



## Exploring Design Factors in Designing Horticultural Garments for Older Adults

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**Introduction.** Gardening is a common leisure pursuit for many older individuals, and research indicates that older individuals who garden are in better overall health than non-gardeners (Park, Shoemaker, & Haub, 2008). Although there are numerous health benefits of gardening activities for older adults, this subject has not been explored sufficiently in the field of apparel design. Thus, the purpose of this study is *to explore design factors in developing gardening garments for older adults*. This study focuses particularly on the population who were born before the year 1960 because this age cohort has begun retiring and has significant buying power (Freedman, 2008). Findings offer insights for designers who seek to better understand and market to this age cohort by designing relevant garments for their gardening activities.

**Literature Review. 1) *Benefits of Gardening for Older Adults:*** In addition to the physical health benefits, mental benefits (Infantino, 2003), emotional benefits (Milligan, Gatrell, & Bingley, 2004), and psychological benefits (Kaplan, 1973) have also been attributed to gardening. Although gardening provides benefits, it can also pose risks that must be considered as individuals age. Physical changes occurring later in life, both height and weight can influence physical abilities such as loss of balance, declines in strength and loss of bone density, and these must all be considered and factored in to gardening apparel design.

**2) *Design Factors of Gardening Garments:*** Considering human factors in gardening apparel can offer older adults opportunities to continue pursuing a healthy leisure time activity well into their later years. Human factors are special considerations to mitigate some of the painful side effects that result from the motions and positions utilized while gardening. Thus, good mobility skills (Rikli & Edwards, 1991) balance and sensory changes with age (Chodzko-Zajko, Proctor, Singh, Minson, Nigg, Salem, & Skinner, 2009), durability (Eckman, Damhorst, & Kadolph), ease of care (Lee, Jeong, & Kim, 2009), and UV rays (Hoffmann, Laperre, Avermaete, Altmeyer, & Gambichler, 2001) are the important human factors that should be considered for gardening apparel design.

**Method.** After receiving IRB approval, in-depth interviews were conducted with ten adults who were born before 1960 living in the United States and regularly engaging in gardening activities. Participants indicated that design factors such as mobility, durability, easy to put on/take off, ease of care, fit comfort, thermal comfort, portability, skin protection, and waterproof, are

important for gardening garments. Based on the interview data and literature review, the survey questionnaire was developed. The participants were purposively sampled and the criteria were the same for the interview with added filtering questions for these requirements. The survey was conducted online and the questionnaire consisted of 65 questions in the following categories: (1) 5 demographic questions; (2) 5 gardening behaviors; (3) 28 questions regarding design factors of gardening garments, (4) 27 questions regarding specific design elements of gardening garments using a 7-point Likert-scale. 197 usable responses out of 204 were analyzed (age;  $m=63.27$ ,  $SD=4.64$ , 57-84 range as of 2018, male=73 and female=124). Data analysis included descriptive analyses such as mean, standard deviation, and percentage, Welch's  $t$ -test, simple and multiple linear regression analyses. The Cronbach's alpha values of design factors of gardening garments were examined and ranged from .845 to .932 which provide good reliability for internal consistency.

**Results and Discussion.** The survey results indicated that the most important design factors that participants consider for gardening garments are mobility ( $m=5.94$ ,  $SD=1.25$ ), followed by durability ( $m=5.81$ ,  $SD=1.26$ ), easy to put on/take off ( $m=5.56$ ,  $SD=1.33$ ), ease to care for ( $m=5.50$ ,  $SD=1.39$ ), fit comfort ( $m=5.48$ ,  $SD=1.38$ ), thermal comfort ( $m=5.23$ ,  $SD=1.45$ ), and portability ( $m=5.16$ ,  $SD=1.57$ ). The other design factors considered most important were protection from irritation, puncture, UV, insects, and being waterproof. All the examined design factors were above 4.00 except visually pleasing design which was 3.99. Then linear regression analyses were performed and there were relationships between preferred design features and age. If participants were older, they preferred long sleeves to protect from insects (Beta=.166,  $p\leq.05$ ) and using zippers (Beta=.166,  $p\leq.05$ ) to easily put on and take off the garments. These findings appear to result from the limited physical capacity of older participants. There were also significant differences in preferred design features for each design factor in genders with  $p$ -values between .000 and .048. Among gardening garment items, the most preferred type of gardening garments was reported as a t-shirt ( $m=132$ ,  $SD=38.37$ ). For specific design elements of the item, most participants preferred to wear a hip-length shirt ( $n=104$ , 52.79%) without a collar ( $n=114$ , 57.87%). They also preferred to wear full-length sleeves ( $n=68$ , 34.52%) with length adjustable cuffs ( $n=61$ , 30.96%).

**Conclusion.** The researchers explored human factors in designing gardening garments for older adults with qualitative and quantitative methods. The findings will help designers who wish to design relevant gardening garments for older users. For future research, it would be beneficial to conduct a similar study with a younger population and compare its result to broaden the understanding of how age impacts design factors for gardening garments.

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