FINDING THE KEY TO HAPPY AGING:
A day reconstruction study of happiness

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Objectives: *The main aim of this study was to examine the roles of physical passivity and extraversion in the relationship between daily engagement in activities and daily happiness among older adults.*

Method: *A day reconstruction method was used to accurately examine day-to-day activities and happiness. In total, 438 participants completed a monthly electronic diary survey over a 2-year period, generating 79,181 reported activities and momentary happiness scores.*

Results: *The results show that happiness increases when older adults combine effortful social, physical, cognitive, and household activities with restful activities. Furthermore, participation in social activities mediated the direct relationship between extraversion and happiness. Also, individuals who score high on extraversion derive greater happiness from social activities compared with their low-extravert counterparts.*

Conclusions: *The study extends activity theory by demonstrating that combining effortful activities with restful activities leads to greater happiness among older adults. Also, personality traits such as extraversion play a decisive role in the kind of activities that contribute most to daily happiness.*

Key Words: Activities—Aging—Day reconstruction—Extraversion—Happiness—Neuroticism.

1 INTRODUCTION

The notion that participation in activities contributes to happiness in later life was first mentioned in the activity theory of aging, one of the earliest major gerontological theories on "successful aging" (e.g., Havighurst & Albrecht, 1953; Lemon, Bengtson, & Peterson, 1972; Tobin & Neugarten, 1961). In line with this tenet, research has shown that the more seniors engage in social, physical, and cognitive activities, the happier they are (Herzog, Franks, Markus, & Holmberg, 1998; Inal, Subasi, Ay, & Osman, 2006; Lawton, Winter, Kleban, & Ruckdeschel, 1999). At least three issues in this line of research, however, merit more attention (for a critical review on activity theory, see also Adams, Leibbrandt, & Moon, 2011).

First, global questionnaire studies on happiness are far from ideal for capturing day-to-day fluctuations in activities and experienced happiness (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). Second, the relationship between physical passivity—defined in this study as activities requiring almost no physical effort—and happiness remains unclear. For instance, studies have demonstrated that physical passivity was not related to happiness (Csikszentmihalyi & Hunter, 2003), negatively related to happiness (Tkach & Lyubomirsky, 2006), or positively related to happiness (Shaw & Gant, 2002; Sonnentag, 2001). How can these mixed findings be explained? Third, despite the fact that personality traits may influence the choices made to engage in and the happiness derived from activities, personality traits are often neglected in research on activities and happiness (Furnham, 2004; Lu & Hu, 2005).

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The central aim of this study is to identify the kind of daily lifestyle that contributes most to the happiness of retired seniors by addressing the issues mentioned above. First, a day reconstruction method (DRM; Kahneman et al., 2004) was used to accurately capture day-to-day fluctuations in activities and happiness among retired seniors. Second, this study extends knowledge rooted in activity theory (Lemon et al., 1972) by examining whether happiness increases when effortful activities are complemented by restful activities on a daily basis. Third, the study extends knowledge on personality theories (Eysenck, 1981; Gray, 1991) by examining the role of extraversion in the day-to- day relationship between social activities and happiness.

2 BACKGROUND

2.1 Everyday Activities and Happiness Ratings

Being active in old age may relate positively to happiness because it may regulate people's mood (Thayer, Newman, & McClain, 1994; Totterdell & Parkinson, 1999) and may satisfy various personal needs (Ryan & Deci, 2000). For instance, "social activities" often leave people feeling connected, recognized, and valued (Folkman, 1997), satisfying their need for relatedness, whereas "physical activities" relate to a sense of mastery or personal achievement, which translates into feeling good about oneself (Folkman, 1997; Sonnentag, 2001). In addition, involvement in physical activities stimulates physiological processes that contribute to psychological well-being (Wankel & Berger, 1990). "Cognitive activities" at older ages may either satisfy the need for competence (e.g., puzzle solving) or satisfy one's curiosity (e.g., studying a new topic of interest). Substantiating this view, social activities (e.g., interacting with family— children and grandchildren—and friends; Kahneman & Krueger, 2006; Litwin, 2000; Zimmer, Hickley, & Searle, 1995), physical activities (e.g., bicycling, walking, and exercising; McAuley et al., 2007; Netz & Wu, 2005; Penedo & Dahn, 2005; Sonnentag, 2001), and cognitive activities (e.g., studying, learning, solving puzzles; Hultsch, Hertzog, Small, & Dixon, 1999; Verghese et al., 2003; Wang et al.,2006) do in fact appear to be positively related to psychological well-being among seniors.

Conversely, "household activities" appear to be detrimental to psychological well-being (e.g., grocery shopping, household finances, cooking; Demerouti, Bakker, Geurts, & Taris, 2009; Sonnentag, 2001, 2003; Sonnentag & Zijlstra, 2006). It may be that the unavoidable nature of these activities (e.g., no clean clothes without washing) makes them less enjoyable. Moreover, the fact that household activities entail additional effort, representing a drain on resources (e.g., energy), could explain their detrimental impact on well-being.

Psychological well-being refers to how a person evaluates his or her life (Diener, Sandvik, & Pavot, 1991). This appraisal may take the form of cognitions (i.e., when a person performs a conscious evaluative judgment about his or her satisfaction with life) or the form of affect (i.e., when people experience unpleasant or pleasant emotions in response to everyday life). Questionnaire studies have focused primarily on cognitive evaluations such as life satisfaction (Kahneman et al., 2004). This study defines happiness as a pleasurable and mildly activated emotional state (Russell, 1980, 2003) experienced during everyday activities. Importantly, emotions are reactions to specific events (e.g., activities) and are usually short lived (e.g., Oatley & Jenkins, 1996; Rosenberg, 1998). For this reason, a DRM (Kahneman et al., 2004) was applied to accurately capture fluctuations in happiness during everyday activities, asking participants to systematically reconstruct the preceding day's activities and happiness using procedures designed to reduce recall biases. Research has shown that the DRM can recover the actual happiness experienced to a significant degree of accuracy, as indicated by their convergence with concurrent mood reports used

in experience sampling methods (e.g., Kahneman et al., 2004; Schwarz, Kahneman, & Xu, 2009; Stone, Shiffman, Atienza, & Nebeling, 2007). To the best of our knowledge, this methodology has not yet been applied to this specific group. Based on the findings above, we hypothesize that:

Hypothesis 1a: The more time older adults spend on social, physical, and cognitive activities, the happier they are.

Hypothesis 1b: The more time older adults spend on household activities, the less happy they are.

2.2 The Role of Physical Passivity in Happiness Ratings

Interestingly enough, empirical findings on the direct relationship between physical passivity and well-being are mixed (Csikszentmihalyi & Hunter, 2003; Shaw & Gant, 2002; Sonnentag, 2001 ; Tkach & Lyubomirsky, 2006). This may possibly be due to a need to balance effortful activities with activities that enable recovery from such activities. The effort-recovery model (Meijman & Mulder, 1998) suggests that recovery from effortful activities and unwinding processes play an important role in predicting psychological well-being. More specifically, expending effort leads to specific individual load reactions, including physical, behavioral, and psychological responses, which are reversible under normal circumstances (i.e., when no longer confronted with an effortful activity, the psychobiological systems should return to their predemand level). This recovery process may result in a heightened sense of well-being. For instance, social, physical, cognitive, and household activities usually entail some degree of effort, after which time is required to recover and unwind. The more a person is able to balance effortful activities with activities that enable recovery on a day-to-day level, the higher the potential happiness a person may experience.

A problem that has plagued the literature on physical passivity is the lack of consistency in measures that reflect inactivity or physical passivity (Lennartsson & Silverstein, 2001; Litwin, 2000; Longino & Kart, 1982; Menec, 2003; Zimmer et al., 1995). Based on the effort-recovery model (Meijman & Mulder, 1998), this study defines physical passivity as restful activities involving almost no physical effort (e.g., relaxing, napping, watching TV). We hypothesize that:

Hypothesis 1c: Older adults who frequently engage in social, physical, cognitive, and household activities are happier when they combine those activities with frequent restful activities.

2.3 Extraversion, Social Activities, and Happiness Ratings

Empirical research on the link between personality, activities, and happiness is rather limited (Furnham, 2004; Lu & Hu, 2005). However, Eysenck (1981) argued that individuals who score high on extraversion would seek out social activities, characterized by a high degree of arousal, whereas their low-extravert counterparts are less likely to do so. One possible explanation is that extraversion as a personality trait is related to lower activity in the corticoreticular loop and other arousal systems. Psychophysiological studies substantiate this view (e.g., Gale, Edwards, Morris, Moore, & Forrester, 2001).

Given the positive relationship between social activities and happiness, the higher frequency of participation in social activities might explain why people who score high on extraversion are on average happier than those who score low on extraversion (DeNeve & Cooper, 1998; Furnham & Cheng, 1997; Lucas & Fujita, 2000; Sheldon & Lyubomirsky, 2006).In line with this notion, Wilson and colleagues (2005) demonstrated that extraversion among seniors was positively correlated with time spent on social activities. However, happiness was not included as an outcome variable. Similarly, Lu and Hu (2005) showed in a sample of young Chinese adults that high extraverts participated more in social activities than low extraverts. However, social activities did not appear to be positively related

to happiness. Importantly, the results were based on a questionnaire study with a cross-sectional design that may not accurately measure happiness as a specific emotional state during activities (Kahneman et al., 2004). We are unaware of longitudinal studies that tested the day-to-day relationship between extraversion, social activities, and happiness in real-life situations. Based on previous findings and our theoretical analysis, we hypothesize that:

> Hypothesis 2a: The direct relationship between extraversion and happiness is mediated by higher participation in social activities.

In addition, Gray (1991) argued that two biologically based systems in the brain govern major variations in personality. The behavioral activation system (BAS) regulates reactions to signals of conditioned reward and non-punishment, whereas the behavioral inhibition system regulates responses to signals of punishment and nonreward. The BAS of high extraverts is stronger than that of low extraverts, and as high extraverts are more sensitive to signals of reward in social situations than low extraverts, they may experience increased positive emotions during social activities.

Although Diener and Biswas-Diener (2008) showed that high extraverts experienced greater happiness when engaging in social activities compared with low extraverts, there was no explicit testing for a moderation effect. In addition, the study relied on questionnaire data, which limited the participants' ability to accurately remember how they felt during the many social activities in which they engaged (Kahneman et al., 2004). Conversely, Rusting and Larsen (1997) did not find a moderation effect of extraversion on happiness following a positive mood induction in which people had to think about happy social events. However, mood induction processes in the laboratory may lead to different outcomes than real-life emotional experiences. To the best of our knowledge, there are no longitudinal studies in real-life situations that tested whether extraversion positively moderates the day-to-day relationship between social activities and happiness. Following the reward-sensitivity model of Gray, we hypothesize that:

> Hypothesis 2b: Extraversion moderates the positive relationship between social activities and happiness.

3 METHODS

3.1 Participants

The participants consisted of a group of 438 retired seniors living in the Netherlands, with a mean age of 65 years ($SD = 6.78$), ranging from 55 to 88 years. Of the participants, 276 were men and 162 were women. Note that although the legal retirement age in the Netherlands is 65 years, over the past two decades older employees have had an option to retire early. Furthermore, 66% of the participants were married, 23% were single, and 11% were in a relationship.

3.2 Procedure

The data are part of an ongoing research project on lifestyle and happiness among seniors in the Netherlands. We asked seniors to participate and invite others to participate. Upon agreement, participants received a monthly e-mail with a link to an electronic diary, that is, online application based on the DRM (Kahneman et al., 2004). Each time the electronic diary was completed, participants were first asked to reconstruct the preceding day's activities, indicating the approximate start and end times and then rating the level of happiness they experienced during each reported activity. To increase the accuracy of the data gathered, we decided to include only participants who completed the diary at

least six times during the preceding two years. In total, 438 of the 585 respondents (75%) met this criterion. The average number of monthly diaries completed was 16 (*SD* = 3.06), ranging from 6 to 24.

3.3 Measures

"State happiness" during activities was rated with one item for each activity using a faces scale ranging from 1 (*extremely unhappy*) to 10 (*extremely happy*). A single item for happiness has good temporal stability and concurrent, convergent, and divergent validity (Abdel-Khalek, 2006).

Activities.—We categorized the activities as follows: social activities included being together with family, friends, children, and grandchildren; telephone conversations; and being with others in public places (e.g., attending mass). Physical activities encompassed exercising, sports, walking, bicycling, and dancing. Restful activities included resting, taking a nap, watching TV, reading (e.g., a newspaper or book), and surfing on the Internet. Household activities included preparing meals, grocery shopping, and household finances. Finally, cognitive activities encompassed studying, homework for a course, card games, and puzzle solving.

Two items of the "Ten Item Personality Index" (TIPI; Gosling, Rentfrow, & Swann, 2003) were used to quantify extraversion. Although somewhat inferior to standard multi item instruments, TIPI achieves adequate levels of (a) convergence with widely used Big-Five measures in observer, peer, and self-reports; (b) test–retest reliability; (c) patterns of predicted external correlates; and (d) convergence between observer and self-ratings (see Gosling et al., 2003). "Extraversion" was measured using two items, (a) I see myself as extraverted and enthusiastic and (b) I see myself as reserved and quiet (reversed). Cronbach's alpha was .72 for extraversion, reflecting adequate reliability.

3.4 Control Variables

We controlled for the daily happiness levels of participants (Sheldon & Lyubomirsky, 2006) to determine whether engagement in activities would increase the happiness experienced by seniors beyond their average day level. We calculated daily happiness by aggregating reported happiness during day-to-day activities. Checks for aggregation yielded good values ($r_{wg[j]}$ = .80–.85; ICC[1] = .29–.33; ICC[2] = .32–.34).

Furthermore, we controlled for neuroticism as this personality trait is consistently—and negatively—related to happiness. We measured neuroticism using two items of TIPI (Gosling et al., 2003): (a) I see myself as anxious and easily upset and (b) I see myself as calm and emotionally stable (reversed). Cronbach's alpha was .62 for neuroticism, showing an acceptable level of reliability for a two-item measure.

Finally, we controlled for physical health, sex, and age. Physical health was measured on a 5-point scale, ranging from 1 (*physically very unhealthy*) to 3 (*neutral*) and finally 5 (*physically very healthy*).

3.5 Analysis

The data set has a hierarchical structure with days nested within persons and activities nested within days. Accordingly, we used hierarchical linear modeling to analyze the data. We centered person-level variables (i.e., extraversion as an independent variable; neuroticism, physical health, age, and sex as control variables) at the grand mean. In addition, daily happiness and all types of activity—as variables that fluctuate at the within-person level—were centered at respective person mean. We conducted data analysis using MLwiN (Rasbash, Browne, Healy, Cameron, & Charlton, 2000).

4 RESULTS

4.1 Preliminary Analyses

Table 1 reports means, standard deviations, and zero-order correlations. Before testing our hypotheses, we examined the variability of state happiness across the three levels (person, day, and within-day level). Of total variance,
32.5% was between persons (0.939/(0.939 + 0.567 + 1.386)),
19.6% at the day level (0.567/(0.939 + 0.567 + 1.386)), and
47.9% at the within-day level (1.386/(0.939 + 0.567 + 1.386))
To test our hypotheses, we started with a null model that included the intercept as the only predictor and state happiness as the outcome variable. For Model 1, extraversion was entered as a predictor variable and neuroticism, health, age, sex, and daily happiness as control variables. In Model 2, the types of activity (social, physical, cognitive, household, and restful activities) were added. Model 3 includes the interaction terms between social, physical, cognitive, and household activities on the one hand and restful activities on the other hand. In addition, the interaction term for extraversion and social activities was added. Table 2 presents the findings of each model.
We tested the improvement of each model over the previous one by computing the differences of the respective log likelihood statistic −2 × log, subjecting the difference to a chi-squared test. Each nested model showed an improved model fit. Model 1 was compared with the intercept-only null model (D−2 × log = 11884.921, D*df* = 6, $p < .001$), Model 2 to Model 1 (D−2 × log = 4957.015, D*df* = 5, $p < .001$), and Model 3 to Model 2 (D−2 × log = 78.816, D*df* = 4, $p < .001$).

The results of Model 1 showed that physical health, age, and sex were not significantly related to state happiness. Extraversion and daily happiness related positively to state happiness, whereas neuroticism related negatively to state happiness.

4.2 Activity Types and Happiness Ratings

Confirming Hypothesis 1a, Model 2 showed that the more time older adults spent on social, physical, and cognitive activities, the happier they were. Conversely—and in line with Hypothesis 1b—the results showed that the more time older adults spent on household activities, the unhappier they were.

Hypotheses 1c stated that restful activities would positively moderate the effect of social, physical, cognitive, and household activities on state happiness. Model 3 revealed significant interaction patterns between social, physical, cognitive, and household activities on the one hand, and restful activities on the other hand. To examine the interaction patterns in more detail, we conducted simple slope tests as suggested by Preacher, Curran, and Bauer (2006). The interaction patterns are presented in Figures 1–4.

Figures 1–3 show that restful activities do in fact positively moderate the effect of social, physical, and cognitive activities on state happiness. Simple slope tests revealed that frequent participation in social activities (1 *SD* above the mean; g = 1.55, *SE* = 0.139, $z = 11.178$, $p < .001$), physical activities (1 *SD* above the mean; g = 1.58, *SE* = 0.285, $z = 5.555$, $p < .001$), and cognitive activities (1 *SD* above the mean; g = 1.58, *SE* = 0.274, $z = 5.783$, $p < .001$) related positively to happiness when combined with frequent restful activities (1 *SD* above the mean). Conversely, physical activities (g = 0.269, *SE* = 0.149, $z = 1.8054$, n.s.) and cognitive activities (g = 0.31, *SE* = 0.163, $z = 1.904$, n.s.) did not relate significantly to happiness when spending little time on restful activities (1 *SD* below the mean). However, the relationship between participation in social activities and happiness remained positive when spending little time on restful activities (1 *SD* below the mean; g = 0.67, *SE* = .067, $z = 9.97$, $p < .001$).

Similarly, Figure 4 shows that time spent on household activities (1 *SD* above the mean) did not relate significantly to happiness when spending a great deal of time on restful activities (1 *SD* above the mean; g = −.023, *SE* = 0.312, *z* = −0.074, n.s.). However, time spent on household activities (1 *SD* above the mean) did relate negatively to happiness when little time is spent on restful activities (1 *SD* below the mean; g = −0.35, *SE* = 0.105, *z* = 3.333, $p < .001$). Accordingly, the interaction patterns partly support Hypothesis 1c for social activities, whereas fully supporting Hypothesis 1c for physical, cognitive, and household activities.

4.3 Extraversion, Social Activities, and Happiness Ratings

Next, we hypothesized that the direct relationship between extraversion and state happiness would be mediated by participation in social activities (Hypothesis 2a). To test this, we examined the four criteria as suggested by Baron and Kenny (1986). The first criterion states that extraversion as the independent variable should be related to state happiness as the outcome variable. Model 1 did in fact show that extraversion was significantly and positively related to state happiness ($t = 2.041$, $p < .05$), thereby meeting this first criterion.

The second criterion states that extraversion should be correlated with social activities as the mediator variable. Results from multilevel analyses (not shown in Table 2) showed that extraversion was significantly and positively related to engagement in social activities ($t = 5.00$, $p < .001$), thereby meeting this second criterion.

The third criterion states that the mediator should affect the outcome variable. The results in Model 2 revealed that social activities ($t = 46.789$, $p < .001$) were positively and significantly related to state happiness, thus meeting the third criterion.

The fourth criterion states that the effect of extraversion on state happiness should turn nonsignificant when the mediator is included in the model. Meeting this criterion, the direct and significant effect of extraversion in Model 1 ($t = 2.049$, $p < .05$) became nonsignificant ($t = 1.633$, n.s.) after adding social activities to the model, indicating a full mediation pattern. A Sobel test further substantiated that social activities mediated the direct effect of extraversion on state happiness (Sobel test statistic = 2.50, $p < .01$). In short, Hypothesis 2a was fully confirmed.

Finally, Hypothesis 2b predicted that extraversion moderates the positive relationship between social activities and state happiness. Model 3 showed that the cross-level interaction effect between extraversion and social activities was indeed significant ($t = 3.00$, $p < .01$). This interaction pattern is presented in Figure 5. It shows that time spent on social activities (1 *SD* above the mean) related positively to state happiness among seniors who scored high on extraversion (1 *SD* above the mean; g = 0.190, *SE* = 0.064, $t = 2.965$, $p < .01$). In contrast, time spent on social activities (1 *SD* above the mean) did not relate to state happiness for participants who scored low on extraversion (1 *SD* below the mean; g = 0.022, *SE* = 0.042, *t* = 0.519, n.s.), confirming Hypothesis 2b.

5 DISCUSSION

The central aim of this study was to identify the kind of daily lifestyle that contributes most to the happiness of retired seniors. In doing so, this study contributes to the literature in three ways. First, a DRM was used to accurately capture day-to-day fluctuations in happiness experienced by seniors during activities (Kahneman et al., 2004). Second, the results show that the effort-recovery model is a useful theoretical framework to explain the mixed findings of previous research into the link between physical passivity and happiness among seniors. Third, the results show that the relationship between extraversion and happiness is mediated by social activities and that extraversion positively moderates the relationship between social activities and happiness. This

confirms the theoretical views of Eysenck (1981) and Gray (1991) that were previously untested in real-life situations on a day-to-day level. The findings, as well as the strengths and limitations of this study, are discussed in more detail subsequently.

5.1 Activity Types and Happiness Ratings

This study showed that spending more time on social, physical, and cognitive activities related positively to state happiness among seniors—whereas household activities related negatively to happiness—on a within-person and within-day level (confirming Hypothesis 1a and Hypothesis 1b). This finding is important as some contemporary theories of well-being show that people have a genetically determined set-point for happiness (Lykken & Tellegen, 1996) and other related personality traits (e.g., Furnham & Cheng, 1997; Lucas & Fujita, 2000). In applying the DRM approach, this study shows that 67.5% of happiness variance occurs at a within-person level, which can be partly attributed to the time seniors spend on various activities. This is good news, as most retired seniors have the freedom to choose their day-to-day activities.

Furthermore, this study shows that activities involving little to no physical effort positively moderate the relationships between social, physical, cognitive, and household activities on the one hand and state happiness on the other hand (confirming Hypothesis 1c). This is in line with the effort-recovery model (Meijman & Mulder, 1998), which states that the effort made entails specific load reactions in the individual (e.g., accelerated heart rate, elevated bloodpressure, and fatigue). These reactions are reversible, provided that the individual is no longer confronted with demands. The psychobiological systems affected eventually return to normal levels, positively affecting psychological well-being (Demerouti et al., 2009; Sonnentag & Bayer, 2005).

This study focused on restful activities requiring little physical effort. It may be useful for future research to further differentiate between restful activities requiring little physical effort (e.g., relaxing), social effort (e.g., solitary activities), or cognitive effort (e.g., napping). For example, happiness might be enhanced when the types of demands an activity involves (e.g., social, physical, cognitive) are matched to specific restful activities, which facilitate specific aspects of psychobiological systems (e.g., social, physical, cognitive) to return to normal levels (e.g., Frese, 1999).

Another related question is whether the effort-recovery process differs according to age group. For instance, restful activities also appear to contribute to the psychological well-being of younger adults after a day's work (Sonnentag, 2001; Sonnentag & Zijlstra, 2006). Future research could examine the effort-recovery process of adults in other age groups.

5.2 Extraversion, Social Activities, and Happiness Ratings

Furthermore, the results of this study seem to confirm the idea that—in line with Eysenck (1981)—personality is important in identifying which types of activities will improve the well-being of older individuals. In particular, the results show that extraverted seniors participate more in social activities, which in turn mediates the relationship between extraversion and state happiness (confirming Hypothesis 2a). Thus, seniors who score high on extraversion do appear to engage more in social activities compared with those who score low on extraversion, which leads to a higher degree of experienced happiness. Previous research on this issue is limited (Furnham, 2004) and relied on cross-sectional designs and questionnaire data (Lu & Hu, 2005; Wilson et al., 2005), which may be an inaccurate method for capturing the happiness experienced by seniors during daily activities (Kahneman et al., 2004). The DRM applied in this study allows for a more accurate examination of the many social interactions in the daily lives of seniors and of the happiness they derive from such interactions.

In addition, this study demonstrates that high extraverts experience greater levels of happiness when engaging in social activities, whereas low extraverts do not (confirming Hypothesis 2b). This finding indirectly supports the notion of Gray (1991) that extraversion relates to a higher BAS, regulating reactions to signals of conditioned reward and non-punishment. As a consequence, high extraverts—compared with low extraverts—may be better able to pick up signals of reward in social situations, enabling them to experience more positive emotions, such as happiness, during social activities.

5.3 Strengths and Weaknesses

This study has some particular strengths. First, the DRM offers the advantage of minimizing recall biases. The results obtained from the DRM are remarkably similar to those obtained using the experience sampling method involving real-time reports of emotions (Kahneman et al., 2004). Accordingly, we are confident that we have accurately monitored the daily activities of seniors and the happiness they experienced while performing the activities. Second, the two-year follow-up design generated a rich data set of 79,181 data points on activity types and accompanying feelings of happiness. As a result, we have an exhaustive view of how retired seniors spend their time and the happiness they derive from these activities. Third, we were able to follow a very specific group of retired seniors using a DRM approach for over two years. Given the rapidly growing population of seniors in Western nations, it is now more important than ever to better understand what kind of lifestyle contributes most to the happiness of this specific group (Williamson, 2005).

This study also has some weaknesses. Two personality traits (i.e., extraversion and neuroticism) were assessed using four items of the TIPI (Gosling et al., 2003). Although internal consistencies of the TIPI were sufficient, there are more elaborate ways to assess personality traits like the NEO Five-Factor Inventory (Costa & McCrae, 2004).

This study does not take into account any other well-being outcome than happiness, disregarding such outcomes as life satisfaction, physical health, or longer life. However, the extensive review conducted by Lyubomirsky, King, and Diener (2005) revealed that happiness is associated with and precedes successful life outcomes, including marriage, friendship, income, work performance, subjective, and objective health outcomes.

5.4 Concluding Remarks

This study sheds more light on which kind of daily life- style contributes to the happiness of retired seniors. Importantly, seniors can enhance the happiness they experience beyond their baseline level by engaging in social, physical, and cognitive activities. Furthermore, this study helps to clarify the mixed findings on physical passivity by demonstrating that balancing more effortful activities with restful activities contributes to the happiness of seniors. Finally, this study extends personality theories by showing that (a) higher participation in social activities explains why extraversion relates positively to happiness on a day-to-day level (Eysenck, 1981) and (b) extraversion positively moderates happiness derived from social activities (Gray, 1991). We hope that the DRM method outlined will be used in future research, as it provides accurate data on how people spend their time and the happiness experienced during activities. Accordingly, it improves our capacity to foresee which daily lifestyle will increase the happiness experienced by seniors.

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Table 1. Means, Standard Deviations, and Correlations Between Study Variables

		M	*N*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1	Age	65.32	438	7.40											
2	Sex (0 = female, 1 = male)	0.30	438	0.95	−.13										
3	Physical health	3.91	438	1.17	−.06	−.06									
4	Neuroticism	5.37	438	1.50	−.10	−.04	−.23								
5	Extraversion	4.83	438	1.87	.03	.15	.02	−.08							
6	Social activities[a]	1:45	7,839	1:15	.05	.26	.03	.04	.17		−.06	−.17	−.28	−.03	.15
7	Physical activities[a]	1:25	2,930	1:11	.08	−.17	.08	−.04	−.02	−.02		−.10	−.17	−.02	.07
8	Restful activities[a]	1:27	21,854	1:17	.10	−.15	−.11	.02	−.20	−.10	.07		−.51	−.06	.06
9	Household activities[a]	1:13	41,491	0:52	−.08	.03	−.07	.15	.01	−.26	−.18	−.30		−.10	−.15
10	Cognitive activities[a]	1:56	1,109	1:13	.13	−.01	.13	.03	.12	.07	.21	−.04	−.18		.04
11	State happiness	7.50	79,181	1.02	−.01	.02	.14	−.21	.12	.03	.04	−.09	−.05	.04	

Notes: Correlations below the diagonal are person-level correlations with correlations $r \geq |.10|$ being significant at $p < .05$ and $r \geq |.13|$ being significant at $p < .01$. Correlations above the diagonal are within-person correlations with correlations $r \geq |.04|$ being significant at $p < .01$.

[a] Means and *SD*s for activities are reported in an hour:minute format.

Table 2. Multilevel Estimates for Models Predicting State Happiness, N = 438 Persons; 6,142 Days; 79,181 Activities

	Null model			Model 1			Model 2			Model 3		
	Estimate	*SE*	*t*	Estimate	*SE*	*t*	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Constant	7.498	0.048	156.208	7.556	0.072	104.944	7.475	0.072	103.819	7.479	0.073	102.452
Physical health				−0.092	0.051	−1.804	0.900	0.051	17.647	0.089	0.051	1.745
Sex				−0.040	0.121	−0.331	−0.017	0.121	−0.140	−0.010	0.122	−0.082
Age				−0.003	0.008	−0.375	−0.004	0.008	−0.500	−0.004	0.008	−0.500
Extraversion				0.100	0.049	2.041*	0.080	0.049	1.633	0.075	0.049	1.531
Neuroticism				−0.107	0.040	−2.675**	−0.107	0.040	−2.675**	−0.107	0.040	−2.675**
Daily happiness				1.000	0.006	166.667***	0.988	0.006	164.667***	0.998	0.006	166.333***
Social activities							0.889	0.019	46.789***	0.991	0.107	9.262***
Physical activities							0.675	0.028	24.107***	0.997	0.061	16.344***
Cognitive activities							0.786	0.045	17.467***	0.534	0.103	5.184***
Household activities							−0.128	0.013	−9.846***	−0.131	0.013	−10.077***
Restful activities							0.362	0.015	24.133***	0.386	0.017	22.706***
Social × Restful activities										1.098	0.237	4.633***
Physical × Restful activities										1.315	0.238	5.525***
Cognitive × Restful activities										1.119	0.420	2.664**
Household × Restful activities										0.225	0.092	2.446**
Extraversion × Social										0.300	0.100	3.000**
−2 × log(lh)		190397.752			178512.831			173555.816			173477.000	
Difference, −2 × log					11884.921***			4957.015***			78.816***	
df					6			5			4	
Level 1 intercept variance		0.939	(0.068)		0.904	(0.078)		0.904	(0.078)		0.904	(0.078)
Level 2 intercept variance		0.567	(0.013)		0.000	(0.000)		0.000	(0.000)		0.000	(0.000)
Level 3 intercept variance		1.386	(0.007)		1.280	(0.008)		1.173	(0.007)		1.113	(0.007)

Note: Leve1 1 intercept variance = between-person level. Level 2 intercept variance = day level. Level 3 intercept variance = within-day level.

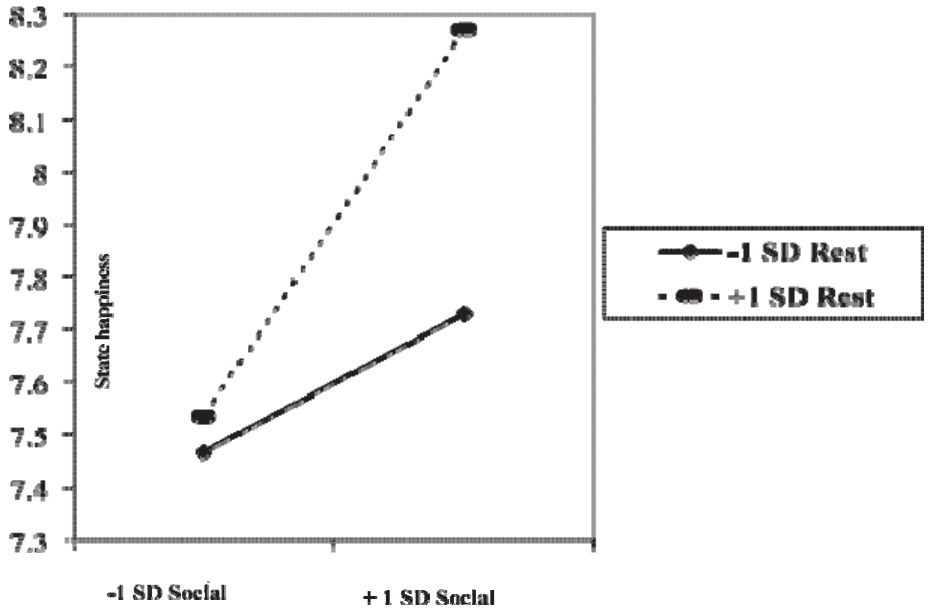

Figure 1. Interaction effect of time spent on social activities and restful activities on state happiness.

Note. −1 SD = 1 standard deviation below the mean;

+1 SD = 1 standard deviation above the mean; Social = social activities; Rest = restful activities.

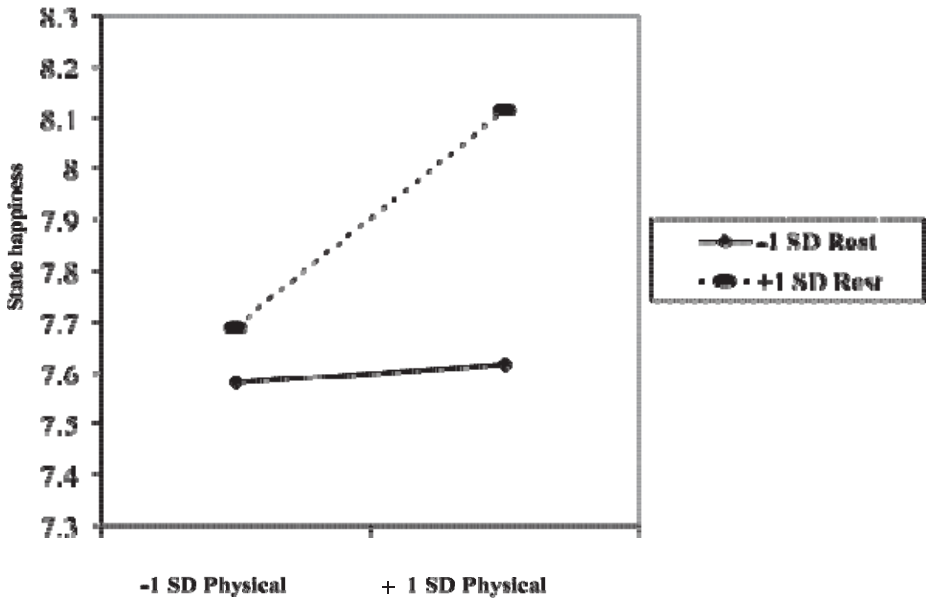

Figure 2. Interaction effect of time spent on physical activities and restful activities on state happiness. Note. −1 SD = 1 standard deviation below the mean; +1 SD = 1 standard deviation above the mean; Physical = physical activities; Rest = restful activities.

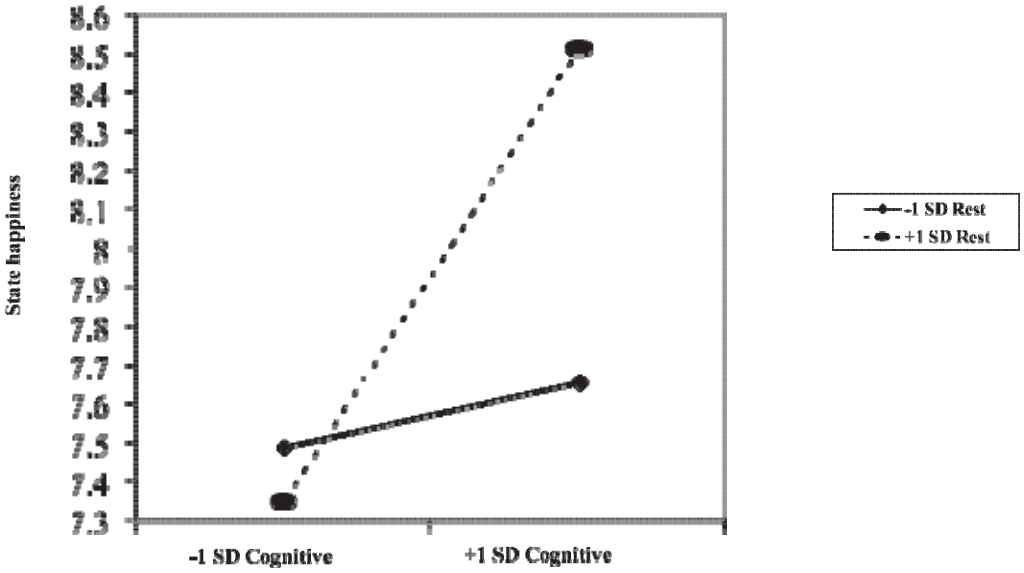

Figure 3. Interaction effect of time spent on cognitive activities and restful activities on state happiness. Note. −1 SD = 1 standard deviation below the mean; +1 SD = 1 standard deviation above the mean; Cognitive = cognitive activities; Rest = restful activities.

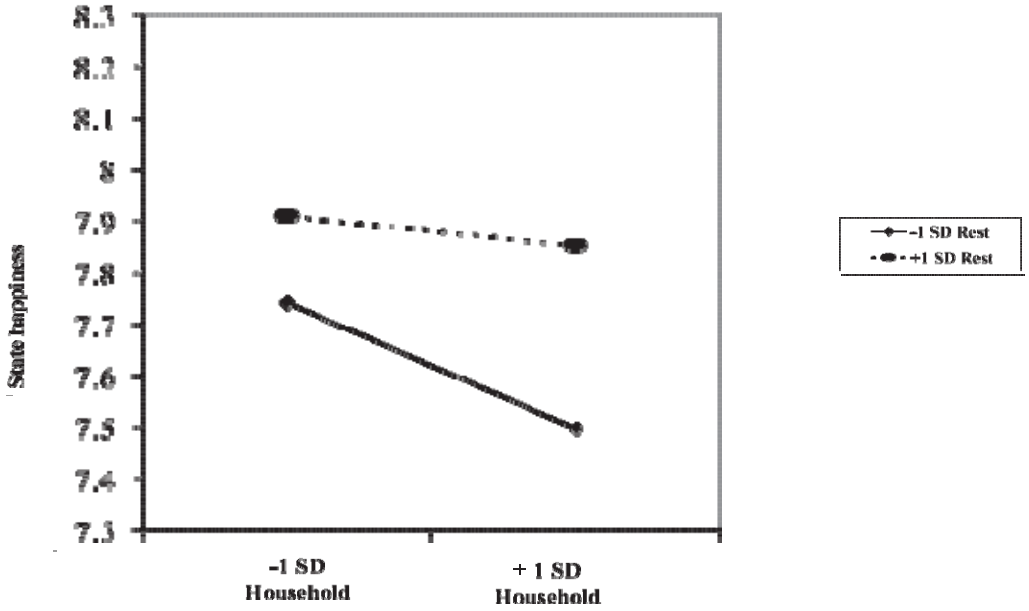

Figure 4. Interaction effect of time spent on household activities and restful activities on state happiness. Note. −1 SD = 1 standard deviation below the mean; +1 SD = 1 standard deviation above the mean; Household = household activities; Rest = restful activities.

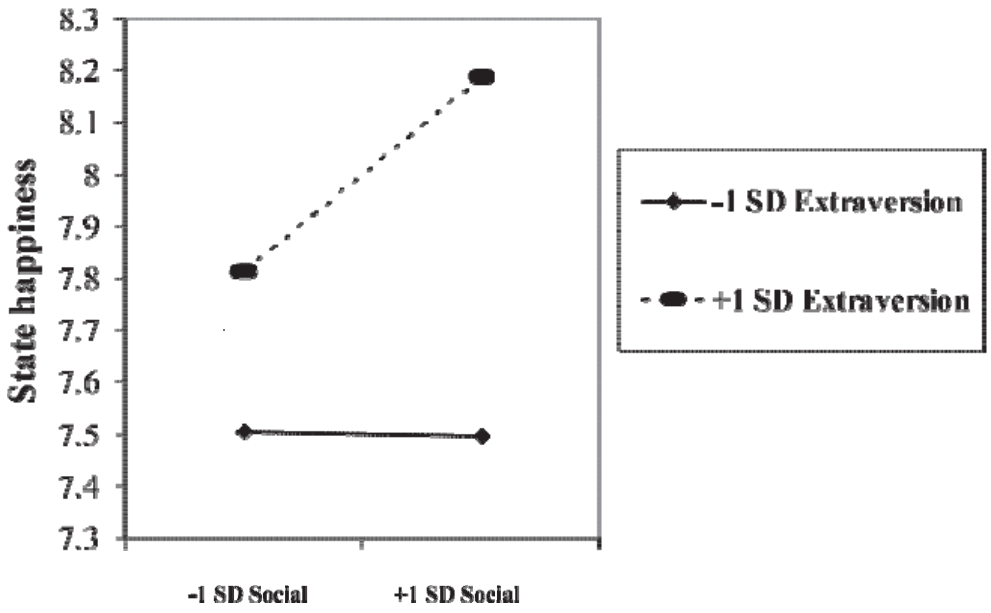

Figure 5. Interaction effect of time spent on social activities and extraver- sion on state happiness. Note. −1 SD = 1 standard deviation below the mean; +1 SD = 1 standaard deviation above the mean; Social is social activities.

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