will undergo a series of three assessment phases over a period of 7 months. When participants choose to withdraw or are unable to complete the study, the specific reasons (e.g., health, interest, study burden) and timing of the withdrawal will be recorded and saved, and factors that may affect the results will be adjusted in the final report. Additionally, measures such as regular follow-ups and reminders will be implemented to minimize participant dropout.

If a control-group participant relocates to a nursing home within one month following the baseline assessment, they will be invited to continue in the study, with renewed consent,

and will restart the daily assessment phase (Phase 2). If a sufficient number of such cases is reached ( $n \geq 10$ ), these participants will be exploratorily reclassified into a separate subgroup (“unexpected relocation subgroup”) to allow for the examination of personality change trajectories following unanticipated residential transitions. If the number of such cases remains small ( $n < 10$ ), these participants will be recorded as dropouts and will not be analyzed as a distinct subgroup.

If a relocation occurs after completion of the daily assessment phase (i.e., after completing the first two phases of measurement), monthly assessments (Phase 3) for those participants will be discontinued. The timing and reason for relocation will be recorded, but these individuals will not be reassigned to the relocation subgroup to avoid biases occurring from repeated measurements. To maintain the intended sample size, new participants will be recruited to replace those who withdraw.

**Preparation phase (baseline measurement, T1).** Baseline assessments will be conducted for experimental-group participants before relocation, at a mutually agreed-upon time, and for control-group participants immediately following enrollment. Measures collected at baseline include demographic characteristics, self-rated health, cognitive function, Big Five personality traits, social activity, daily routines, and subjective perceptions of nursing home living. Trained research assistants will administer all baseline assessments and subsequently provide participants with instructions about the procedures for daily and monthly follow-up assessments, including questionnaire distribution and collection.

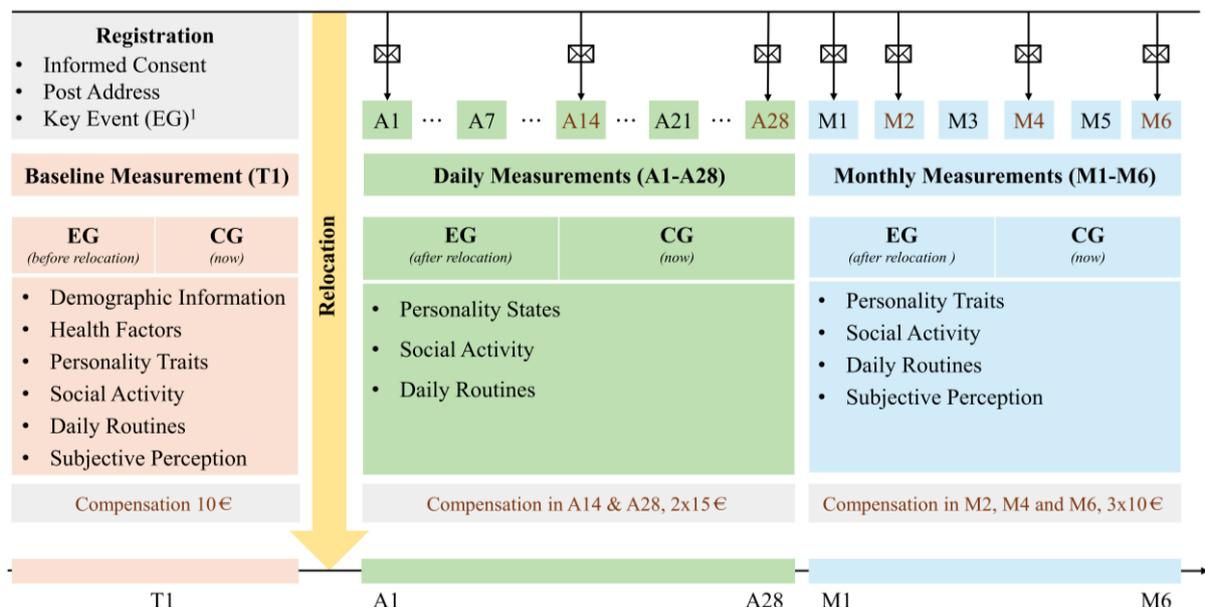
**Initial phase of transition (daily surveys, A1-A28).** Beginning on the day of relocation,

participants will complete daily surveys for 28 days to assess their personality states, social activity, and daily routines. The control group will start their daily surveys 1 month after the baseline measurement and receive the same measurements.

**Adaptation phase (monthly surveys, M1-M6).** Monthly follow-up surveys will begin 1-month post-relocation and continue for 6 months for the experimental group. This phase will continue to track changes in older adults’ personality traits with the administration of measures consistent with the baseline measurements, but without repeated measures, for relatively stable demographic information. The control group will commence monthly surveys two months after the baseline measurement, aligning the timeline and measurements with the experimental group to evaluate stability or natural change in their condition over time (see Figure 5.2 for details).

**Figure 5.2**

*Research Flowchart*



*Note.* EG = experimental group; CG = control group. <sup>1</sup>Record the possible time of relocation and organize how and when the questionnaires will be distributed for daily measurements.

Reminders will be sent to participants who need them on the date the envelope logo appears to ensure that participants are able to successfully complete the study.

#### 5.2.4 Measures

**Accommodation type.** The type of accommodation in which the older people are residing will be recorded as a dichotomous variable (0 = nursing home; 1 = private home).

**Personality traits.** The Big Five Inventory-2-Short (BFI-2-S) will be used to assess the five personality traits of agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience in older adults. The BFI-2-S is simplified from the 60-item BFI-2 inventory and consists of 30 items, six items per domain, rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The BFI-2-S has been validated for strong internal consistency and convergent validity, ensuring that the key dimensions of personality are captured effectively while reducing the burden on respondent (Soto, 2019).

**Personality states.** In this study, we will employ the adjective measurement approach proposed by Fleeson (2001) for bipolar disorder, using a 10-item bipolar rating scale to assess participants' daily personality states. Each personality dimension will be assessed through two items, using a 1 to 7 Likert bipolar rating scale, contrasting two adjectives: *extraversion* (quiet, assertive vs. talkative, assertive); *agreeableness* (cold, resentful vs. empathetic, forgiving); *conscientiousness* (chaotic, lazy vs. organized, hardworking); *neuroticism* (pessimistic, mood-optimistic vs. emotionally stable); and *openness* (disinterested, uncreative vs. interested, creative). Except for the two items in the neuroticism dimension, which use reverse scoring, the scoring for all other dimensions will be positively oriented.

**Social activity.** Social activity will be assessed by quantifying the frequency, manner, and quality of interactions with key social relationships, including partners, children, grandchildren, other relatives, friends, caregivers, and neighbors. Interaction frequency will be quantified based on the regularity of contact: multiple times a day (6 points), once a day (5 points), several times a week (4 points), once a week (3 points), two to three times a month (2 points), and once a month (1 point). The manner of communication will be coded based on the intimacy and immediacy of the communication: face-to-face (3 points), telephone (2 points), and video communication (1 point). The quality of interactions and anticipation of future interactions will each be assessed on a 5-point scale, ranging from “very unpleasant or not at all looking forward to” (1 point) to “very pleasant or very much looking forward to” (5 points). Each participant’s total social activity score will be calculated by summing the scores for interaction frequency, manner, quality, and expectations across all types of social contacts.

**Daily routine.** This study will also assess the daily routine of older adults, using a customized questionnaire called the Scale of Older Adults’ Activities Routine (SOAR; Zisberg et al., 2009) and the Activities of Daily Living types (ADL; Lawton & Brody, 1969). The questionnaire categorizes routines into 16 types: self-care, cooking, housekeeping, working, shopping, personal relaxation, group activities, volunteering, social visits, receiving visitors, outdoor sports, indoor exercise, prayer, recreational activities, communication, and travel. Two measurement methods are utilized: monthly and daily questionnaires. On the monthly questionnaire, participants rate each routine based on frequency, with scores ranging from 1 (several times a day) to 8 (never). On the daily questionnaire, the scoring ranges from 1 (seven

times a day) to 8 (never). The overall routine frequency for an individual is calculated by averaging the frequency scores of all routines. Additionally, routine diversity is assessed by counting the number of routine categories in which participants report engagement, excluding those rated as “never”.

**Subjective perceptions of residing in nursing homes.** This study will also employ two items selected from the Event Characteristics Questionnaire (ECQ; Luhmann et al., 2021), specifically from the dimensions of valence and challenge, to assess the subjective perceptions of older people residing in nursing homes. These items were suitably adjusted to better align with the objectives and design requirements of our research. Specifically, the assessment items will include “Residing in a nursing home would be positive for me” and “Residing in a nursing home would be stressful for me”. These items will be scored using a 5-point Likert scale, ranging from 1 (does not apply at all) to 5 (applies completely).

**Cognitive function.** Participants’ cognitive functioning will be assessed using the Montreal Cognitive Assessment (MoCA; Nasreddine et al., 2005), a well-validated instrument designed to evaluate overall cognitive functioning in older adults. The MoCA assesses multiple cognitive domains, including visuospatial and executive abilities, memory (recall and registration), attention, language, abstraction, and orientation. It will be administered by trained research staff using standardized procedures. The total score ranges from 0 to 30, with higher scores indicating better cognitive functioning. According to revised scoring criteria, a total score below 18 is considered indicative of moderate to severe cognitive impairment in this study (Canadian Task Force on Preventive Health Care et al., 2016).

**Sociodemographic and health variables.** This study will assess the sociodemographic variables of chronological age and gender (1 = male, 2 = female). Participants' self-perceived health status will be assessed using three items, including "How would you rate your current state of health?" with responses ranging from 1 (excellent) to 5 (poor); "How severe is your pain or physical discomfort at the moment?" with responses ranging from 1 (not present) to 5 (extreme); and "Do you currently suffer from a chronic illness?" with responses coded as 1 (no) and 2 (yes).

### **5.2.5 Data Analysis Plan**

The data analysis for this study will primarily be conducted in R (Version 4.2.3; R Core Team, 2022). To test hypotheses 1 and 2, we will analyze the effects of relocations on personality traits using our baseline and monthly measurements data and examine the moderating effects of age, gender, health status, and subjective perceptions of residing in nursing homes. This analysis will be conducted through a series of multilevel models that incorporate robust sensitivity analyses to account for any potential biases due to participant dropout or transition from control to experimental groups.

Moreover, multivariate time-series analyses will be employed to explore the dynamic relationships between personality state, social activity, and daily routine from the daily measurements. Upon completion of these analyses, a series of structural equation models (SEMs) will be constructed using the baseline, daily, and monthly data to examine the mediating roles of personality state, social activity, and daily routine in the relationship between relocation and changes in personality traits, possibly validating H3.

### 5.3 Discussion

The “My New Home” study outlined in this research protocol will hopefully offer a substantial advancement concerning later life personality development and the effects of relocations to nursing homes in later life. Due to high attrition rates and tracking difficulties, most traditional longitudinal panel studies have excluded nursing home residents (e.g., SOEP, MIDUS, HILDA), resulting in a persistent lack of understanding about the processes and influencing factors of personality development in this demographic (Fiordelli et al., 2021; Ries et al., 2017). To our knowledge, the present future study will be the first longitudinal study to focus on the personality development of nursing home residents. We confidently anticipate that the findings from this study will provide reliable new insights regarding the importance of later life relocations as catalysts of personality development.

Our study protocol will have several strengths. First, this will be a comprehensive prospective cohort study design, and we have developed a corresponding measurement plan based on the transition phases into nursing homes, including baseline assessments (preparation phase before moving), daily assessments (initial transition phase), and monthly assessments (adaptation phase). This approach will meticulously track the personality development trajectories of residents at different stages of transition to nursing homes, hopefully overcoming the limitations of previous studies that relied solely on pre- and post-measurements. Moreover, unlike traditional annual follow-up studies (Denissen et al., 2019; Specht et al., 2014), our approach should be able to more accurately capture the transient responses of personalities, thereby gaining a deeper understanding of the short-term changes and long-term developmental

mechanisms of personality development (e.g., Jackson & Wright, 2024; Wrzus & Roberts, 2017). The results might capture the dynamic trajectories of personality development in adulthood triggered by a move to a nursing home, providing reliable evidence for the causal relationship between major life events and personality in late adulthood. Second, by setting up a control group, this study should be able to effectively distinguish between the effects of relocating to nursing homes on personality development from the general pattern of personality change in late adulthood. Third, our research methodology will also consider individual differences, and including relevant moderating variables and covariates in the model will allow for a comprehensive and in-depth exploration of the impact of later life relocations on personality traits, also possibly contributing to the validation and support of previous research findings. Finally, by employing techniques like time series and SEM, we will be able to obtain reliable statistical models of the dynamic trajectory of personalities among older people before and after relocation.

One of the main challenges to the implementation of this study will be the difficulty of recruiting a sufficient number of older people who intend on moving to a nursing home in a single city or region. Typically, due to limitations of available resources, nursing homes often have long waiting lists, and homes often only accept a few new residents each year; for example, in the Heidelberg region, some nursing homes may only welcome 1-2 new residents per year. A possible solution to this dilemma is to expand the scope of the research and recruitment through cross-regional/country collaboration with more researchers. Such an approach might not only contribute to a smoother implementation of this study but might also enhance the

robustness and generalizability of its findings.

As second challenge might be related to sample composition. Systematic differences between people living in nursing homes and in private homes, which affect both the initial participation in the study (i.e., selection biases) and the selective drop-out due to health issues (i.e., survivorship bias). Moreover, because participants with moderate-to-severe cognitive impairment (MoCA < 18) were excluded, the nursing-home cohort under-represents the most cognitively frail residents, potentially attenuating relocation effects and limiting generalizability to the full spectrum of institutionalized older adults. We will handle these biases through (a) thorough description of both groups with respect to demographic, socioeconomic, and health indicators, and (b) attrition analyses over time.

Overall, the proposed “My New Home” research, via its comprehensive longitudinal study design, will aim to provide new and practical insights into the impact of later life relocations on personality development. We hope our future findings both help guide future interventions aimed at improving nursing home residents’ well-being and promote successful aging.

## CHAPTER 6

### General Discussion

The cumulative evidence presented in the preceding chapters of this dissertation indicates that late-life relocation, as a major life event, is significantly associated with older adults' mental health and personality development. Older adults' preexisting personality traits exert selective effects on their relocation decisions. Although different types of relocation influence personality change trajectories in different ways, relocation generally serves as a driving force for personality development among older adults (socialization effect). Moreover, the impact of this transition exhibits marked heterogeneity, which is systematically moderated by individual characteristics and macro-level contextual factors. In the following sections, I first provide a comprehensive discussion of the key findings of this dissertation, as they directly address the core research questions. Second, I critically evaluate the overall strengths and limitations of the present project and propose feasible directions for future research. Finally, based on the research findings, I outline a series of practical and policy suggestions aimed at promoting successful aging.

#### 6.1 Summary of Key Findings

In this section, I integrate the findings from the three empirical studies covered in this dissertation and discuss them in relation to the core research questions posed in the Introduction chapter. The findings from these studies are interconnected, and times, the results of one study relate to more than one research question. To ensure clarity and focus, I highlight the research findings most directly relevant to each specific research question when addressing them.

### ***6.1.1 RQ1: Late-Life Relocation as a Stressor for Mental Health and Personality Development***

The results from Chapter 2 supported the starting point of this study: late-life relocation, as a psychosocial stressor, is closely associated with older adults' mental health and personality traits (RQ1). The results showed that, within the specific context of China, older adults who experienced policy-driven, involuntary relocation from rural to urban areas generally reported higher levels of anxiety. In addition, the study revealed that excessive reassurance-seeking (ERS), which emerged as an attempt to restore a sense of security after disruption of the original living environment and social networks, did not serve the expected buffering function under conditions of high stress. In contrast, ERS exacerbated older adults' anxiety by enhancing their attention to negative information (ANI). This finding supports the previous view that late-life relocation, as a stressful event, negatively impacts older adults' mental health through changes in cognition and behavior (Keister, 2006; Robinson, 2002; Wiyono et al., 2019).

Unexpectedly, our research indicated that, contrary to previous studies, resilience does not always function as a protective factor (Rutter, 1985; Steinhardt & Dolbier, 2008). In this study, for individuals with higher resilience, the positive association between ERS and ANI was stronger, thereby reinforcing the mediating effect through ANI. One potential explanation is that older adults with high resilience may possess greater agency to mobilize internal and external resources to cope with stressful situations (Kumpfer, 2002). But, when older adults are placed in a situation in which their social support networks are systematically disrupted, this proactive coping tendency (e.g., ERS) may be repeatedly thwarted. As a result, they may focus

more on negative feedback, ultimately falling into an adaptation dilemma characterized by “the more effort, the more anxiety”.

In addition, this study provides a bridge for the transition of the dissertation’s focus from mental health to personality development. According to the hierarchical structure of the Big Five personality theory, anxiety is one of the primary state-level manifestations of neuroticism (Soto & John, 2017). The high levels of anxiety observed among older adults in this study can be considered preliminary evidence for the association between late-life relocation and personality traits. Moreover, since the participants in this study were policy-driven involuntary relocatees, their psychological responses largely exclude interference from the selection effects, more purely reflecting the socialization effects brought about by the relocation event itself. Therefore, these results also provide strong cross-sectional evidence supporting the longitudinal study in Chapter 4 concerning the separation of selection and socialization effects. Overall, the study in Chapter 2 provided a theoretical entry point for research on the association between late-life relocation and personality development, and together with the longitudinal study from Chapter 4, it established the driving role of late-life relocation in the process of personality development.

### ***6.1.2 RQ2: Personality Development During Late-Life Relocation Transitions***

The longitudinal study in Chapter 4 presented the full trajectory of changes in the Big Five personality traits of older adults before and after relocation (RQ2). The results suggested that there is no uniform relocation effect; community relocation and nursing home admission exhibited two distinctly different patterns of personality development.

The study indicated that personality changes before and after community relocation followed a mild transition process. Before relocation, personality differences between future movers and non-movers were already evident in baseline levels and developmental trends. Compared to non-movers, movers tended to be more extraverted, agreeable, and open, but they exhibited lower emotional stability and life satisfaction. This finding indicates that movers typically possess stronger environmental change needs and greater resource advantages for coping with relocation, validating the dynamic selection effect of personality–relationship interaction (Bühler et al., 2024). Furthermore, no immediate shock to personality traits was observed at the point of relocation, and the long-term developmental trajectories following relocation remained largely parallel to those of non-movers. This suggests that older adults' personalities exhibit considerable resilience during such relocations, consistent with the perspective of continuity theory (Atchley, 1989).

In marked contrast, the process of nursing home admission represents a multistage and more profound psychological transition. Several years before relocation, future nursing home residents had already embarked on a distinct developmental trajectory, characterized by a more rapid decline in all personality traits and life satisfaction compared to their peers. This pattern suggests that nursing home admission may result from a long-term decline process rather than an isolated sudden event (Berete et al., 2022; Palese et al., 2016). In this context, moving into a nursing home also brought about a direct and comprehensive impact on the personality traits of older adults. At the time of relocation, sharp declines were observed in emotional stability, agreeableness, conscientiousness, and openness. These findings are consistent with previous

research on role-exit events, such as retirement (Asselmann & Specht, 2021; Schwaba & Bleidorn, 2019). Moreover, the process of personality adaptation following nursing home admission showed prolonged and complex characteristics. For example, emotional stability and conscientiousness exhibited a brief recovery trend after the initial shock, but this appeared only temporary, followed by a subsequent decline. This pattern aligns with the sensitive response model of adaptive traits to stressful events proposed by Denissen et al. (2019). Taken together, the continuous changes preceding nursing home admission, the immediate shock at admission, and the long-term nonlinear adaptation process afterward collectively and profoundly reshape the personality trajectories of older adults.

Overall, the above findings lend support to the personality–relationship transactions framework (Bühler et al., 2024). And, the studies respectively charted the full trajectory of personality changes during community relocation and nursing home admission, providing a comprehensive and concrete response to the second core research question from a dynamic, process-oriented perspective.

### ***6.1.3 RQ3: Moderating Effects of Relocation Type, Individual Characteristics, and Macro-Level Factors***

The third core research question (RQ3) focused on the heterogeneity of relocation effects, specifically how relocation type, individual characteristics, and macro-level contexts moderate the association between late-life relocation and personality development. Findings from Chapters 2 and 3 together provide answers to this question.

First, at the event level, the type of relocation was found to be a key moderator of

relocation effects' heterogeneity. As mentioned earlier, comparing the two parts of Chapter 4 study revealed that community relocation and nursing home admission exhibit fundamentally different patterns of impact on personality development. The former resembled a mild transition, while the latter was a profound psychological and personal transformation. This finding aligns with recent studies on life events, indicating that even within the same event category, differences in nature and type can lead to significant differences in the direction, intensity, and duration of their effects (Bleidorn et al., 2018; Luhmann et al., 2021; Schwaba et al., 2023).

Second, at the individual level, personal resources and health status serve as important moderating factors. The study in Chapter 3 provided crucial evidence for this view. The findings revealed that, when longitudinal changes were not considered, the observed personality differences between nursing home residents and their peers, such as lower conscientiousness, could largely be explained by demographic factors including age, gender, and health status. These results suggest that individual-level characteristics are key to understanding the heterogeneity of relocation impacts. They may serve as antecedents for selecting different residential environments and may also moderate individuals' adaptation processes after relocation. These moderating effects have also been observed in previous studies of life events such as retirement and divorce (Schwaba & Bleidorn, 2019; van Scheppingen & Leopold, 2020).

Finally, at the broader macro-contextual level, the cross-national comparisons in Chapter 3 provided preliminary yet important support for the moderating role of macro-contextual factors. The study showed that national-level resources and socioeconomic status significantly moderated the association between accommodation type and specific personality

traits. For example, in countries with greater availability of long-term care beds, the association between nursing home residence and lower extraversion as well as higher neuroticism was weakened, potentially reflecting the buffering effect of higher-quality nursing care resources. Interestingly, in countries with higher Human Development Index (HDI), nursing home residency was associated with lower extraversion, suggesting that high levels of economic development do not necessarily translate directly into effective psychosocial support. These findings correspond with the perspective that macro-level environments shape personality (e.g., Bleidorn et al., 2013) and emphasize the necessity of considering macro-contextual factors and conducting cross-national comparative research when examining life events influenced by broader societal contexts.

In summary, integrating the findings from Chapters 3 and 4 consistently suggests that the impact of late-life relocation on personality development is highly contextual and individualized. Its effects are moderated at multiple levels, including event type, individual demographic and health characteristics, and the broader societal context.

## **6.2 Strengths, Limitations, and Future Directions**

The primary strength of this dissertation lies in its systematic, multilevel, and multi-method research design. By integrating three empirical studies, this project spanned diverse cultural contexts (China, Europe, and the United States) and combined different research methods, including cross-sectional mechanism exploration, large-scale cross-national comparative analysis, and longitudinal trajectory analysis. Together, these approaches enabled the first comprehensive exploration of the association between later-life relocation and

personality development. Since the primary strengths and limitations of each study have already been discussed in the corresponding chapters, here I mainly outline the broader strengths, limitations, and future directions that run throughout this project.

### ***6.2.1 Strengths and Limitations***

This dissertation provides a comprehensive analysis of the complex relationship between late-life relocation and personality development through three logically progressive studies. The study in Chapter 4 employed the event-centered PLMM analyses to examine the relocation effect by decomposing it into three phases along the timeline: the selection process, immediate shock, and long-term adaptation. This approach provided a reliable basis for understanding personality development trajectories before and after the event.

Nevertheless, several limitations of this dissertation's research must be acknowledged. First, relocation events were dichotomously coded as either occurring or not, without direct measurement of participants' subjective experiences of relocation. This approach may have led to an underestimation or misjudgment of individual differences in relocation impacts. Previous studies have shown that individuals' subjective perceptions are a key source of differences in the impact of the same event (Luhmann et al., 2021; Rakhshani et al., 2022; Schwaba et al., 2023). Second, the four-year measurement interval for personality in the HRS database used in the study (Chapter 4) prevented us from capturing the micro-processes of personality state changes in the immediate post-relocation period. The observed immediate shock to personality traits following nursing home admission suggests that changes in personality traits may accumulate from short-term state-level fluctuations. Third, the present research design cannot

fully distinguish the sources of observed pre-move differences. The different developmental trajectories observed between the relocation and non-relocation groups prior to relocation (Chapter 4) may reflect not only selection effects based on personality, but also anticipatory effects arising from expectations of upcoming life changes (Asselmann & Specht, 2021; Lawes et al., 2025; Luhmann et al., 2014). Fourth, all studies in this dissertation relied on self-report measures of personality and related variables, which are susceptible to biases such as social desirability and memory distortions (McDonald, 2008). Finally, Chapter 2 employed convenience sampling, whereas Chapters 3 and 4 relied on large longitudinal databases that typically exclude the most vulnerable older adults, such as those with severe cognitive impairment. These factors limit the external validity of the research findings.

### **6.2.2 *Future Directions***

Taking into account the limitations of the current research, in Chapter 5 I proposed a prospective intensive follow-up study protocol, which also serves as a bridge for the future extension of the research logic developed in this dissertation.

The primary direction for future research is to explore the “black box” of change from personality states to traits. The short-term discontinuities in personality observed after nursing home admission in Chapter 4 support the hypothesis that trait-level shifts may be mediated by cumulative changes in personality states, social activity, and daily routines after relocation. This pattern highlights the necessity of conducting intensive longitudinal follow-up measurements after the event. Based on this, I presented a prospective cohort study design in Chapter 5 that aims to capture the micro-processes of personality changes by conducting intensive tracking

measurements before and after relocation, including daily and monthly assessments. Through this intensive longitudinal design, we will be able to move beyond examining what has changed to addressing how and why these changes occur, thereby providing direct empirical validation for modern process models of personality development, such as the TESSERA framework.

Building on the study protocol outlined in Chapter 5, future research may be extended in the following aspects to address broader limitations of this dissertation. First, as wearable mobile devices become increasingly employed in personality research, future studies on personality development in later life are expected to integrate ecological momentary assessment with digital devices (Lee et al., 2024; Wiernik et al., 2020). By continuously monitoring real-time fluctuations in personality-related states and associated physiological indicators, researchers will gain access to more objective data with higher temporal resolution. Second, by incorporating third-party reports from family members, friends, or caregivers, future studies can include very old or cognitively impaired nursing home residents. This approach will reduce sample attrition and enhance the representativeness and external validity of research findings. Finally, to better distinguish between selection effects and anticipatory effects, future research could begin tracking participants from the relocation intention stage. For example, by collaborating with nursing homes, researchers could follow older adults who are on the waiting list and conduct comprehensive analyses that combine repeated measurements with changes in their attitudes toward nursing home admission.

### **6.3 Practical Implications**

The central goal of psychological research is to enhance the well-being of individuals

and communities. Therefore, in the final part of this dissertation, I discuss the practical significance of the findings and propose concrete, actionable recommendations to promote the well-being and successful adaptation of older adults following relocation.

### ***6.3.1 Individuals and Families: Enhancing Understanding and Support***

This dissertation emphasized the importance of providing psychological support to older adults before and after relocation. Research has shown that relocation, particularly moving into a nursing home, is a radical process accompanied by psychological shocks. With the global aging problem becoming increasingly severe, the likelihood of nursing home admission among older adults will continue to rise (Spillman & Lubitz, 2000; Szczepura, 2011). During the transition to a nursing home, family members should increase open communication with older adults, give them greater autonomy in choosing a facility, and reduce their concerns about the nursing home environment. In addition, the findings from Chapter 2 regarding excessive reassurance-seeking suggested that family members should learn to recognize such behaviors. When older adults repeatedly seek reassurance, patient and positive responses should be provided to prevent them from falling into an adaptation dilemma due to excessive focus on negative information.

### ***6.3.2 Nursing Homes: Targeted and Proactive Support***

For care facilities and caregivers, the findings of this research highlight the importance of providing multi-stage, targeted support to older adults both before and after nursing home admission. The findings clearly indicate that the moment of nursing home admission represents a peak period of psychological shocks. Nursing homes should establish dedicated welcome and

orientation programs for new residents to help them quickly understand and adapt to nursing home life. For example, they could establish peer support groups to help new residents quickly build new social networks. Moreover, caregivers should also consider the existing personality traits and personal resources of the older adults, design personalized activity arrangements, and help them build a bridge of continuity between home and nursing home life.

### ***6.3.3 Social Governance: Optimizing Resource Allocation and Aging Policies***

The findings of this dissertation reconfirm that relocation, as a major life transition in later life, exerts both immediate and lasting impacts on older adults' mental health and personality. Therefore, when promoting policies related to older adults' living arrangements, such as urbanization and the planning of retirement communities, public administration should also consider providing psychological support services both before and after relocation. Furthermore, the findings suggested that greater availability of high-quality long-term care resources can partially moderate the negative impact of nursing home admission on personality. Therefore, policymakers should not only focus on expanding the coverage of long-term care facilities but also emphasize quality evaluation and monitoring of care services. Finally, the study observed two distinct trajectories of community relocation and nursing home admission, providing empirical support for promoting "aging in place" policies. When relocation is unavoidable, small-scale, embedded, and human-centered models of care should be encouraged, while ensuring older adults' rights to informed decision-making and autonomy in the relocation process (Hatano et al., 2017; Zhou & Zhang, 2022).

## 6.4 Conclusion

Through three empirical studies and a study protocol, this dissertation systematically examines the association between late-life relocation and personality development, proposes extendable directions for future research. The findings indicate that relocation, as a psychosocial stressor, is associated with mental health and personality development among older adults. From cross-sectional studies to event-centered longitudinal evidence, I explored the impact of late-life relocation on personality traits across three stages: pre-relocation selection effects, immediate shocks at relocation, and post-relocation long-term effects. The results revealed that community relocation is characterized by a mild personality transition and improved life satisfaction, whereas nursing home admission brings about more pronounced shocks and complex, enduring socialization effects on personality traits. These average patterns are not uniform across all individuals. Personal resources (such as age, gender, and health status) and macro-level contextual factors (such as national LTC resource accessibility and economic development levels) moderate the effects of relocation. The findings further supported the view that changes in personality traits may accumulate through short-term fluctuations in state-level processes, delineating the plasticity and boundary conditions of personality development. Furthermore, the results also carry important practical implications. They suggest that caregivers and policymakers should provide targeted, stage-specific support around relocation, enhance the accessibility and quality of care facilities, and prioritize the development of “aging in place” policies. Finally, in the future, it will be important to conduct prospective and intensive research that directly tracks the state-to-trait pathways during older adults’ transition to nursing

homes. Such research will provide a more comprehensive understanding of personality development mechanisms and will advance the evaluation and improvement of personality development theories in late adulthood.

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## Supplemental Materials

### Supplemental Materials for Chapter 3

#### *Sample Selection Process*

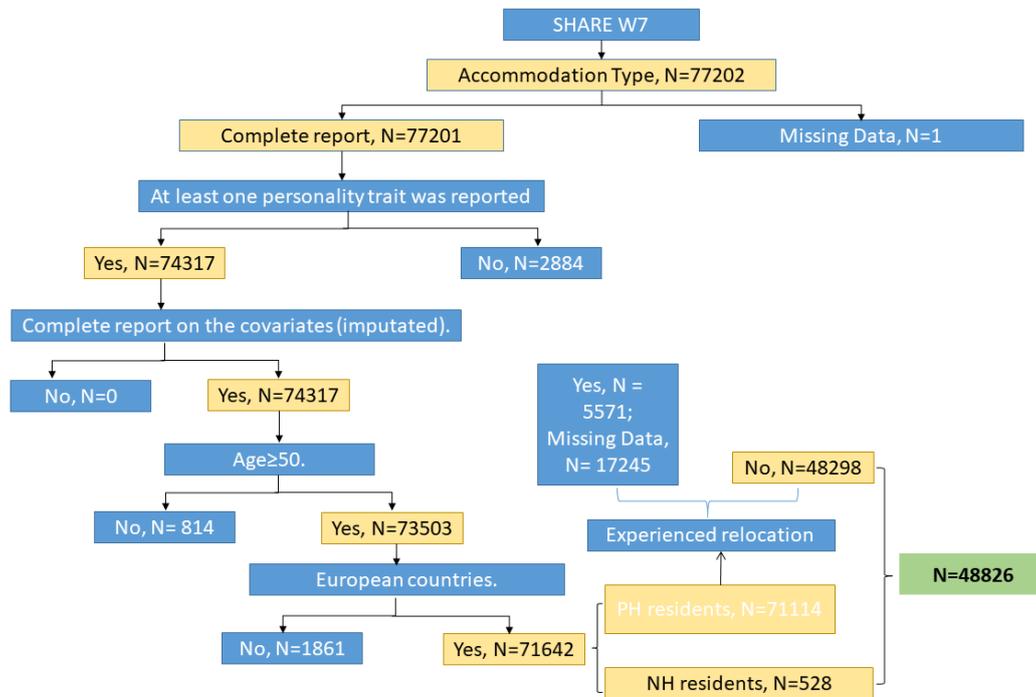
Figure S3.1 illustrates the stepwise data selection process used in this study based on SHARE Wave 7. Initially, older adults who reported their residential type (nursing home vs. private housing) were identified, with one case excluded due to missing residential information (final  $N = 77,201$ ). Next, participants who provided data for at least one of the Big Five personality traits were retained ( $n = 74,317$ ; missing  $n = 2,884$ ). Cases with complete imputed data on covariates—including nationality, age, gender, education, partnership status, self-perceived health, and activity limitations—were then selected, with no further exclusions at this stage. Because SHARE collected data on spouses of individuals aged 50 and older regardless of the spouse's age, participants younger than 50 were excluded to ensure sample consistency. In order to focus on cross-national differences within the European Union, individuals from non-EU regions were also removed. Finally, to avoid potential confounding effects arising from recent environmental or social changes, older adults residing in private housing who reported a recent relocation ( $n = 17,245$ ) or had missing relocation data ( $n = 5,571$ ) were excluded from the control group.

The final analytic sample included 48,826 participants ( $N = 528$  nursing home residents;  $N = 48,298$  private home residents) meeting all eligibility criteria. This rigorous selection process ensured methodological coherence by addressing potential confounders related to age, geographical heterogeneity, and environmental stability, thereby strengthening the validity of

cross-group comparisons.

**Figure S3.1**

*Sample selection flowchart*



*Supplementary Results*

**Table S3.1**

*Descriptive Information and Bivariate Correlations Among Study Variables (Post-Matching)*

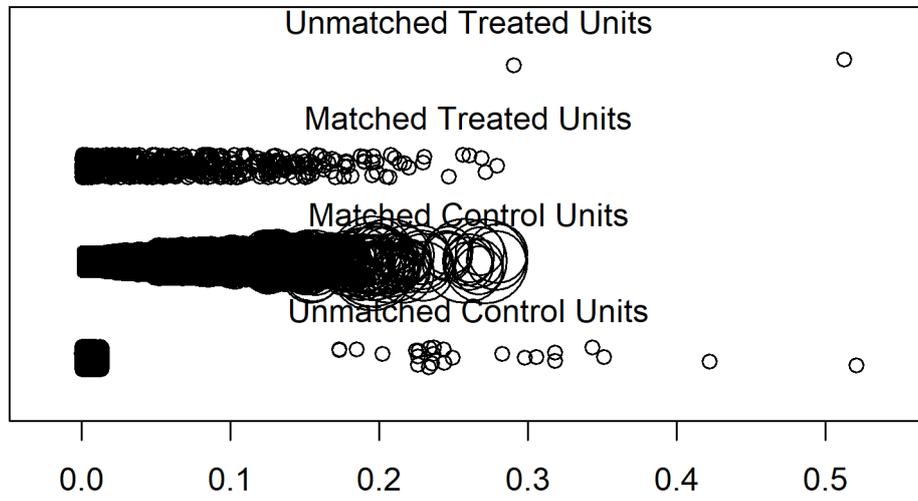
Variable	<i>M (SD)</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	74.58 (9.67)										
2. Gender	0.61 (0.49)	.02**									
3. Partnership	0.62 (0.49)	.11**	.31**								
4. Education	2.66 (1.52)	-.23**	-.08**	-.09**							
5. Self-perceived health	3.48 (1.02)	.24**	.03**	.06**	-.20**						
6. Activity limitation	2.13 (0.80)	-.23**	-.01	-.02**	.10**	-.57**					
7. Accommodation type	0.03 (0.17)	.12**	.02*	.08**	-.03**	.04**	-.08**				
8. Agreeableness	3.70 (0.81)	.05**	.05**	.04**	-.01	-.08**	.04**	.01			
9. Conscientiousness	4.06 (0.82)	-.02*	.05**	-.03**	.01	-.11**	.10**	-.02**	.14**		
10. Extraversion	3.44 (0.95)	-.04**	.02**	-.01	.06**	-.11**	.05**	-.01	.16**	.16**	
11. Neuroticism	2.67 (1.03)	-.01	.12**	-.01	-.11**	.19**	-.12**	.00	-.21**	-.12**	-.23**
12. Openness	3.27 (0.98)	-.09**	.05**	.01	.26**	-.08**	.03**	-.00	.01	.10**	.16**

*Note.*  $N_{post-match} = 18,640$  ( $N_{NH} = 526$ ,  $N_{PH} = 18,114$ ). Accommodation Type: 0 = private home, 1 = nursing home. Gender: 0 = male, 1 = female.

Partnership: 0 = not single, 1 = single. Education: 0 = pre-primary education to 6 = second stage of tertiary education. Self-perceived health: 1 = excellent to 5 = poor. Activity limitation: 1 = severely limited to 3 = not limited. \* $p < .05$ ; \*\* $p < .01$ .

**Figure S3.2**

*Distribution of Propensity Scores*



**Table S3.2***Frequency of Countries and Regions*

Area	Country	Pre-match		Post-match	
		Frequency	Percent	Frequency	Percent
Eastern Europe	Czech Republic	3733	7.6	1533	60
	Poland	1318	2.7	516	20.2
	Hungary	1187	2.4	497	19.5
	Bulgaria	6	0.0	6	0.2
	Slovakia	3	0.0	3	0.1
Western Europe	Austria	2703	5.5	1251	20.2
	Germany	3265	6.7	1110	17.9
	France	2829	5.8	1139	18.4
	Switzerland	2085	4.3	790	12.7
	Belgium	4232	8.7	1595	25.7
	Luxembourg	1052	2.2	313	5
	Lithuania	2	0.0	2	0.0
Southern Europe	Spain	3977	8.1	1385	23.6
	Italy	4112	8.4	1352	23
	Greece	2908	6	1032	17.6
	Portugal	957	2	297	5.1
	Slovenia	3338	6.8	1246	21.2
	Croatia	1672	3.4	541	9.2
	Cyprus	8	0.0	8	0.1
	Malta	17	0	17	0.3
Northern Europe	Sweden	2533	5.2	1035	25.8
	Denmark	2512	5.1	883	22
	Estonia	4357	8.9	2069	51.6
	Finland	14	0.0	14	0.3
	Latvia	6	0.0	6	0.1

**Table S3.3***Cohen's d Values for Personality Traits by Accommodation Type (Pre-Match)*

Personality Trait	Accommodation type	<i>n</i>	<i>M</i>	<i>SD</i>	Cohen's <i>d</i>
Agreeableness	PH	48208	3.68	0.81	.08
	NH	514	3.74	0.82	
Conscientiousness	PH	48209	4.11	0.79	-.19
	NH	509	3.96	0.83	
Extraversion	PH	48150	3.48	0.93	-.12
	NH	515	3.37	0.94	
Neuroticism	PH	48224	2.67	1.01	.02
	NH	517	2.69	1.04	
Openness	PH	48087	3.30	0.96	-.06
	NH	505	3.24	0.95	

*Note.* NH = Nursing Home, PH = Private Home.

**Table S3.4***Cohen's d Values for Personality Traits by Accommodation Type (Post-Match)*

Personality Trait	Accommodation type	<i>n</i>	<i>M</i>	<i>SD</i>	Cohen's <i>d</i>
Agreeableness	PH	18060	3.69	0.81	.06
	NH	513	3.74	0.82	
Conscientiousness	PH	18053	4.06	0.81	-.13
	NH	508	3.96	0.83	
Extraversion	PH	18024	3.44	0.95	-.08
	NH	514	3.37	0.94	
Neuroticism	PH	18065	2.67	1.03	.02
	NH	515	2.69	1.05	
Openness	PH	17987	3.27	0.98	-.02
	NH	504	3.24	0.95	

*Note.* NH = Nursing Home, PH = Private Home.

**Table S3.5**

*Regression of Accommodation Type on the Big Five Personality Traits (Post-Match)*

Personality Trait	$\beta$	SE	$t$	$p$
Agreeableness	0.05	0.04	1.29	.198
Conscientiousness	-0.11	0.04	-2.89	<.001
Extraversion	-0.07	0.04	-1.69	.091
Neuroticism	0.02	0.05	0.40	.692
Openness	-0.02	0.04	-0.53	.595

*Note.*  $N_{\text{post-match}} = 18,640$  ( $N_{\text{NH}} = 526$ ,  $N_{\text{PH}} = 18,114$ ).

**Table S3.6**

*Variance Inflation Factors (VIF) for Independent Variables in Regression Models*

Predictor	Agreeableness	Conscientiousness	Extraversion	Neuroticism	Openness
Age	1.14	1.14	1.13	1.14	1.14
Gender	1.11	1.11	1.11	1.11	1.11
Education	1.09	1.09	1.09	1.09	1.09
Partnership	1.13	1.13	1.13	1.13	1.12
Self-perceived Health	1.55	1.55	1.55	1.55	1.55
Activity Limitation	1.51	1.51	1.51	1.51	1.51
Accommodation Type	1.02	1.02	1.02	1.02	1.02

**Table S3.7**

*Multiple Regression (Post-Match)*

Variable	Agreeableness		conscientiousness		Extraversion		Neuroticism		Openness	
	$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>
Accommodation type	.01	0.35	-.07	-1.81	-.04	-0.87	.01	0.24	.02	0.48
Age	.01	9.30**	.00	2.71**	.00	-1.04	-.01	-9.70***	.00	-4.09***
Gender	.06	5.07**	.11	8.28***	.07	4.51***	.26	16.67***	.13	8.47***
Education	.00	-0.34	.00	-0.56	.03	5.81***	-.06	-11.49***	.17	34.90***
Partnership	.05	3.68***	-.08	-6.32***	-.03	-1.75	-.13	-8.03***	.03	1.68
Self-perceived health	-.08	-10.37***	-.06	-8.75***	-.10	-11.25***	.17	19.22***	-.03	-4.00***
Activity Limitation	.00	0.51	.06	6.43***	-.01	-1.30	-.04	-3.74***	-.03	-2.74**
R <sup>2</sup>	.01		.02		.01		.06		.08	
AR <sup>2</sup>	.01		.02		.01		.06		.08	
F(df)	38.46*** (7, 18565)		50.70*** (7, 18533)		38.91*** (7, 18530)		173.80*** (7, 18572)		216.20*** (7, 18483)	

*Note.*  $N_{post-match} = 18,640$  ( $N_{NH} = 526$ ,  $N_{PH} = 18,114$ ). Accommodation Type: 0 = private home, 1 = nursing home. Gender: 0 = male, 1 = female.

Partnership: 0 = not single, 1 = single. Education: 0 = pre-primary education to 6 = second stage of tertiary education. Self-perceived health: 1 = excellent to 5 = poor. Activity limitation: 1 = severely limited to 3 = not limited. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**Table S3.8***Regional Regression Analysis (Eastern, Northern, Southern, and Western Europe)*

Traits	Region ( $\beta$ [95% CI])			
	Eastern	Northern	Southern	Western
Agreeableness	.16 [-.02, .33]	.12 [-.04, .29]	-.04 [-.21, .12]	.03 [-.07, .14]
Conscientiousness	-.15 [-.34, .04]	-.17 [-.34, -.00]	-.05 [-.21, .12]	-.12 [-.22, -.02]
Extraversion	-.07 [-.24, .10]	-.18 [-.38, .01]	.12 [-.08, .32]	-.11 [-.24, .01]
Neuroticism	-.06 [-.28, .15]	.09 [-.10, .29]	-.16 [-.38, .05]	.14 [.01, .28]
Openness	.13 [-.08, .35]	-.08 [-.28, .13]	.04 [-.15, .23]	-.16 [-.29, -.03]

*Note.* Sample sizes varied by region due to population differences: Eastern Europe  $N = 2,555$  ( $N_{NH} = 76$ ), Northern Europe  $N = 4,007$  ( $N_{NH} = 119$ ), Southern Europe  $N = 5,878$  ( $N_{NH} = 87$ ), and Western Europe  $N = 6,200$  ( $N_{NH} = 247$ ).

**Table S3.9**

*Multilevel Results for Accommodation Type Predicting Personality Traits (Null and Main Effect Models, Including ICC)*

Parameter	Agreeableness	Conscientiousness	Extraversion	Neuroticism	Openness
<b>Model 1 : Null Model</b>					
Intercept ( $\gamma_{00}$ )	3.66 [3.55, 3.78]	4.09 [4.03, 4.15]	3.42 [3.32, 3.53]	2.69 [2.56, 2.82]	3.26 [3.16, 3.36]
Random intercept variance ( $\tau_{00}$ )	0.07	0.02	0.06	0.08	0.05
Residual variance ( $\sigma^2$ )	0.62	0.65	0.85	0.97	0.91
ICC	0.10	0.03	0.06	0.08	0.05
AIC	43,835.43	44,734.54	49,699.77	52,247.80	50,716.12
<b>Model 2: Accommodation Type</b>					
Intercept ( $\gamma_{00}$ )	3.66 [3.55, 3.77]	4.10 [4.04, 4.16]	3.44 [3.33, 3.54]	2.68 [2.56, 2.81]	3.2 [3.17, 3.37]
Accommodation Type ( $\gamma_{01}$ )	0.05[-0.2, 0.12]	-.14 [-0.21, -0.07]	-0.11 [-0.19, -0.03]	0.06 [-0.03, 0.15]	-0.07 [-0.16, 0.01]
Random intercept variance ( $\tau_{00}$ )	0.07	0.02	0.05	0.09	0.05
Residual variance ( $\sigma^2$ )	0.62	0.65	0.85	0.97	0.91
AIC	43,831.90	44,716.89	49,690.82	52,244.36	50,711.29
BIC	43,863.22	44,748.21	49,722.13	52,275.68	50,742.59
Log-likelihood	-21,911.95	-22,354.45	-24,841.41	-26,118.18	-25,351.64

*Note.*  $N_{post-match} = 18,640$  ( $N_{NH} = 526$ ,  $N_{PH} = 18,114$ ). Accommodation Type: 0 = Private Home, 1 = Nursing Home;

**Table S3.10***Country-Level Indicators and Sources*

Country	Area Coding	Beds per 100 000 65+ (EHCI 2014)	Pension System	Public spending on LTC as % of GDP (2013)	HDI (2013)	
1	Austrian	W 4	4133	Bismarckian 1	1.4	0.9290
2	Germany	W 4	5168	Bismarckian 1	1.4	0.9340
3	Sweden	N 2	7459	Beveridge 2	3.6	0.9320
4	Spain	S 3	3450	Beveridge 2	1.0	0.8800
5	Italy	S 3	1825	Beveridge 2	1.8	0.8820
6	France	W 4	5674	Bismarckian 1	1.7	0.8870
7	Denmark	N 2	4753	Beveridge 2	2.4	0.9330
8	Greece	S 3	115	Beveridge 2	0.5	0.8710
9	Switzerland	W 4	7105	Bismarckian 1	2.3	0.9480
10	Belgium	W 4	7181	Bismarckian 1	2.1	0.9160
11	Czech Republic	E 1	4029	Bismarckian 1	0.7	0.8810
12	Poland	E 1	1752	Bismarckian 1	0.8	0.8630
13	Luxembourg	W 4	7563	Bismarckian 1	1.5	0.9210
14	Hungary	E 1	4903	Bismarckian 1	0.8	0.8400
15	Portugal	S 3	3586	Beveridge 2	0.5	0.8450
16	Slovenia	S 3	4913	Bismarckian 1	1.4	0.9000
17	Estonia	N 2	3952	Bismarckian 1	0.6	0.8800
18	Croatia	S 3	1137	Bismarckian 1	0.4	0.8380
19	Lithuania	W 4	3779	Bismarckian 1	1.4	0.8540
20	Bulgaria	E 1	334	Bismarckian 1	0.4	0.8050
21	Cyprus	S 3	-999	Beveridge 2	0.3	0.8610
22	Finland	N 2	6823	Beveridge 2	2.4	0.9260
23	Latvia	N 2	1842	Beveridge 2	0.6	0.8430
24	Malta	S 3	6814	Beveridge 2	1.1	0.8720
25	Slovakia	E 1	4913	Bismarckian 1	0.2	0.8480

*Note.* Data sources:

1. Area coding: United Nations Contributors. UN M49: Standard country or area codes for statistical use. United Nations Statistics Division. Updated December 2021. Retrieved September 20, 2022, from <https://unstats.un.org/unsd/methodology/m49/>
2. Beds per 100,000 (65+; ehci2014-indicators): <https://healthpowerhouse.com>

3. Pension system: Kozun-Cieslak, G., & Zdrzil, P. (2021). Efficiency of healthcare systems in the European Union states—Who performs better, Bismarckians or Beveridgeans? *European Research Studies Journal*, 24(Special Issue 4), 397–411.
4. Public spending on LTC as % of GDP (2013):
  - a. Switzerland: <https://ec.europa.eu/social/BlobServlet?docId=19871&langId=en>
  - b. Malta: [https://economy-finance.ec.europa.eu/system/files/2017-01/joint-report\\_mt\\_en\\_2.pdf](https://economy-finance.ec.europa.eu/system/files/2017-01/joint-report_mt_en_2.pdf)
  - c. Other countries: European Commission, Directorate-General for Employment, Social Affairs and Inclusion. (2021). *Long-term care report: Trends, challenges and opportunities in an ageing society. Volume II, Country profiles*. Publications Office.  
<https://data.europa.eu/doi/10.2767/183997>
5. Human Development Index (HDI, 2013): <https://countryeconomy.com/hdi>

## Supplemental Materials for Chapter 4

**Table S1**

*Deviations from the Preregistration*

Preregistration (Hypotheses)	Deviation	Reasoning
<p><b>Moderation by Relocation Distance.</b>  <i>H2a:</i> Changes in extraversion, agreeableness, and neuroticism will be greater among older adults who relocate over long distances compared to those who relocate over short distances.</p>	<p>These hypotheses were not tested.</p>	<p>The planned three-way interaction models (time × group × distance) were overly complex for the available data and failed to converge. This is likely due to insufficient statistical power within specific subgroups required to reliably estimate such a complex effect.</p>
<p><b>Moderation by Relocation Frequency.</b>  <i>H2b:</i> Changes in extraversion, agreeableness, and neuroticism will be greater among older adults who relocate more frequently compared to those who relocate less frequently.</p>		<p>Similar to H2a.</p>
<p><b>Moderation by Relocation Duration.</b>  <i>H2c:</i> Changes in extraversion, agreeableness, and neuroticism will be smaller among older adults with longer relocation durations compared to those with shorter durations.</p> <p><i>H4:</i> The effects of nursing home admission on extraversion, conscientiousness, and neuroticism will decrease as the duration of nursing home residence increases.</p>	<p>Those hypotheses were not tested via a direct between-person comparison of "long" vs. "short" duration groups. Instead, its underlying scientific question was addressed by including a quadratic term for post-relocation time (TimePostSq) in the Piecewise Linear Mixed Model (PLMM).</p>	<p>A direct comparison of movers with shorter versus longer follow-up durations is highly susceptible to survival bias, as individuals with shorter durations may have dropped out due to health-related attrition. Therefore, we adopted a methodologically more robust within-person approach. Testing for a non-linear (quadratic) trajectory provides a more valid way to examine whether the impact of relocation attenuates over time, directly addressing the core theoretical idea of the pre-registered hypothesis while avoiding the confound of attrition.</p>

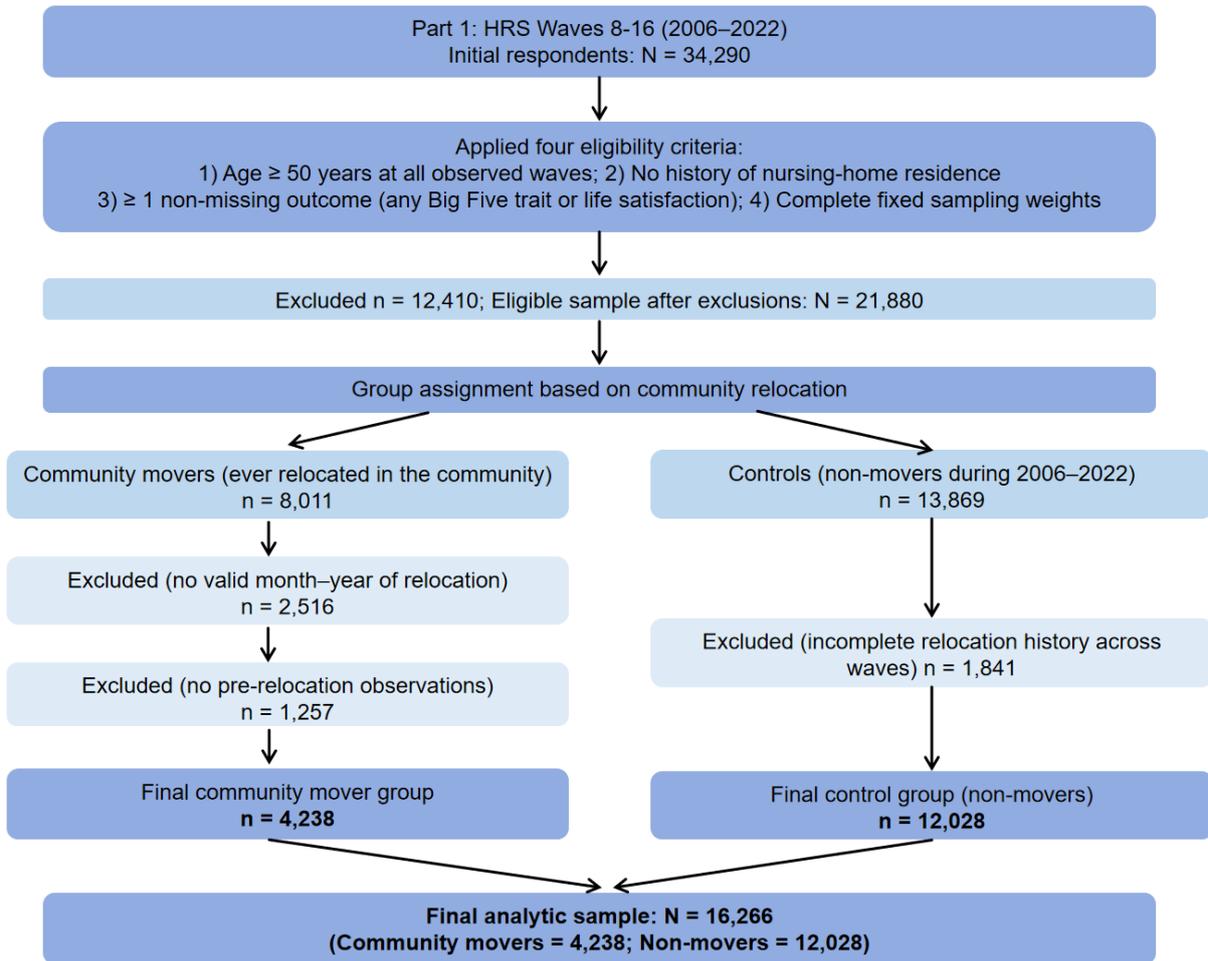
***Part 1: Community Relocation***

**Sample Selection Description.** In the Health and Retirement Study (HRS), 34,290 respondents completed at least one core interview between 2006 and 2022. To define the analytic cohort for Study 1, we applied four eligibility criteria and excluded any individual who failed any of the following: (1) being  $\geq 50$  years old at all observed waves; (2) no history of nursing-home residence; (3) having at least one non-missing observation for the outcomes (any Big Five trait or life satisfaction; i.e., outcomes not entirely missing across waves); and (4) having complete fixed sampling weights (RAEHSAMP). After these exclusions, 21,880 eligible participants remained, comprising 8,011 community-relocation candidates and 13,869 non-movers (controls).

Among community-relocation candidates, we further excluded 2,516 individuals who lacked a valid month–year of relocation and 1,257 who had no pre-relocation observations, yielding a final community mover group of  $n = 4,238$ . Among controls, we excluded 1,841 individuals with incomplete relocation history across waves, yielding a final control group of  $n = 12,028$ . The final analytic sample for Study 1 consisted of  $N = 16,266$  participants (4,238 community movers; 12,028 non-movers).

**Figure S1**

*Flowchart of Sample Selection*



**Table S2**

*Model Comparison (Likelihood Ratio Test) for the Main Effect on Personality Traits and Life*

*Satisfaction*

Dependent Variable	Model	Df	AIC	BIC	logLik	Test	$\chi^2$	<i>p</i>
Neuroticism	Linear Model	11	65825.41	65920.04	-32901.70			
	Quadratic Model	13	65822.09	65933.93	-32898.04	1 vs 2	7.32	<.05*
Extraversion	Linear Model	11	57100.91	57195.61	-28539.46			
	Quadratic Model	13	57097.83	57209.75	-28535.92	1 vs 2	7.08	<.05*
Agreeableness	Linear Model	11	49274.75	49369.41	-24626.38			
	Quadratic Model	13	49275.64	49387.51	-24624.82	1 vs 2	3.12	>.05
Conscientiousness	Linear Model	11	49110.34	49205.03	-24544.17			
	Quadratic Model	13	49113.49	49225.40	-24543.75	1 vs 2	0.85	>.05
Openness	Linear Model	11	57129.05	57223.72	-28553.52			
	Quadratic Model	13	57129.49	57241.38	-28551.75	1 vs 2	3.55	>.05
Life Satisfaction	Linear Model	11	143875.06	143969.75	-71926.53			
	Quadratic Model	13	143877.68	143989.59	-71925.84	1 vs 2	1.38	>.05

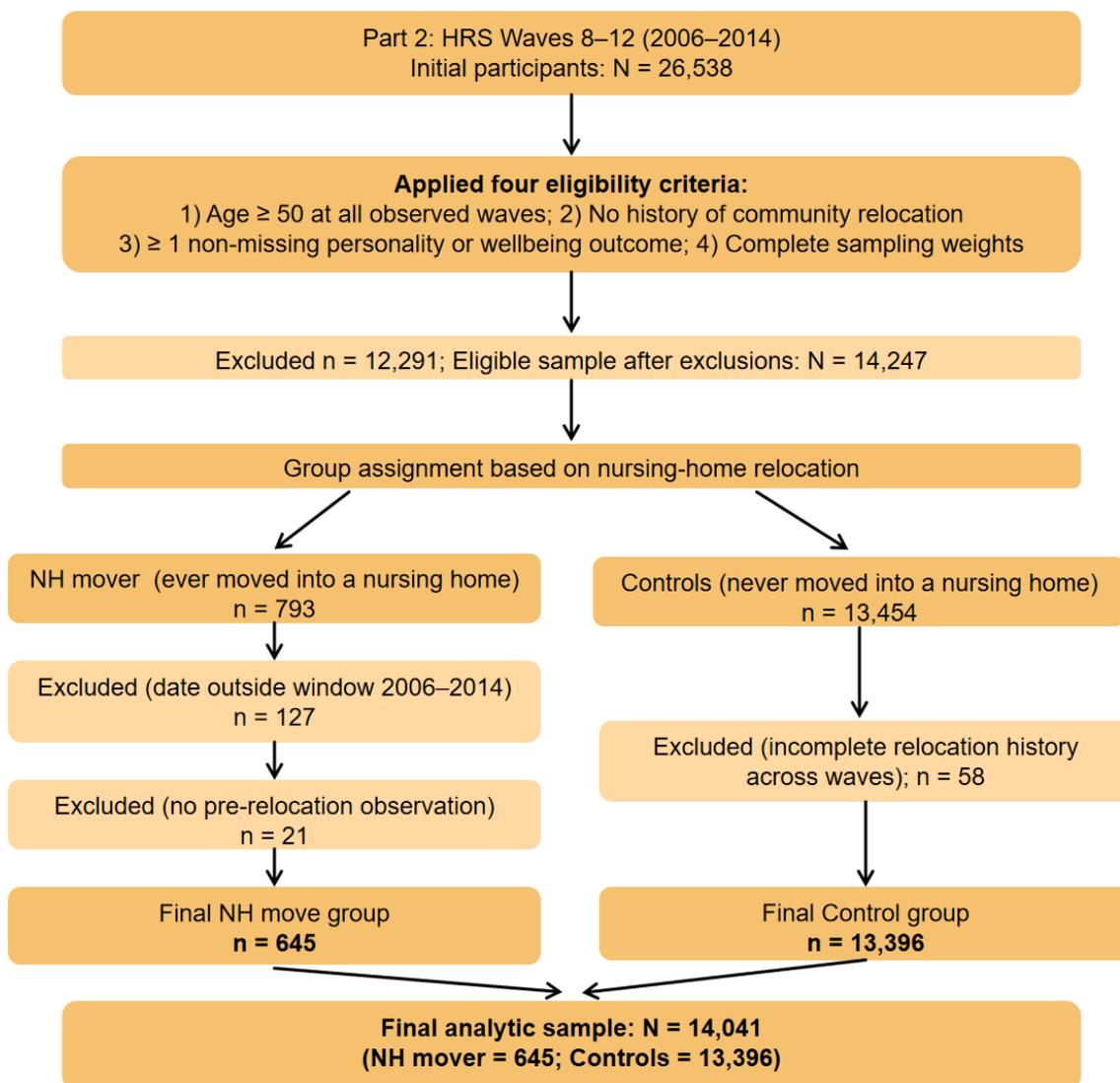
***Part 2: Nursing Home Admission (2006-2014)***

**Sample Selection Description.** In the Health and Retirement Study (HRS), 26,538 respondents residing in community settings or nursing homes completed biennial interviews during Waves 8–12 (2006–2014). We assembled a five-wave panel to examine changes in psychological functioning associated with institutional relocation. To define the analytic cohort, we excluded respondents who failed any of the following criteria: (a) age  $\geq 50$  years at all observed waves; (b) no history of community relocation; (c) at least one no missing observation on the outcomes (any Big Five trait or life satisfaction); and (d) complete sampling weights. This mutually exclusive, rule-based procedure excluded 12,291 respondents, yielding an eligible sample of  $N = 14,247$ .

Eligible respondents were then classified by nursing-home relocation during the observation window. The NH move group comprised those who moved into a nursing home at least once ( $n = 793$ ). Of these, 127 were excluded because the recorded relocation date fell outside 2006–2014, and 21 were excluded for lacking any pre-relocation observation, resulting in a final NH move group of  $n = 645$ . The Control group included respondents who did not move into a nursing home during the study period ( $n = 13,454$ ); 58 were excluded due to incomplete relocation history across waves, yielding a final control group of  $n = 13,396$ . The final analytic sample therefore comprised  $N = 14,041$  participants (NH movers,  $n = 645$ ; non-movers,  $n = 13,396$ ).

**Figure S2**

*Flowchart of Sample Selection*



**Table S3**

*Model Comparison (Likelihood Ratio Test) for the Main Effect on Personality Traits and Life Satisfaction*

Dependent Variable	Model	Df	AIC	BIC	logLik	Test	$\chi^2$	<i>p</i>
Neuroticism	Linear Model	11	59479.08	59568.51	-29728.54			
	Quadratic Model	13	59466.71	59572.40	-29720.36	1 vs 2	16.37	<.05*
Extraversion	Linear Model	11	57406.92	57496.42	-28692.46			
	Quadratic Model	13	57399.83	57505.61	-28686.92	1 vs 2	11.09	<.05*
Agreeableness	Linear Model	11	52354.30	52443.76	-26166.15			
	Quadratic Model	13	52357.59	52463.32	-26165.80	1 vs 2	0.71	>.05
Conscientiousness	Linear Model	11	55758.28	55847.77	-27868.14			
	Quadratic Model	13	55741.43	55847.19	-27857.71	1 vs 2	28.06	<.05*
Openness	Linear Model	11	59500.52	59589.99	-29739.26			
	Quadratic Model	13	59492.50	59598.23	-29733.25	1 vs 2	12.03	<.05*
Life Satisfaction	Linear Model	11	106866.16	106955.65	-53422.08			
	Quadratic Model	13	106849.67	106955.43	-53411.84	1 vs 2	20.49	<.05*



## List of Publications and Personal Contributions

### Chapter 2:

Sun, Y., Wrzus, C., & Lv, S. (2025). Excessive reassurance-seeking and anxiety among Chinese new urban older adults: The role of attention to negative information and resilience. *BMC Geriatrics*, 25(1), 680. <https://doi.org/10.1186/s12877-025-06382-x>

I contributed to the conceptualization and study design, developed the methodology, conducted the investigation, curated the data, performed the formal analyses, created the visualizations, wrote the original draft, administered the project, and served as the corresponding author. CW contributed to the conceptualization and methodology, supervised the project, administered the project, and reviewed and edited the manuscript. SL contributed to the conceptualization and methodology, assisted with the investigation, supervised the project, administered the project, and reviewed and edited the manuscript.

### Chapter 3:

Sun, Y., Teichmann, B., & Wrzus, C. (2025). *Personality Differences of Older Adults Living in Nursing Homes versus Private Homes in 25 European Union Countries*. [Manuscript under review at Geriatric Nursing]. Psychological Institute and Network Aging Research, Heidelberg University, Heidelberg, Germany.

I contributed to the conceptualization and study design, developed the methodology, curated the data, performed the formal analyses, created the visualizations, wrote the original draft, administered the project, and served as the corresponding author. BT contributed to the conceptualization and reviewed and edited the manuscript. CW supervised the project, contributed to conceptualization and methodology, administered the project, and reviewed and edited the manuscript.

#### **Chapter 4:**

Sun, Y., Zhang, L., & Wrzus, C. (2025). *Temporary Shake and Long-term Shift: Different Types of Late-Life Relocation Shape Older Adults' Personality and Life Satisfaction*. [Manuscript under review at Psychology and Aging]. Psychological Institute and Network Aging Research, Heidelberg University, Heidelberg, Germany.

I contributed to the conceptualization and study design, developed the methodology, curated the data, performed the formal analyses, created the visualizations, wrote the original draft, administered the project, and served as the corresponding author. LZ contributed to the methodology and reviewed and edited the manuscript. CW supervised the project, contributed to conceptualization and methodology, administered the project, and reviewed and edited the manuscript.

#### **Chapter 5:**

Sun, Y., & Wrzus, C. (2025). My new home: Study protocol for a prospective cohort study on the long-term personality development and short-term processes during transitions into nursing homes. *BMC Geriatrics*, 25, 640. <https://doi.org/10.1186/s12877-025-06300-1>

I contributed to the conceptualization and study design, developed the methodology, conducted the investigation, created the visualizations, wrote the original draft, administered the project, and served as the corresponding author. CW contributed to the conceptualization and methodology, supervised the project, administered the project, as well as reviewed and edited the manuscript.



**Promotionsausschuss der Fakultät für Verhaltens- und Empirische Kulturwissenschaften der Ruprecht-Karls-Universität Heidelberg / [Doctoral Committee of the Faculty of Behavioural and Cultural Studies of Heidelberg University](#)**

**Erklärung gemäß § 8 (1) c) der Promotionsordnung der Universität Heidelberg für die Fakultät für Verhaltens- und Empirische Kulturwissenschaften / [Declaration in accordance to § 8 \(1\) c\) of the doctoral degree regulation of Heidelberg University, Faculty of Behavioural and Cultural Studies](#)**

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Datum / <a href="#">Date</a>	17.10.2025
Unterschrift / <a href="#">Signature</a>	Dem Dekanat der Fakultät für Verhaltens- und Empirische Kulturwissenschaften liegt eine unterschriebene Version dieser Erklärung vom 17.10.2025 vor.

