Journal of Consumer Marketing

Using gerontographics to explain consumer behaviour in later life: Evidence from a Thai study
Thuckavadee Sthienrapapayut, George Moschis, Anil Mathur,

Article information:

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.

Using gerontographics to explain consumer behaviour in later life: Evidence from a Thai study

Abstract

Increasing life expectancy creates a greater diversity in a country's older population due to different life experiences and ageing processes that shape the mindsets of people at later stages in life. This paper proposes "gerontographics", a term that has been coined to capture the diversities in the ageing processes, as an alternative model to age and cognitive age. A large sample of older Thai adults is used to test the efficacy of this model in predicting selected consumer behaviours. The findings show that although the gerontographic measures that gauge ageing processes validate the presence of similar gerontographic segments as those in the United States, the influence of these measures on consumer behaviours might be subject to cultural contexts. They further show that gerontographics model is more powerful in predicting certain types of older adults' consumer behaviour than age or cognitive age.

Key words: chronological age, cognitive age, gerontographics, older consumers, Thailand

Introduction

Increase in life expectancy globally has created a rise in the older segment of the population that has become important worldwide, as companies and governments look for ways to address the ageing persons' consumption needs and enhance their wellbeing (Drolet *et al.*, 2010; Pettigrew and Moschis, 2011). To help develop effective strategies and policies, researchers and practitioners must understand older consumer behaviour, especially age-related changes and the variability in the physiological and experiential nature of ageing in later stages of life (Moschis, 2012). Individuals experience different ageing processes due to a wide variety of factors, some hereditary and others environmental, such as health conditions, exposure to different events, and life circumstances that shape their mindsets (Drolet *et al.*, 2010; Pettigrew and Moschis, 2011).

Studies on older consumers' behaviour that attempt to explain why individuals act the way they do tend to use the passage of time (indexed by chronological age, for example) as a surrogate measure of ageing processes to explain differences. They infer changes in consumer behaviours from observed age differences (Moschis, 2012), in part because chronological age is associated with ageing (e.g., Gregoire, 2003; Moschis, 2000). Consumer behaviour studies that report different patterns of behaviours as a result of the age factor cannot clearly explicate and decompose the reason(s) for changes in behaviour (Moschis, 2012). Thus, previous studies offer inadequate explanations of how ageing processes affect behaviour because they have used either chronological age, which presents the passage of time and has little explanatory power (Rutter, 1996), or inadequate measures of ageing processes (Moschis, 2012). Although differences in consumer behaviours in later life may reflect age-related changes, previous studies do not rigorously examine the effects of ageing process(es) that may better explain these differences. Because ageing entails multi-dimensional process, such as psychological, social, spiritual, and biological ageing that are believed to be universal (Moody, 1988), Moschis (2000) urges researchers to seek explanations for older adults' consumer behaviours by employing a multidisciplinary approach that underscores the role of various ageing processes.

To capture multi-dimensional aspects of age and ageing, the present study employs the gerontographics model that has been used to explain a wide variety of older consumer behaviours but has seen limited cross-cultural applications. It validates the model's measures of the ageing processes and assesses its efficacy by comparing it with chronological and

cognitive age in predicting a variety of consumer behaviours among a sample of older Thai adults.

Background

The concepts of age and ageing

Social scientists and gerontologists make a distinction between three main types of age and ageing processes: biological, social, and psychological (e.g., Birren and Cunningham, 1985; Settersten and Mayer, 1997). Biological age is defined as the potential life span in the present physical condition; it refers to the changes in human functional capacity due to changes in cells and tissues causing deterioration of the main bodily systems and susceptibility to disease and mortality. Biological age and ageing are assessed by the functional capacities of the bodily systems (Moschis, 1992, 2000). Social age refers to the roles and expected behaviours that constitute norms of the society to which an individual belongs. Social ageing refers to changes in social relationships that define social status within a society (e.g., within a family) and in social roles that people assume at different stages in life. Psychological age reflects the person's mindsets and capacities to adapt to changing demands (Baltes and Baltes, 1990), and psychological ageing refers to continuous growth or change in cognition and personality (Moschis, 1996).

Ageing and consumer behaviour

Researchers in several disciples have developed theories to explain biological, social, and psychological changes that people experience in later life (e.g., Moschis, 1996), while consumer researchers have attempted to explain differences in consumer behaviour by relying on theories of ageing. Thus, although ageing theories have been developed to explain changes in bodily systems (e.g., sensory, biomechanical), social roles and psychological states (e.g., self-concept), consumer researchers have applied these theories to explain changes in consumption-related activities and have inferred changes from the observed age differences. They have reasoned that biological, social, and psychological changes associated with age and ageing are also likely to affect the ageing person's consumer behaviour (Moschis, 2012).

Although assertions that ageing theories can explain changes in consumer behaviour in later life are intuitively appealing, they are less than rigorously tested. The employment of ageing theories to explain the inferred changes from observed age differences leaves much to

3

be desired, as age differences may also reflect the effects of cohort and period, not just ageing (Moschis, 2012). Furthermore, it is not clear which ageing theory or theories (if any) account for the observed age differences in behaviour, nor how these theories account for wide variability in ageing. People age differently and at different rates, which is reflected in the increasing intra-age group heterogeneity in thoughts and actions associated with age and ageing (Moschis, 1996).

Gerontographics

Theoretical foundations

The concept of "gerontographics" refers to the multi-dimensional ageing processes that are relatively independent of age and neither uniform nor invariant. It is based on theories of ageing subsumed under the 'life course' paradigm (e.g., Elder and Johnson, 2002; Moschis, 2012) that explains individual differences in the ageing processes. This paradigm maintains that the events and circumstances people experience at different stages in life affect their mindsets and behaviours. People in later life experience life events that serve as markers of biological, psychological, and social ageing. The variability that marks the timing and circumstances of these experiences is offered as the reason for individual differences in the ageing processes. For example, the timing of events that signify social ageing–i.e., the transition into old-age roles (e.g., retirement, grandparenthood)–affects a person's age identity, producing an older cognitive age (Mathur and Moschis, 2005) and accelerating "the pace of ageing, including a sense of being old" (Elder and Johnson, 2002, p. 67), as do the onset of chronic conditions associated with a sense of frailty, such as hearing impairment (Atchley, 1987; Rapkin and Fischer, 1992). Whether in the form of biological changes (e.g., onset of chronic conditions) or of transitions into social roles (e.g., retirement, grandparenthood), life events create emotional demands (e.g., stress) to which people must adapt (Moschis, 2012). Changes in behaviours are the results of adaptation and adjustments to life changes.

Thus, because ageing processes are not uniform across people, individuals vary markedly in the way they experience ageing. Furthermore, the multi-dimensional aspects of ageing suggest that people may experience these processes differently because they may not occur at the same time or at a similar rate. For example, persons of a certain age are likely to differ with respect to biophysical ageing (e.g., appearance and health) and social ageing because of differences in timing of their experience of events that mark transitions into old

4

age roles (e.g., loss of parents, grandparenthood). The internalisation and acceptance of these changes is likely to affect the person's behaviour. Previous research has shown that biological and life-stage changes can lead to internalisation and acceptance of old age status, which can subsequently affect consumer behaviours (e.g., Mathur *et al.*, 2011; Mathur and Moschis, 2005; Moschis, 2012). Thus, a real indicator of ageing would not be an arbitrarily chosen event (e.g., retirement, onset of a chronic condition), but whether the individual has responded and adapted to the event (e.g., internalisation of his or her retiree status, approaching end of life)–i.e. the extent to which a person has *experienced* the specific ageing processes.

Conceptual definition

At the conceptual level, "gerontographics" incorporates the internalisation of the multiple dimensions or domains of ageing (biological, social, psychological, and spiritual) that people experience as they grow old. It is based on the premise that people age differently and at different rates due to biological, social, and psychological changes that are not uniformly experienced at a specified chronological age (e.g., Moody, 1988). This premise also implies that internalisation of the ageing processes likely influences not only one's self-definitions with respect to his or her age but his or her consumer behaviours as well. Thus, gerontographics can be defined conceptually as the degree of one's internalisation of types of ageing experienced (biophysical, psychological, social, and spiritual), as evidenced by the extent to which the ageing person has acquired the characteristics associated with old age (e.g. Kaufman and Elder, 2002) or displays commitment to the behavioural prescriptions that characterise old age-related roles (Herzog and Markus, 1999). These characteristics and orientations are manifested in the ageing person's increased concern and preoccupation with matters such as spirituality, vulnerability to fraud and crime, loss of independence, desire for preservation of the self beyond death symbolically, norms regarding the transfer of possessions to younger relatives, a greater awareness of the person's stage in life in relation to his or her life span, and perceived proximity to the end of life (e.g., Atchley, 1987; Belk, 1988; Heckhausen and Schulz, 1995; Kaufman and Elder, 2002; Mathur *et al.*, 2011; Moody, 1988; Moschis, 2012).

Gerontographics and consumer behaviour

Based on the widely-accepted belief that ageing is a multi-dimensional process, older people are likely to experience the various ageing processes differently due to the wide

5

variability across individuals. Some people experience each of these processes earlier than others, some may experience one or more of them, and others may not experience any of them. The timing and duration of the various events that define these ageing processes differ across people, leading to differences in experiences among ageing persons. Because of differences in ageing processes, gerontographics acknowledges the heterogeneity in ageing and attempts to locate ageing persons on a continuum in relation to others with respect to these processes. However, rather than examining each person's state of ageing at a given time, gerontographics locates each person according to the type of ageing they have experienced. It further suggests that older adults who have experienced similar circumstances in later life (i.e., social, psychological, biophysical, and other environmental factors) are likely to exhibit similar patterns of behaviour.

In a series of studies, gerontographics research has identified four segments of the mature audience that differ according to the extent and type of ageing they have experienced. Factor analysis of items developed to tap the ageing person's experiences of the three main ageing variables consistently reveals two dimensions of ageing: biophysical and psychosocial (Moschis 1996). Social and psychological ageing are strongly related, suggesting the strong interplay between these two dimensions. Measures of these two dimensions have been applied to form four gerontographic segments, terms that have been used for nearly three decades based on work by the Center for Mature Consumer Studies (e.g., Correia and Elliott, 2006; Gonzalez and Paliwoda, 2006; *Marketing Communications,* 1988; Moschis, 1992, 1993, 1996; Nimrod, 2013): healthy indulgers, healthy hermits, ailing outgoers, and frail recluses (Moschis,1996).

Healthy indulgers represent individuals who have not experienced changes that suggest the onset of psychosocial and biological ageing. Contrary to healthy indulgers, *frail recluses* have experienced both biophysical and social ageing, while *healthy hermits* represents the group of older adults who have internalised psychosocial ageing processes without experiencing significant biophysical ageing. Finally, *ailing outgoers* represents the group that maintains high self-esteem and a positive outlook on life despite experiencing biophysical decline. Changes in social, psychological or physical conditions may shift older people from one segment to another. Many of the frail recluses, for example, may have been healthy indulgers who subsequently went through one of the intermediate stages experienced by healthy hermits and ailing outgoers. Such shifts are not mandatory, however, and one may remain in the same segment throughout later life. Moreover, although changes may occur

6

over time, they are "relatively age-irrelevant because they may begin at any age in later life, or may never be experienced" (Moschis, 1996, p. 59).

Since its introduction, the gerontographics model has been employed in many studies, predominantly in marketing and consumer behaviour. For example, it was used to examine the preferences of older consumers with regard to financial services, food and grocery stores, restaurants, retirement communities, travel and leisure services, long-term care insurance, apparel and footwear brands, department stores, housing, healthcare products and services, home fire safety services and use of the Internet (e.g., Bird and Tapp, 2011; Correia and Elliott, 2006; Gonzalez and Paliwoda, 2006; Moschis *et al.*, 1997; Nimrod, 2013). Most such studies, however, were carried out by Moschis and his colleagues, with only rare implementation in countries outside United States (e.g., Nimrod, 2013). These as well as other studies (Moschis, 1996; Moschis *et al.*, 1997) suggest that gerontographic characteristics are more powerful than age in predicting responses to marketing stimuli.

Despite the model's popularity over the years, its implicit assumption that the four segments are the result of internalisation of the ageing processes that lead to "movement" from one gerotographic group to the next (Figure 1) has not been empirically verified. If consumer behaviours are the result of ageing processes that define the gerontographic group membership, then consumer behaviours should also be related to the ageing processes. Yet, it is reasonable to assume that in comparison to older adults who have not experienced ageing, those who experienced biophysical ageing are also more likely to have experienced deterioration of their bodily systems, those who have experienced social ageing have also experienced events that signify transitions into old-age-related roles, and those who have experience psychological ageing are more likely to see themselves in closer proximity to the end of their lives.

Furthermore, if ageing processes are universal, these relationships and the resultant ageing-based segments should hold in any cultural contexts, even in countries that have cultures different from Western countries, such as the Eastern culture of Thailand. Although certain life conditions, cultural and environmental factors (e.g., preventive healthcare, social norms, nutrition) may influence the onset of ageing processes in different countries, these processes are expected to be universal. As such, gerontographic measures of the ageing processes should provide the bases for the formation of the four gerontographic groups, but cultural factors may affect the relationships between measures of the ageing processes and specific consumer behaviours. Finally, because gerontographic measures tap multidimensional ageing processes, they should also be better predictors of behaviour than

both age that merely marks passage of time and cognitive age that taps a limited dimension of psychological ageing, as shown in studies conducted in the United States.

Thus, the present research is theoretically and empirically motivated; it is designed to fill several gaps in previous gerontographics research and make four main contributions. First, it validates previous gerontographic measures that tap the internalisation of the ageing processes based on the ageing person's experiences of their own ageing. Second, it uses data from a country (Thailand) that has a different culture than United States to assess the validity of gerontographic measures as bases of the four gerontographic groups. Third, it assesses the efficacy of the gerontographic measures of the ageing processes in predicting selected consumer behaviours. Fourth, it tests and compares the power of gerontographic measures relative to chronological and cognitive age in predicting consumer behaviours.

Study

Sample

This study utilised convenience sampling of Thai people aged 45 years or older, living in Bangkok and vicinity areas of Thailand. Thailand appeared an ideal country in which to conduct our study not only because it is a collectivistic country where people have strong family ties and define themselves in terms of their relationships with others (e.g., Hofstede, 1980; Triandis, 1989), but also because of norms, and other socio-demographic factors different from those of Western countries such as the United States, where nearly all previous work on gerontographics was carried out.

The self-administered questionnaire was distributed to 1,200 persons who were members of old-age associations and elderly clubs, or visitors of public parks. A total of 511 questionnaires were completed. The sample is comprised of almost equal percentages of female and male participants (female = 48.9%, male = 51.1%), aged between 45 and 54 (22.1%), 55 to 64 (28.6%), 65 to 74 (37.0%), and aged 75 or older (12.3%). In terms of annual income, approximately one-fifth of the sample (19.1%) reported 250,000 THB or less, almost one-third (32.2%) between 250,000 and 600,000 THB, and nearly one-third (31.6%) 600,000 to 1,200,000 THB. A substantially smaller percentage reported annual incomes between 1,200,000 and 2,400,000 THB (11.4%), and over 2,400,000 THB (5.7%). Nearly half (49%) of the sample was retired, and one-tenth (10.9%) consisted of retired and employed part-time. One-third (30.4%) of the participants were employed full-time. A small portion were retired and employed full-time (3.6%) or part-time (6.1%).

8

Measures

Gerontographics. Gerontographics research draws from the fields of gerontology and social sciences to reveal changes occurring with advancing age in later life (e.g., fear of deteriorating health and dependency on others, stronger spirituality, desire for extending one's self beyond death) (e.g., Moody, 1988; Moschis, 2012). These changes are used to operationally define the internalisation of ageing processes; they are the bases for developing statements that tap the internalisation of ageing processes. For example, biological ageing is assessed by including statements related to the experiences of declining physical health and internalisation of those changes (e.g., "I am concerned with the physical changes in my looks", "I am concerned with my ability to take care of myself when I get older"). Similarly, the spiritual dimension of ageing is reflected in the statement, "Nowadays, I find that I rely more on my spirituality and faith". Table I presents the conceptual and operational definition of the gerontographic measures.

Insert Table I about here

Respondents were asked to indicate the extent to which they agreed or disagreed with the initial list of thirteen statements that reflect internalisation of the changes one might have experienced as a part of ageing and the readjustment of age-related self-conceptions. Based on initial exploratory factor analysis, three items were dropped from the scale. The final list of ten items used to measure gerontographics is shown in the Appendix. Although the 10 items were expected to measure three latent factors, each related to the main ageing processes (biophysical, psychological, and social), exploratory factor analysis with varimax rotation produced two main domains (factors), one that was interpreted as psychosocial ageing and another as biophysical ageing (Appendix). The two-factor results are consistent with those of previous studies conducted in the United States based on large samples (Moschis, 1996). The items tapping each dimension are also noted in the Appendix. Factor scores were retained for assigning respondents to the four gerontographic groups.

Chronological age was measured by asking respondent to indicate their birth date. *Cognitive age* was an identical measure that used in previous studies (e.g., Mathur and Moschis, 2005; Wilkes 1992). The four items commonly used to measure cognitive age are shown in the Appendix. Cronbach's alpha for the cognitive age scale is very high ($\alpha = 0.933$), which indicates excellent reliability level. Finally, due to the sensitivity of age and ageing-

9

related questions, we used a short version of social desirability scale (Strahan and Gerbasi, 1972).

We used three measures to validate the two dimensions of gerontographics: old-age-role transition events, prescription drugs used, and perceived proximity to death. A retrospective life history approach was used to collect the information about the timing of five events that signify transitions into old age roles (retirement, last child left household, death of both parents, birth of first grandchild, and diagnosis of a chronic condition). Respondents were also asked to indicate if they anticipate experiencing three of these transition events in the next 12 months (retirement, empty nest, and grandparenthood), as previous research suggests that the experience of such events and their anticipation serve as markers of transition into old age (Mathur and Moschis, 2005; Mathur *et al.*, 2008; Rapkin and Fisher, 1992). If they had experienced an event more than once, they were requested to indicate the year in which the event took place each time. We formed a 0-to-8-point index of *old-age-role transition events*. Even though we were concerned with the accuracy of the retrospective method that relies on respondents' ability to recall, especially in older adults (Moschis, 1992), previous research has shown that the accuracy of recall of important life events is not affected by a respondent's age (Rodgers and Hertzog, 1987). Generally, retrospective measures tend to be rather reliable if the events are important to respondents (Scott and Alwin, 1998) and have been widely used by life course and consumer researchers (e.g., Henry *et al.*, 1994; Richins and Chaplin, 2015). All the experienced and anticipated life events were treated as equally weighted scores, because weighted or un-weighted scores are very highly related to one another and similarly correlated with dependent variables (Grant *et al.*, 1978; Ross and Mirowsky, 1979). Furthermore, because these life events are not necessarily related, the composite index of these events is not expected to indicate internal consistency (e.g., Herbert and Cohen, 1996; Kim *et al.*, 2003). Such measures have been used in previous life course research (e.g., Crosnoe and Elder, 2002; Moen *et al.*, 1992).

Old-age consumer behaviours refer to overt consumption-related activities relevant to people in later life. We reviewed the literature to determine the types of activities that older adults engage in, compared to their younger counterparts (e.g., Moschis, 1992; Moschis and Mathur, 2007). We identified 11 behaviours (shown in the Appendix). For each, respondents were asked to indicate whether they had done it, thought about it, or had not done it or thought about it, assigning the number 1 to those that respondents had done. Scores were summed across all 11 behaviours to form a 0-to-11-point index.

10

Respondents were also asked to indicate the number of prescription drugs they were using for chronic conditions. The total *number of drugs* was used as a proxy measure of the deterioration of the bodily systems. Finally, respondents were asked to indicate "how long they hoped to live, at the very least." Their chronological age was subtracted from this "hope to live" age to form the measure of the respondent's *perceived proximity to death*.

Validation of measures

With respect to measures that tap the derived biophysical and psychosocial ageing dimensions of ageing, it was expected that the former will correlated positively with the deterioration of the bodily system (as measured by the number of prescription drugs used for chronic conditions), and the latter will correlate positively with the ageing person's transitions into old-age related roles (measured by the number experienced and anticipated events that mark such transitions). The results of correlations shown in Table II are consistent with our expectations. After controlling for social desirability, the relationship between number of prescription drugs used and the gerontographic measures of biophysical ageing was positive ($r = 0.155$, $p < 0.001$), while the relationship between old-age-role transitional events was also significant ($r = 0.168$, $p < 0.001$).

Furthermore, the internalisation of ageing tapped by gerontographic measures implies that people who are aware of their ageing and old-age status are also aware of their increasing perceived proximity to the end of life (Carstensen, 2006). Therefore, those who are aware of their ageing processes and have internalised age-related changes are likely to expect to live fewer years than those who have yet to experience such changes. Thus, the number of years a respondent expects to live beyond their chronological age at the time of the survey (perceived proximity to the end of life) was expected to be negatively associated with the two gerontographic measures. The statistical results shown in Table II provide a validity test for this measure, showing a negative relationship between perceived proximity to the end of life (in years) and the two gerontographic measures—for both psychosocial ageing and biophysical ageing dimensions, after controlling for social desirability (psychosocial ageing $r = -0.222$, $p < 0.001$ and biophysical ageing $r = -0.177$, $p < 0.001$, respectively).

Insert Table II about here

To assess the validity of the cognitive age scale, identification of the relationships between cognitive age and other relative variables is required, similar to the gerontographics

11

scale. It was expected that the relationships between cognitive age and number of years expected to live would be negative. In contrast, cognitive age was expected to have a positive association with the number of prescription drugs used and age at which "one think of self as an 'old' person." The findings (Table II) confirm the validity of cognitive age scale in Thai context.

Test and comparison of alternative models: Age and cognitive age

Over the past several decades, chronological age and cognitive age have been widely used by scholars to help better understand the behaviour of older consumers (e.g., Guido *et al.*, 2014; Mathur and Moschis, 2005; Szmigin and Carrigan, 2001; Wilkes, 1992). Age has been more useful in classifying and predicting than in explaining consumer responses (Moschis, 2012). As Rutter (1996) states, "age per se does not provide any kind of explanation; it is necessary to go on and ask which features indexed by age constitute mediating mechanisms" (p. 608). Similarly, despite its popularity, concerns have been raised about the efficacy of cognitive age in predicting the behaviour of individuals in later life and about its relationship with chronological age. As the cognitive age construct is strongly correlated with chronological age, it is possible that cognitive age is merely a proxy measure of chronological age and of limited predictive ability beyond that of chronological age for certain behaviours (e.g., Mathur *et al.*, 2011).

Thus, the great variability in ageing processes cannot be captured by chronological age, while alternative measures of subjective age such as age identity and cognitive age capture limited aspects of ageing processes (mostly single dimensions) and raise issues of invalidity (Moschis, 2012). Because the gerontographic measures are designed to tap the ageing processes, they were expected to explain variability and thus better predict consumer behaviours in later life than age or cognitive age.

Models

To test the predictive power of gerontographics, eleven dependent variables were used (Appendix). These variables were selected because of their strong association with age found in previous studies. Chronological age groups, cognitive age groups, and gerontographic groups were included as predictor variables. Chronological age (A) was segregated into four groups: age 45-54 (baseline), age 55-64 (A1), age 65-74 (A2) and age 75 and above (A3). Cognitive age (CA) was segregated into four groups: under 50s, 50s (CA1), 60s (CA2) and

70s and above (CA3). The gerontographic measures also segregated respondents into four groups: healthy indulgers, healthy hermits (G1), ailing outgoers (G2) and frail recluses (G3). Three models were tested in predicting old-age-related behaviours (CB), as shown by the resultant regression models.

$$CB_i = \beta_0 + \beta_1 A1_i + \beta_2 A2_i + \beta_3 A3_i + \varepsilon_i \qquad (1)$$
$$CB_i = \beta_0 + \beta_1 CA1_i + \beta_2 CA2_i + \beta_3 CA3_i + \varepsilon_i \qquad (2)$$
$$CB_i = \beta_0 + \beta_1 G1_i + \beta_2 G2_i + \beta_3 G3_i + \varepsilon_i \qquad (3)$$

The main contention of this research is that gerontographics should have a stronger predictive power, compared with cognitive age and chronological age.

Comparison of models

The predictive power of the three models on eleven old-age-related behaviours was tested by using multiple regression. Table III presents *R-squared* values and significance levels (*p-value* of the model), with a higher *R-squared* showing a greater explanatory power. Only chronological age can predict 'money needed for comfortable retirement' (R-*squared* = 0.056, $p < 0.001$). Chronological age was the best predictor of 'things to do in retirement' (R-*squared* = 0.086, $p < 0.001$), 'senior discount' (R-*squared* = 0.180, $p < 0.001$), and 'leave a legacy' (R-*squared* = 0.036, $p < 0.001$), compared to cognitive age and gerontographics. Cognitive age had a significant influence on certain old-age-related activities, but all of the significant emerged relationships were also significant for chronological age, which appears to be a stronger predictor of these behaviours than cognitive age. Gerontographics can predict 'volunteer' (R-*squared* = 0.036, $p < 0.001$), 'save money' (R-*squared* = 0.031, $p < 0.001$) and 'make a will' (R-*squared* = 0.016, $p < 0.05$), while both chronological age and cognitive age cannot predict these behaviours. Furthermore, gerontographics has the highest predictive power for 'religious activities' (R-*squared* = 0.097, $p < 0.001$), 'talk to relatives' (R-*squared* = 0.053, $p < 0.001$) and 'give to loved ones' (R-*squared* = 0.043, $p < 0.001$), compared to chronological age and cognitive age. Finally, though chronological age seems to have the highest predictive power on the summated number of old-age-related activities (R-*squared* = 0.096, $p < 0.001$), gerontographic measures appear to explain these activities better than cognitive age (R-*squared* = 0.037, $p < 0.001$ vs. R-*squared* = 0.028, $p < 0.01$).

Insert Table III about here

13

Effects of ageing on consumer behaviour

To further gain additional insights into the effects of the three types of ageing (chronological age, cognitive age, and the two gerontographic measures), we performed separate analyses using continuous scales for these measures. We assessed the effects of these variables on each consumer activity, taking into account not only overt but also cognitive activity, and assigning the value of 2 to respondents who indicated they had engaged in the activity ("Had done it"), the value of 1 to those who had only thought about engaging in the activity ("Had only thought about it", and the value of 0 to those who did neither ("Had not thought or done it"). Table IV shows the results of these analyses.

Insert Table IV about here

The results in Table IV provide additional interesting insights into the effects of gerontographics, beyond those shown in group analyses (Table III). They help understand both the effects of ageing processes as well as possible cultural influences. With respect to volunteering, the results explain possibly increase or decrease in the engagement of this activity; it appears to increase as older adults experience psychosocial ageing ($r = 0.134$, $p < 0.001$) and it decreases with biophysical ageing ($r = -0.100$, $p < 0.05$). Perhaps volunteering serves as a substitute for role losses among those who are experiencing contraction of their social environments and loss of self-esteem due to ageing, and it becomes an increasingly difficult task among those who are experiencing biophysical declines – i.e., increasingly poor health such as a lack of mobility. In comparison to the healthy indulgers who have experienced relatively lower levels of ageing, healthy hermits tend to volunteer more ($r = 0.194$, $p < 0.001$) perhaps due to more available free time, and ailing outgoers volunteer less ($r = -0.106$, $p < 0.05$).

Although saving for later years becomes less likely with age and ageing, it is interesting to note that in comparison to healthy indulgers, ailing outgoers save more regularly ($r = 0.124$, $p < 0.01$), reflecting their positive attitude for life despite biophysical declines. Further, although people are increasingly more likely with age to make a will ($r = 0.170$, $p < 0.001$), a tendency that increases with one's experience of psychosocial ageing ($r = 0.102$, $p < 0.05$), those who see themselves increasingly younger than their chronological age as they get older tend to be *less* likely to have a will ($r = -0.126$, $p < 0.01$), a finding that may reflect defiance of ageing or old-age status.

14

In a predominantly Buddhist culture, such as Thai, spirituality is associated with temple visitation and meditation. Although increase in such spiritual activities appears to be associated with age ($r = 0.173$, $p < 0.001$), this relationship may also reflect cohort effects. Older Thai adults who report that they see themselves younger than their chronological age are less likely to engage in spiritual activities ($r = -0.112$, $p < 0.01$), a finding difficult to explain in the context of the positive association of spirituality with age and the strong association of age with cognitive age ($r = 0.670$, $p < 0.001$) (Table II). A similar pattern of relationships emerges with respect to making arrangements for leaving a legacy, where age and cognitive age show positive ($r = 0.276$, $p < 0.001$) and negative ($r = -0.112$, $p < 0.05$) associations with this behaviour, respectively (Table IV). It might be that those who report an older cognitive age may not see themselves as "old" persons. Gerontographic measures shed light on the possible effects of ageing on spirituality. As shown in Table IV, this variable (religious activities) has a strong positively association with psychosocial ageing ($r = 0.251$, $p < 0.001$), but a marginally significant negative association with biophysical ageing ($r = -.060$, ns). These results suggest that for those experiencing biophysical ageing, increase in temple visitation may become difficult. In contrast, those experiencing psychosocial ageing are also increasingly more likely to elevate their spiritual activities.

Use of senior discounts appears to a matter of age eligibility, as this variable correlates strongly only with age ($r = 0.403$, $p < 0.001$). Unlike the Western culture of the United States where altruism is associated with increasing age (e.g., Moschis, 1992), older Thai adults do not seem to show this behavioural tendency. Neither age, nor cognitive age, nor gerontographic measures correlate giving a major portion of one's wealth to charitable organizations. Because Thailand is a collectivistic culture, social norms may dictate that wealth is passed on to one's descendants than to charitable organizations. Finally, the last two behaviours, talking to relatives about things that show their family's history or legacy and giving to their loved ones cherished objects that show the things they and their close relatives did in their lives, are relevant to the person's life accomplishments and preservation of self beyond death. The 'talk to relative' behaviour is positively correlated with age ($r = 0.139$, $p < 0.001$) and with the two gerontographic measures, psychosocial ($r = 0.188$, $p < 0.001$) and biophysical ($r = 0.077$, $p < 0.05$) but not with cognitive age; and in comparison to healthy indulgers, healthy hermits and frail recluses are more likely to talk to family members about their family's history or legacy, while ailing outgoers are less likely to engage in such conversations. Finally, in comparison to healthy indulgers, healthy hermits are more likely ($r = 0.134$, $p < 0.001$) and frail recluses less likely ($r = -0.093$, $p < 0.05$) to transfer cherished

15

positions to their loved ones, a behaviour that is positively associated with age ($r = 0.149$, $p < 0.001$) but not with cognitive age ($r = -0.056$, ns).

Discussion

One of the objectives of the present study was to validate the gerontographics model and its measures. Consistent with the results of studies in the United States, the present study reveals also two relatively uncorrelated measures of ageing processes (Table II) (roughly similar correlations were revealed in using either factor scores or raw scores). Furthermore, this study confirms the validity of the ageing measures of gerontographics as they relate to other objective measures of ageing. These findings support a basic premise of the gerontographics model–i.e., that people in later life go through different stages as they experience different types of ageing, as shown in Figure 1.

As with previous studies in the United States, the items developed to measure three main ageing processes appear to measure only two such processes (psychosocial and biophysical), with those items designed to tap psychological and social ageing likely measuring the same latent factor. Although the two ageing processes may not occur concurrently, it is possible people may begin experiencing psychological ageing in anticipation of many life events that signify transition into old-age roles (e.g., retirement, 'empty nest'). Longitudinal data would be ideal in validating the internalisation of gerontographics as related to the ageing processes.

A major objective of the study was to determine whether gerontographics predicts older consumers' behaviour in countries outside the United States that have different cultures, such as Thailand. The study findings show that the gerontographics model can explain only certain types of consumer behaviours. To gain further insights into the relationships between the various measures of ageing used to construct the three different models (age, cognitive age, and gerontographics), we examined relationships between these measures as continuous variables and each specific behaviour. Although the present study used behaviours different from previously used in the United States, results suggest possible cultural differences with respect to the effects of explanatory variables on some consumer behaviours. For example, the negative relationships that emerged between cognitive age and old-age-related consumer behaviours, when chronological age had strong positive effects on such behaviours, suggest that people may have a different age-related connotation in Eastern countries like Thailand, Thais may think of cognitive age in terms of biophysical changes, because of its strong

16

positive association was with biophysical ageing ($r = 0.220$, $p < 0.001$) and its negative relationship with psychosocial ageing (r = -0.072, ns) that approaches significance (Table II). Regardless of explanation, the empirical results suggest that psychosocial ageing is less relevant than biophysical ageing in predicting the consumer behaviours examined in this study.

Another objective of this study was to determine the extent to which the gerontographics model is a better predictor of consumer behaviours than other widely used non-chronological models of ageing in countries outside the United States that have different cultures, such as Thailand. Again, the results show the superior power of gerontographics for certain types of behaviours, and they raise questions as to the reasons the relationships exist for some consumer behaviours and not others. An interesting finding was the absence of significant correlations between giving to charitable organizations with increasing age and ageing. It is likely that in collectivistic countries like Thailand, the ageing person's wealth is viewed as property of his or her relatives, in comparison to individualistic countries like the United States where giving to charities has by the aged is well-documented (e.g., Moschis, 1992).

In sum, these findings have implications for marketing and business strategies because they suggest that gerontographics segmentation may be a more useful and effective way to segment older consumers. Further research should include a greater number and diversity of consumer behaviours and assess the explanatory power of gerontographics, compared to traditional age measures, such as chronological age and cognitive age, across a much broader diversity of consumption activities than those employed in this research. Examination of consumer responses to marketer-controllable variables (e.g., pricing, sales promotions) of companies in different countries and specific industries, and how the various gerontographic segments respond to these variables, could provide useful guidelines for strategy development, as it has in the United States (e.g., Moschis, 2003; Moschis *et al.*, 1997). It is hoped that this research has provided the impetus for further research in this area.

References

Atchley, R.C. (1987), *Ageing: Continuity and Change*, 2nd ed., Wadsworth Publishing, Belmont, CA.

Baltes, P.B. and Baltes, M. (1990), "Psychological Perspectives on Successful Ageing: The Model of Selective Optimisation and Compensation", in Baltes, P. and Baltes, M. (Eds.), *Successful Ageing*, Cambridge University Press, Cambridge, pp. 1-34.

Belk, R.W. (1988), "Possessions and the extended self", *Journal of consumer research*, Vol. 15 No. 2, pp. 139-168.

Bird, S. and Tapp, A. (2011), "Fear and fire: Ethical social marketing strategies for home fire safety for older people", paper presented at World Social Marketing Conference, 11-12 April, Dublin, Ireland, available at: http://eprints.uwe.ac.uk/14657/2/WSMC_2011_AFRS.pdf (accessed 13 January 2017).

Birren, J.E. and Cunningham, W.R. (1985), "Research on the psychology of ageing: principles, concepts and theory", in Birren, J.E. and Schaie, K.W. (Eds.), *Handbook of Ageing and Psychology*, Van Nostrand Reinhold, New York, NY, pp. 3-34.

Carstensen, L.L. (2006), "The Influence of a Sense of Time on Human Development", *Science (New York, N.Y.)*, Vol. 312 No. 5782, pp. 1913–1915. http://doi.org/10.1126/science.1127488

Correia, S. and Elliott, R. (2006), "An examination of internet user profiles in the mature tourism market segment in South Africa", *Consortium Journal of Hospitality & Tourism*, Vol. 10 No. 2, pp. 47-62.

Crosnoe, R. and Elder Jr, G.H. (2002), "Successful adaptation in the later years: A life course approach to aging", *Social Psychology Quarterly*, Vol. 65, pp. 309-328.

Drolet, A., Schwarz, N. and Yoon, C. (2010), *The Ageing Consumer*, Psychology Press, New York.

Elder, G.H. and Johnson, M.J. (2002), "The life course and ageing: challenges, lessons, and new directions", in Settersten, R.A. (Eds.), *Invitation to the Life Course: Toward New Understanding of Later Life Part II*, Baywood, Amityville, NY, pp. 49-81.

Gonzalez, A. and Paliwoda, S. (2006), "Segmenting the older consumer for online travel", *The marketing review*, Vol. 6 No. 4, pp. 331-348.

Grant, I., Sweetwood, H., Gerst, M.S., and Yager, J. (1978), "Scaling procedures in life events research", *Journal of Psychosomatic Research*, Vol. 22 No. 6, pp. 525-530.

Gregoire, Y. (2003), "The impact of ageing on cognitive responses: what do we know?" in

Keller, P.A. and Rook, D.W. (Eds.), *Advances in Consumer Research 30*. Association for Consumer Research, Valdosta, GA, pp. 19-26.

Guido, G., Amatulli, C. and Peluso, A.M. (2014), "Context effects on older consumers' cognitive age: the role of hedonic versus utilitarian goals", *Psychology and Marketing*, Vol. 31 No. 2, pp. 103–114.

Heckhausen, J. and Schulz, R. (1995), "A life-span theory of control", *Psychological Review*, Vol. 102 No. 2, pp. 284-304.

Henry, B., Moffitt, T.E., Caspi, A., Langley, J. and Silva, P.A. (1994), "On the "remembrance of things past": A longitudinal evaluation of the retrospective method", *Psychological assessment*, Vol. 6 No. 2, pp. 92-101.

Herbert, T.B. and Cohen, S. (1996), "Measurement issues in research on psychosocial stress", in Kaplan H.B. (Ed.), *Psychosocial Stress: Perspective on Structure, Theory, Life-Course and Methods*, Academic, New York, pp. 295-332.

Herzog, A.R. and Markus, H.R. (1999), "The self-concept in life span and ageing research", in Bengtson, V.L. and Schaie, W. (Eds.), *Handbook of Theories of Ageing*, Springer, New York, NY, pp. 227-252.

Hofstede, G. (1980), *Culture's consequences*, Sage, Beverly Hills, CA.

Kaufman, G. and Elder, G.H. (2002), "Revisiting age identity: a research note", *Journal of Ageing Studies*, Vol. 16 No. 2, pp. 169-176.

Kim, K.J., Conger, R.D., Elder, G.H., and Lorenz, F.O. (2003), "Reciprocal influences between stressful life events and adolescent internalizing and externalizing problems", *Child Development*, Vol. 74, pp. 127–143.

Marketing Communications (1988), "Survey: Age Is Not a Good Indicator of Consumer Needs", 21 November, pp. 6.

Mathur, A., Mathur, R.J. and Moschis, G.P. (2011), "Effects of health concerns and adoption of health-related products on cognitive age", in Bradshaw, A., Hackley, C. and Maclaran, P. (Eds.), *European Advances in Consumer Research 9*, Association for Consumer Research, Duluth, MN, pp. 243-248.

Mathur, A. and Moschis, G.P. (2005), "Antecedents of cognitive age: a replication and extension", *Psychology and Marketing*, Vol. 22 No. 12, pp. 969-994.

Mathur, A., Moschis, G.P. and Lee, E. (2008), "A longitudinal study of the effects of life status changes on changes in consumer preferences" *Journal of the Academy of Marketing science*, Vol. 36 No. 2, pp. 234-246.

19

Moen, P., Dempster-McClain, D. and Williams, R. (1992), "Successful Aging: A Life-Course Perspective on Women's Multiple Roles and Health", *American Journal of Sociology,* Vol. 97 No. 6, pp. 1612-1638.

Moody, H.R. (1988), "Toward a critical gerontology: the contributions of the humanities to theories of ageing", in Birren. J.E. and Bengtson, V.L. (Eds.), *Emergent Theories of Ageing*, Springer Publishing Company, New York, NY, pp. 19-40.

Moschis, G.P. (1992), *Marketing to Older Consumers*, Quorum, Westport, CT.

Moschis, G.P. (1993), "Gerontrographics: a scientific approach to analysing and targeting the mature market", *Journal of Consumer Marketing*, Vol. 10 No. 3, pp. 43-53.

Moschis, G.P. (1996), *Gerontographics: Life-stage Segmentation for Marketing Strategy Development*, Quorum, Westport, CT.

Moschis, G.P. (2000), "Consumer behaviour in later life: multidisciplinary approaches and methodological issues", *Research in Consumer Behaviour*, Vol. 9, pp. 103–128.

Moschis, G.P. (2003), "Marketing to older adults: an updated overview of present knowledge and practice", *Journal of Consumer Marketing*, Vol. 20 No. 6, pp. 516-525.

Moschis, G.P. (2012), "Consumer behaviour in later life: current knowledge, issues, and new directions for research", *Psychology and Marketing*, Vol. 29 No. 2, pp. 57-75.

Moschis, G.P., Lee, E. and Mathur, A. (1997), "Targeting the mature market: opportunities and challenges", *Journal of Consumer Marketing*, Vol. 14 No. 4, pp. 282-293.

Moschis, G.P. and Mathur, A. (2007), *Baby boomers and their parents: Surprising findings about their lifestyles, mindsets, and well-being*, Paramount Market Publishing.

Nimrod, G. (2013), "Applying gerontographics in the study of older Internet users", *Journal of Audience & Reception Studies*, Vol. 10 No. 2, pp. 46–64.

Pettigrew, S. and Moschis, G.P. (2011), "Consumer well-being in later life", in Mick, D., Pettigrew, S., Pechman, C. and Ozanne, J. (Eds.). *Transformative Consumer Research for Personal and Collective Well-being*, Routledge, New York, NY, pp. 565-581.

Rapkin, B.D. and Fischer, K. (1992), "Personal goals of older adults: issues in assessment and prediction", *Psychology and Ageing*, Vol. 7 No. 1, pp. 127–137.

Richins, M.L. and Chaplin, L.N. (2015), "Material parenting: how the use of goods in parenting fosters materialism in the next generation", *Journal of Consumer Research*, Vol. 41 No. 6, pp. 1333-1357.

Rodgers, W.L., and Herzog, A. (1987), "Interviewing older adults: The accuracy of factual information", *Journal of Gerontology*, Vol. 42 No. 4, pp. 387-394.

Ross, C.E. and Mirowsky, J. (1979), "A comparison of life-event-weighting schemes: Change, undesirability, and effect-proportional indices", *Journal of Health and Social Behavior*, Vol. 20, pp. 166-177.

Rutter, M. (1996), "Transitions and turning points in developmental psychopathology: as applied to the age span between childhood and mid-adulthood", *International Journal of Behavioural Development*, Vol. 19 No. 3, pp. 603-626.

Scott, J. and Alwin, D. (1998), "Retrospective versus prospective measurement of life histories in longitudinal research", in Giele, J.Z. and Elder Jr, G.H. (Eds.), *Methods of Life Course Research: Qualitative and Quantitative Approaches*, Sage Publications, Thousand Oaks, CA, pp. 98-127.

Settersten, R.A. and Mayer, K.U. (1997), "The measurement of age, age structuring, and the life course", *Annual Review of Sociology*, Vol. 23, pp. 233–261.

Strahan, R. and Gerbasi, K.C. (1972), "Short, homogeneous versions of the Marlow-Crowne Social Desirability Scale", *Journal of clinical psychology*, Vol. 28 No. 2, pp. 191-193.

Szmigin, I. and Carrigan, M. (2001), "Introduction to special issue on cognitive age and consumption", *Psychology and Marketing*, Vol. 18 No. 10, pp. 999-1002.

Triandis, H. C. (1989), "The self and social behavior in differing cultural contexts", *Psychological review*, Vol. 96 No. 3, pp. 506.

Wilkes, R.E. (1992), "A structural modeling approach to the measurement and meaning of cognitive age", *Journal of Consumer Research*, Vol. 19 No. 2, pp. 292-301.

Appendix

Items used in scale construction

Cognitive age (indicated in age decades – 20s, 30s, 40s, 50s, 60s, 70s, 80, 90s)

1. I feel as though I am in my ____.
2. I look as though I am in my ____.
3. I do most things as though I am in my ____.
4. My interests are mostly of a person in his or her ____.

Measures of gerontographics (1 = strongly disagree, 4 = strongly agree)

1. Nowadays, I find that I rely more on my spirituality and faith. (PS)
2. Staying in good health is more important to me than improving my appearance. (PS)
3. I sometimes think about the mark I will leave on this world. (PS)
4. I often think of things I want to pass on to my loved ones. (PS)
5. Nowadays, I value relationships with my loved ones more than I did 10 years ago. (PS)
6. I must admit that sometimes I feel and think as other people of my age. (PS)
7. I can still physically do most things as well today as I did earlier in life. (BP) (Reverse item)
8. I admit that I have lost some of my stamina in recent years. (BP)
9. I am concerned with my ability to take care of myself physically when I get older. (BP)
10. I sometimes think that the prime years of life may be behind me. (BP)

*Notes: PS = psychosocial ageing; BP = biophysical ageing

Old-age activities (have done it = 1, otherwise = 0)

1. Spend a lot of your time doing volunteer work. (Volunteer)
2. Figure out how much money would be needed for a comfortable retirement. (Money needed for comfortable retirement)
3. Make plans for the things they want to do during their retirement years. (Things to do in retirement)
4. Save money regularly to use later in life. (Save money)
5. Make a will.
6. Begin or increase engagement in religious or spiritual activities. (Religious activities)

22

7. Use discounts or perks offered to people over a certain age. (Senior discounts)

8. Give a major portion of their wealth (money or property) to charitable organisations. (Give to charity)

9. Make arrangements for leaving a legacy. (Leave a legacy)

10. Talk to relatives about things that show their family's history or legacy. (Talk to relatives)

11. Give to their loved ones cherished objects (like photos, trophies, and plaques) that show the things they and their close relatives did in their lives. (Give to loved ones)

Table I. Definition and measures of gerontographics

Conceptual definition	Operational definition and sample items for measure*	Scale & measure
The degree of one's internalisation of types of ageing experienced (biophysical, psychological, social, and spiritual), as evidenced by the extent to which the ageing person has acquired the characteristics associated with old age or displays commitment to the behavioural prescriptions that characterise old age-related roles.	Characteristics and orientations manifested in the ageing person's increased concern and preoccupation with: Spirituality (items such as: "Nowadays, I find that I rely more on my spirituality and faith"); Vulnerability (items such as: "I admit that I have lost some of my stamina in recent years"); Loss of independence (items such as: "I am concerned with my ability to take care of myself physically when I get older); Desire for preservation of the self beyond death symbolically (items such as: "I sometimes think about the mark I will leave on this world"); Norms regarding the transfer of possessions to younger relatives (items such as: "I often think of things I want to pass on to my loved ones"); A greater awareness of the person's stage in life in relation to his or her life span (items such as: "I sometimes think that the prime years of life may be behind me"); Proximity to the end of life (items such as: "I have more things to look forward to in life now than I had a few years ago").	Summated scale of responses to 10 items measured on a four-point "strongly agree" (4) to "strongly disagree" (1) scale.

Note: *See Appendix for the complete list of the statements as they are applied to the domains of gerontographics.

Table II. Partial correlations among independent variables, controlling for social desirability

	Age	CA	PS	BP	Events	Prescription drugs	Perceived end of life	Think of self as 'old'
Age	1.000							
CA	.670***	1.000						
PS	.104*	-.072	1.000					
BP	.146**	.220***	.032	1.000				
Events	.651***	.393***	.084*	.168***	1.000			
Prescription drugs	.326***	.291***	.045	.155**	.457***	1.000		
Perceived end of life	-.646***	-.352***	-.222***	-.177***	-.465***	-.239***	1.000	
Think of self as 'old'	.272***	.287***	-.016	.366***	.261***	.218***	-.291***	1.000

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

Legend:

    CA—Cognitive Age

    PS—psychosocial ageing

    BP—biophysical ageing

    Events—experienced and anticipated old-age role transition events.

    Prescription drugs—number of prescription drugs for chronic conditions used.

    Perceived end of life—the age one hopes to live minus present chronological age.

    Think of self as 'old'—frequency a person thinks of self as 'old'.

Table III. Effects of age, cognitive age and gerontographic groups on select old-age-related activities

Dependent variables	Independent variable		
	Age groups	**Cognitive age groups**	**Gerontographic groups**
Volunteer	0.005	0.003	0.036***
Money needed for comfortable retirement	0.056***	0.012	0.003
Things to do in retirement	0.086***	0.031***	0.009
Save money	0.011	0.006	0.031***
Make a will	0.009	0.002	0.016*
Religious activities	0.061***	0.019*	0.097***
Senior discounts	0.180***	0.091***	0.009
Give to charity	0.011	0.006	0.006
Leave a legacy	0.036***	0.020*	0.015
Talk to relatives	0.027**	0.005	0.053***
Give to loved ones	0.028**	0.007	0.043***
Summated 11 old-age activities	0.096***	0.028**	0.037***

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

Note: Table entries are *R-squared* of the regression model.

Table IV. Relationships between age, cognitive age and gerontographics, and measures of old-age-related consumer behaviours

	Effects of age (controlling for social desirabilty)	Effects of cognitive age (controlling for social desirabilty and age)	Effects of psychosocial and biophysical gerontographic domains (controlling for social desirability and age)		Effects of gerontographics for three groups that experienced ageing (HH, AO, &FR), relative to group not experienced (HI) (controlling for social desirability and age)		
			PS	BP	HH	AO	FR
Volunteer	-0.005	-0.107**	0.134***	-0.100*	.194***	-0.106**	-0.012
Money needed for comfortable retirement	0.045	-0.020	0.013	-0.052	.056	0.010	-0.062
Things to do in retirement	0.137***	-0.033	0.036	-0.070	.115**	-0.015	-0.067
Save money	-0.138***	0.032	-0.087*	-0.082*	-.023	0.124**	-0.153***
Make a will	0.170***	-0.126**	0.102*	0.044	.047	-0.054	0.062
Religious activities	0.173***	-0.112**	0.251***	-0.060	.183***	-0.131**	0.087*
Senior discounts	0.403***	0.025	0.041	-0.006	.025	-0.039	0.026
Give to charity	-0.045	0.045	-0.057	-0.055	.015	-0.033	-0.065
Leave a legacy	0.276***	-.0112**	0.105**	0.036	.070	-0.046	0.041
Talk to relatives	0.139***	-0.071	0.188***	0.077*	.092*	-0.075*	0.130**
Give to loved ones	0.149***	-0.056	0.037	-0.042	.134***	-0.003	-0.093*
Summated 11 old-age activities	0.237***	-0.093*	0.139***	-0.060	.167***	-0.071	-0.018

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

Notes: PS = Psychosocial Ageing, BP = Biophysical Ageing; HH = Healthy Hermits, AO = Ailing Outgoers, FR = Frail Recluses, HI = Healthy Indulgers.

Table entries are partial correlation coefficients. For the three gerontographic groups, correlations are *relative* to HI. For example, compared to HI, HH are more likely ($r = .194, p < .001$) and AO are less likely ($r = -.106, p < .01$) to have volunteered or have thought about volunteering.

Figure 1. Lifestage segments of the mature market
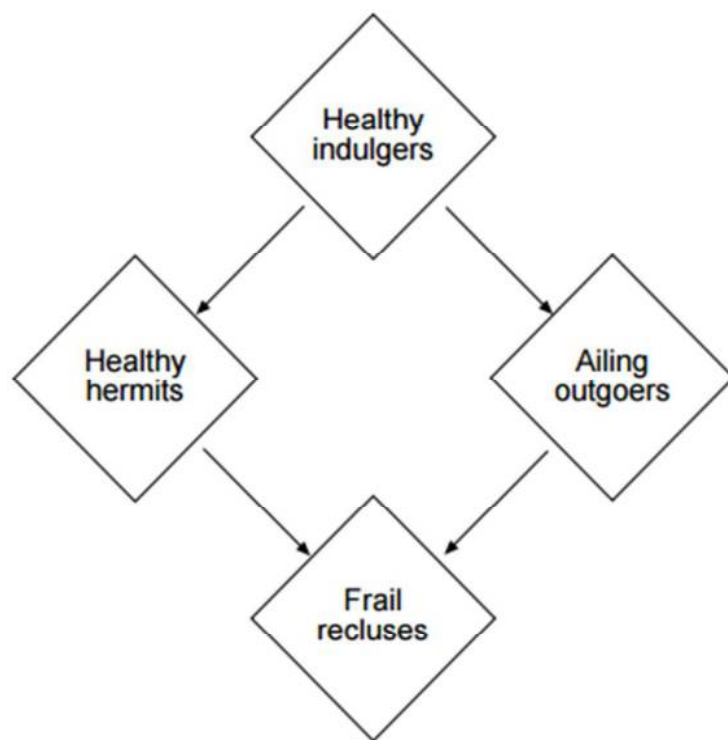
Notes: Specific arrows designate that individuals may move to the next lifestage due to biophysical and psychosocial ageing processes. The left pointing arrows denote psychosocial ageing. The right pointing arrows denote biophysical ageing.

Sources: Moschis (1996)