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Original Research

Social support mediates the relationships between extraversion, neuroticism, and cognitive function in older adults



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ABSTRACT

Objectives: We supplement existing findings on a link between social support and cognitive function in later life by considering the role of personality as an antecedent to both, and of social support as a mediator of the link between personality and cognitive function.

Study design: An observational cohort study.

Methods: We evaluated social support using the Lubben Social Network Scale, across 624 adults aged over 60 years, and investigated this measure as a mediator of the relationships between extraversion and neuroticism at baseline 2007–2009, and cognitive function at follow-up, 2 years later. A half-longitudinal mediation design, within a structural equation modelling framework, was used.

Results: There was a direct effect of extraversion, such that lower levels were related to higher scores of cognitive function. There was no significant direct effect of neuroticism on cognitive function at follow-up. Social support partially mediated the paths between both extraversion and neuroticism and cognitive function at follow-up. Decomposing the mediation effects by using social support subscales (measuring support from friends, relatives and neighbours) showed meaningful indirect effects for both predictors.

Conclusion: Results suggest that social support may offer a target for interventions for cognitively at-risk older adults and add to the existing empirical evidence describing the link between personality and cognitive function.

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Introduction

Ageing can often be accompanied by cognitive ageing, a process of progressive but non-pathological changes in functions such as memory. The most commonly cited risk factors for cognitive ageing include: smoking,¹ metabolic syndrome,² physical inactivity,³ depression⁴ and low educational attainment.⁵ Latterly, social factors such as socioeconomic status,⁶ marital status,⁷ social network size⁸ social isolation,⁹ and social integration¹⁰ have also been implicated.

Personality traits have been suggested as a factor in the aetiology of both social support and cognitive functioning. Among the most commonly assessed personality traits are extraversion and neuroticism.^{11,c} Extraversion is defined by Eysenck as describing an individual's basal cortical arousal, with low levels indicating an extrovert personality, while high levels indicate an introvert personality.¹¹ Low levels of basal cortical arousal purportedly cause the individual to seek stimulation in the form of sociability, risk-taking and surges, and as such, extraversion is by definition associated with social support.¹³

Extraversion may be related to cognitive function because it engenders sensitivity to external reward, which may promote diligence.¹⁴ Extraversion is also associated with increased levels of positive affect, which can enhance aspects of cognitive function.¹⁵ Findings are extremely mixed when it comes to the directionality of the association between extraversion and cognitive function. While high levels of extraversion have been found to relate to lower likelihood of cognitive decline at 25-year follow-up,¹⁶ lower levels of extraversion were elsewhere found to be related to desirable outcomes in cognitive functioning over time.¹⁷ Yet other researchers have shown no association.^{18,19} The inconsistency of findings linking extraversion and cognitive outcomes was remarked on in a recent review of the literature.²⁰

Understanding the nature of mediators may help to elucidate the nature of the association between extraversion and cognitive functioning. One such potential mediator is social support. Individuals with high levels of extraversion are more likely to seek social support,²¹ and as has been demonstrated above, higher levels of social support are associated with better cognitive functioning. As such, with this potential mediator in mind, it would make sense to expect a positive association between extraversion and cognitive functioning.

Neuroticism is defined by Eysenck as an individual's proneness to psychological distress, caused by the stability of one's cortical arousal¹¹ such that instability in this system is associated with high levels of neuroticism. This instability leads to anxiety, distress, irrationality and emotional lability.

^c While the competing five-factor model (inclusive of openness to experience, agreeableness and conscientiousness) has also been explored in cognitive functioning literature,¹² we limit our discussion for reasons of parsimony to the former two traits of neuroticism and extraversion. Our data collection took place within a larger cohort study for which it was seen as more prudent to focus our efforts on two traits measured using a large number of items, although we acknowledge that an alternative solution would have been to use a shorter scale measuring all five traits.

Neuroticism is associated with social support, in that high levels of neuroticism are related to lower levels of social support.^{21–23}

The theoretical underpinnings of a link between neuroticism and cognitive function have also been considered at length. High levels of neuroticism may involve intrusive, worrisome thoughts, which may reduce resources available for performance in cognitive testing.²⁴ High levels of neuroticism may also impact cognitive function via their association with HPA-axis dysfunction.^{25,26} In comparison with extraversion, the literature on the link between neuroticism and cognitive function is quite consistent and points towards a deleterious impact of high levels of neuroticism on cognitive function in later life^{17,20,27,28} (but see Ref. 29).

Given the contested nature of the association between personality and cognitive function, calls have been made by Austin et al.³⁰ to more closely explore potential mediators of the link between personality and cognitive function. Our aim was to address the absence of individual level factors in recent analyses relating to social support and health outcomes³¹ while also responding to Austin's call, by examining social support as a mediator of the association between personality traits (extraversion and neuroticism) and overall cognitive function in older adults over time. In addition, it is expected that furthering the understanding of social support as a mediator in the relationship between extraversion and cognitive function will elucidate the hitherto contradictory findings on the direction of this relationship.^d

The scale used to evaluate social support measures support from friends, relatives and neighbours separately. As such, we appended additional analyses investigating whether scores on these separate subscales mediate the relationships between extraversion/neuroticism and cognitive outcomes (see [Supplementary Materials](#)), since the source of social support has previously been shown to have different effects on health outcomes.³²

Hypotheses

Hypothesis 1. Social support will mediate the positive relationship between extraversion and a global measure of cognitive function.

Hypothesis 2. Social support will mediate the negative relationship between neuroticism and a global measure of cognitive function.

^d Our planned analysis has three potential outcomes: 1. Positive association between extraversion and cognitive functioning, consistent (positive) mediation effect of social support. This will be in accordance with previous findings. 2. Positive or negative association between extraversion and cognitive functioning, no mediation effect. This will contribute (but not necessarily improve on) to evidence from previous findings. 3. Inconsistent mediation effect (i.e. the sign of the mediation effect opposite that of the direct effect). This would look like one of two things: either extraversion positively predicts cognitive functioning but negatively predicts social support (just because the individual wants higher levels does not mean that they receive them; alternatively, individuals high in extraversion may have higher standards for social support and so rate their actual levels as lower), or extraversion negatively predicts cognitive functioning but positively predicts social support (so social support ameliorates the negative impact of extraversion on cognitive functioning).

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