



Openness to experience, intelligence, and successful ageing

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ABSTRACT

Anecdotal evidence suggests that elderly people more open to experience may age more successfully. In this study, we tested whether openness to experience was associated with memory and everyday functioning. We also investigated the role of intelligence on this association, and considered which facets of openness were related to successful ageing. Seventy participants, aged 74–90 years, completed tests of fluid reasoning, crystallised abilities, the primary battery of the Wechsler memory scale-III, the everyday problems test and the openness to experience scale from the NEO PI-R. Results confirmed that elderly adults more open to experience had superior immediate and delayed memory and better everyday functioning skills. However, statistical control of fluid reasoning reduced this association to non-significant levels. At the facet level for openness, results confirmed that openness to ideas and values were important to successful ageing, but also suggested openness to fantasy (active imagination). Results suggest that an active imagination helps memory and everyday functioning for elderly people, and confirm that fluid reasoning accounts for the influence of openness on successful ageing.

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1. Introduction

Anecdotal evidence suggests that elderly people more willing to accept new challenges (e.g., learn a language, adopt a new community role) are more likely to age successfully, with studies showing that engagement in volunteer work and leisure activities leads to increased retirement satisfaction (Butrica & Schaner, 2005). Conversely, elderly people who retire from employment and fail to take up new hobbies, projects or activities, may experience deterioration in health and quality of life. This leads to the possibility that successful transition from paid employment to retirement may be easier for people who are more willing to accept new challenges.

Openness to experience, a trait in Costa and McCrae's five factor model of personality, appears on the basis of item content to be akin to the construct of willingness to accept challenges. Costa and McCrae (1992, p. 15) suggested that open individuals are "willing to entertain novel ideas and unconventional values" and that "their lives are experientially richer". Further, they suggested that closed people are "more comfortable with the familiar and have little incentive to try the new" (McCrae, 1987, p. 1259). Given that retirement requires that people at least cease their regular daily routine,

it is conceivable that more open individuals might age more successfully. Studies have reported that openness is associated with higher life satisfaction later in life (Stephan, 2009) and longevity (Masui, Gondo, Inagaki, & Hirose, 2006). In this study, we test the hypothesis that openness is associated with "successful ageing" measured by memory and independence in everyday living.

1.1. Openness and memory

Memory complaints are ubiquitous features of older age, leading to interest in the traits and behaviours that influence memory. Findings from the Seattle longitudinal study (Schaie, 1994) suggest that substantial involvement in intellectually stimulating activities like travel, attendance at cultural events, and continuing educational activities help maintain cognitive functioning into later life. Research suggests that closed people have a narrow scope and intensity of interests (Costa & McCrae, 1992) and fewer hobbies (Little, Lecci, & Watkinson, 1992) than open people, which may make them less likely to engage in intellectually stimulating activities.

Thus, based on a propensity for open individuals to prefer variety to familiarity, and their engagement in a broader range of activities and experiences, it is plausible that more open people are more likely to engage in intellectually stimulating activities, reducing the risk of cognitive decline in older age and helping to maintain memory functioning. Previous research provides support for this assertion.

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Empirical results confirm an association between personality traits and measures of psychometric intelligence (Ashton, Lee, Vernon, & Jang, 2000; Furnham & Chamorro-Premuzic, 2006; McCrae, 1992; Moutafi, Furnham, & Paltiel, 2005). A consistent finding has been that openness is more strongly related to intelligence than are extraversion, neuroticism, agreeableness or conscientiousness (Zeidner & Matthews, 2000). Specifically, a large meta-analysis found that openness correlated significantly with general intelligence and crystallised ability but not with memory, speed of processing or fluid reasoning (Ackerman & Heggestad, 1997). However, most studies have utilised student populations or people across a wide age span, and have not addressed whether openness is related to maintenance of memory in older age. Moreover, many have focused on measures of fluid and crystallised intelligence and, even when including measures of memory functioning, have generally combined cognitive tests to generate a measure of *g*, rather than considering the correlation between openness and memory.

Baker and Bichsel (2006) provided an exception, comparing associations between personality and specific cognitive abilities, including short-term and long-term memory, in three age groups: young adults (19–60 years), cognitively “normal” older adults (>60 years) and cognitively superior older adults (>60 years). Openness was independent of long-term memory, but correlated with superior short-term memory in young adults, but not for older groups. However, these results derived from age-adjusted memory scores (i.e., standard scores), thereby masking possible age effects. Given that memory declines with age as does openness (Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2009), unadjusted scores should be used when testing for correlation between the two constructs. Moreover, openness comprises six facets (Costa & McCrae, 1992) and analysis at the facet level is warranted because (1) age-related decline occurs in some openness facets but not others (Bleidorn et al., 2009); and (2) cognitive functioning is associated with some but not all facets of openness (McCrae, 1992; Moutafi, Furnham, & Crump, 2006). These findings justify further exploration of the association between memory and openness in elderly people.

1.2. Openness and everyday functioning

Independence in everyday functioning is another key predictor of life satisfaction and psychological well being in later life (Greenfield & Marks, 2007). Duberstein et al. (2003) tested the association between personality and functional status in elderly adults aged 60–94 years. Controlling for age, sex, health and depression, openness was the only personality trait to predict functional status, with more open people reporting fewer functional limitations in activities of daily living. Similarly, Jerram and Coleman (1999) found that, in older women, openness was associated with better general health, physical functioning, and less role limitation, although none of these effects held for men.

Duberstein et al. (2003) questioned whether the association between openness and functional status was mediated by mastery or emotional suppression? Examining the association between openness and everyday functioning at the facet level might provide an answer. If emotional suppression mediates this relationship then the facet of “openness to feelings” should be related to everyday functioning.

The current study extended previous research by examining in more detail the aspects of openness that are related to everyday functioning. The aims were threefold. First, we investigated whether elderly adults with higher openness age more successfully with respect to memory and independence in everyday functioning. If so, the second aim was to examine which facets of openness were most strongly related to successful ageing. Based on previous studies (McCrae, 1992; Moutafi et al., 2006), we hypothesised that

openness to aesthetics, to ideas and to values would relate to memory but there is no basis in the literature to make detailed predictions about how the facets related to everyday functioning. Finally, given a strong association between openness and general intelligence observed in the literature, the third aim was to test whether any relationship between openness and successful ageing was mediated by age, fluid or crystallised intelligence. Previous studies have suggested that openness is more strongly related to crystallised ability than to fluid abilities (Ackerman & Heggestad, 1997; Ashton et al., 2000) and we therefore anticipated that people with higher crystallised ability would register higher openness and experience more successful ageing. Moreover, given that openness, memory and everyday functioning all decline with age, we hypothesised that an association between these constructs is mediated by age.

2. Methods

2.1. Participants

Participants had completed five waves of data collection between 2003 and 2008. Variables reported here were measured in 2008 except for fluid and crystallised ability, which were assessed in 2005. For details of the test battery and recruitment procedures including ethical considerations see Gregory, Nettelbeck, Howard, and Wilson (2008).

Participants ($N = 70$; 44 women, aged 74–90 years) were recruited through newspapers, radio and television. They lived in their own homes, were fluent in English, and highly educated ($M = 12.4$ years of formal education) but none was currently in paid employment. Participants were screened for dementia at each wave using the Alzheimer’s disease assessment scale-cognitive (ADAS-Cog: Rosen, Mohs, & Davis, 1984) with a cut-off score of 22 (Weyer, Erzigkeit, Kanowski, Ihl, & Hadler, 1997).

Participants had completed three tests of crystallised ability without time limit (Spot-the-Word, information and similarities) and three timed tests of fluid reasoning (Raven’s standard matrices, Cattell’s culture fair test and concept formation). Spot-the-Word (Version B: Baddley, Emslie, & Nimmo-Smith, 1992) consists of 60 pairs of words, each containing one real and one invented word. Participants circled the real word in each pair (maximum score 60). A 40-item multiple-choice Information test adapted from the WAIS-R information sub-test was presented on the computer. The Similarities task (Wechsler, 1997a) was administered according to the manual (maximum score 35). For Raven’s Standard Progressive Matrices (de Lemos, 1995), the 30-even numbered questions were administered. Items were presented on a computer screen, with instructions verbatim from the test manual, and responses made via the keyboard, with a 10-min time limit. Scale 2, Form A from Cattell’s culture fair test (Cattell & Cattell, 1959) was administered via the computer with instructions, items, and time limits taken from the manual. Concept formation (Woodcock & Johnson, 1989) was administered under time constraints in accordance with the manual.

Participants completed the openness items from the NEO PI-R Form S (Costa & McCrae, 1992), the primary battery from the Wechsler memory scale-III (WMS-III: Wechsler, 1997b) and a short 21-item version of the everyday problems test (EPT: Willis & Marsiske, 1993) to measure independence in everyday life. The EPT had a 10-min time limit. Items were selected from the full 84-item version to include three items from each of the seven domains in the full version (health, meal preparation, telephone, consumer/shopping, financial management, household, and transportation), with equal numbers from the three types of stimuli (charts, directions and forms). This paper-and-pencil test presents information

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