



*Brief report*

## Relationship between fluid intelligence and ability to benefit from cognitive-behavioural therapy in older adults: A preliminary investigation

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**Objective.** The aim of this study was to conduct a preliminary evaluation of the hypothesis that fluid intelligence in older adults is associated with the ability to benefit from cognitive-behavioural therapy (CBT), but unrelated to the ability to benefit from non-directive supportive counselling (SC).

**Method.** A sample of 32 older adults who had completed a randomized controlled trial course of either CBT ( $N = 16$ ) or SC ( $N = 16$ ) for anxiety disorders took part in the study. The Raven's Coloured Progressive Matrices (RCPM) test was used to assess fluid intelligence. The Beck Anxiety Inventory change scores between pre-treatment and post-treatment were used as an index of ability to benefit from therapy. A measure of depressive symptomatology was also administered to control statistically for the effects of depression on intellectual functioning.

**Results.** The results for the SC group showed a significant and positive association between fluid intelligence scores and anxiety change scores, such that older adults with higher levels of fluid intelligence demonstrated the most benefit from this intervention. In contrast, there was no significant association between level of fluid intelligence and ability to benefit from therapy in the CBT group.

**Conclusion.** CBT for anxiety disorders is suitable for older adults, irrespective of their fluid intelligence, while the nature of SC may render it more sensitive to level of fluid intelligence.

Empirical evidence has shown that fluid intelligence, or the ability to solve novel problems, declines in old age (e.g. Cunningham, Clayton, & Overton, 1975; Hayslip & Sterns, 1979). Such findings have motivated several theorists (e.g. Church, 1983; Knight, 1996; Knight & Satre, 1999) to suggest that older adults may not benefit

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significantly from cognitive-behavioural therapy (CBT) because of its inherent problem-solving qualities, which prompt individuals systematically to challenge and test the content of their negative thoughts, and reverse a range of problematic behaviours. To some extent, this assumption may account for the fact that older adults with emotional disorders are prescribed psychotropic drugs at a disproportionately higher rate than that of younger adults with similar diagnoses (Hersen & Van Hasselt, 1992), and are more likely to be referred for therapies that do not appear to rely on fluid intelligence such as non-directive counselling (Collins, Katona, & Orrell, 1997).

Knowledge of the impact of fluid intelligence on treatment outcome and modality may advance our understanding of factors determining suitability of older adults for psychological therapy. To date, however, no studies have evaluated the notion that age-related decline in fluid intelligence is associated with the ability to benefit from CBT. Although an earlier study showed that intelligence measures did not significantly predict outcome in CBT for patients with mood and anxiety disorders (Haaga, DeRubeis, Stewart, & Beck, 1991), the study was conducted in an adult population with a restricted range on the predictor measures. In the present study, we aimed to carry out a preliminary investigation of the above hypothesis in a sample of older adult out-patients with primary diagnoses of anxiety disorders. Specifically, consistent with current speculation, it was predicted that fluid intelligence would bear a significant positive relationship with outcome in CBT. Moreover, other therapies, such as non-directive or supportive counselling, which are not thought to rely heavily on individuals' fluid intelligence but rather on the nature of the therapeutic relationship, were not expected to show such a relationship. It is important to note that the present study was not a test of the impact of decline in fluid intelligence.

## Method

### Participants

In all, 32 community-dwelling older adults (28 women, four men) agreed to take part in the study. All of the participants were recruited from a larger sample of patients involved in a randomized controlled trial comparing the effectiveness of CBT vs. supportive counselling (SC) in the treatment of anxiety disorders in older adults (Barrowclough *et al.*, 2001). Patients taking part in the treatment trial were invited to participate in a smaller-scale research project. They were referred to the treatment trial by general practitioners and mental health services. The participants satisfied DSM-IV (American Psychiatric Association, 1994) criteria for panic disorder with or without agoraphobia, generalized anxiety disorder, and anxiety disorder not otherwise specified. The patients were excluded from the study if they also met criteria for major depressive disorder, schizophrenia, dementia, and alcohol dependence. Upon satisfying inclusion criteria, patients were allocated to either CBT or SC. Treatment allocation controlled for age, gender, initial level of anxiety and type of anxiety disorder. We also ensured that the groups in the smaller scale research project were matched on several variables; each group comprised 16 older adults (14 women, two men). Table 1 shows descriptive statistics for the demographic characteristics of each group. Independent sample *t* tests confirmed that the groups were comparable in terms of age ( $t(30) = .4$ , n.s.) and years of education ( $t(30) = 1.2$ , n.s.). Patients had been stabilized on relevant psychotropic medication prior to receiving CBT or SC.

## Measures

Fluid intelligence was assessed using Raven's Coloured Progressive Matrices (RCPM; Raven, Court, & Raven, 1995). The RCPM is one of the most commonly used tests of fluid intelligence. It requires the conceptualization of abstract relationships between

**Table 1.** Means (SDs) for demographic, intelligence and treatment outcome variables

	Treatment group	
	SC	CBT
Age (yrs)	69.3 (5.4)	68.6 (4.4)
Education (yrs)	10.3 (1.8)	9.7 (0.8)
RCPM	28.4 (4.4)	28.6 (4.7)
Pre-treatment BAI	24.6 (13.4)	25.4 (11.8)
Post-treatment BAI	17.9 (12.8)	9.9 (8.5)
Pre-treatment BDI	17.2 (11.8)	16.1 (7.6)
Post-treatment BDI	10.1 (7.5)	7.8 (5.9)

Notes: SC = supportive counselling; CBT = cognitive-behavioural therapy; RCPM = Raven's Coloured Progressive Matrices; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory.

complex visual designs. The RCPM consists of three sets of 12 problems, increasing in difficulty for abstract reasoning abilities by analogy, pattern completion through identity and closure, and simple pattern completion. The raw RCPM scores were used in the statistical analyses. The mean RCPM scores for each group are shown in Table 1. The treatment groups did not differ significantly in terms of their RCPM scores ( $t(30) = -.2$ , n.s.).

Ability to benefit from CBT was assessed using the Beck Anxiety Inventory (BAI; Beck & Steer, 1990). The BAI is one of the most widely used measures of anxious symptoms. In addition, since depressive symptoms are frequently found in individuals with anxiety disorders, we administered the Beck Depression Inventory (BDI; Beck & Steer, 1987) in order to statistically control for the effects of depression. Both the BAI and BDI have good properties of reliability and validity. The BAI and BDI data in this study were the same as those used in the treatment trial (Barrowclough *et al.*, 2001). Descriptive statistics for pre-treatment BAI and BDI scores are presented in Table 1. The groups were comparable in terms of pre-treatment scores on the BAI ( $t(30) = -.2$ , n.s.) and BDI ( $t(30) = .3$ , n.s.).

## Procedure

The CBT treatment protocol was based on Wells' (1997) practice manual and the SC protocol was based on Woolfe's (1989) counselling skills manual. The therapists delivering the interventions were experienced practitioners in either CBT or SC, and their sessions were randomly sampled and assessed to check for adherence to the protocols (for further details, see Barrowclough *et al.*, 2001).

On completion of the relevant treatment, patients were informed about the study and invited to participate. The RCPM was administered to each participant in his or her own home between one and two weeks following treatment. The test was not timed to prevent results being confounded by any age-related decrements in either reaction time

or processing speed (Bors & Forrin, 1995). The test administrator (EKD) was unaware of patients' treatment allocation.

## Results

Prior to performing the statistical analyses, one-sample Kolmogorov–Smirnov tests of normal distribution were computed for all of the variables. The analyses showed that the data of all of the variables were distributed normally, hence supporting the use of parametric statistics. Mean post-treatment BAI and BDI scores for each group are presented in Table 1. The results are consistent with those obtained in the treatment trial (Barrowclough *et al.*, 2001), showing that significant reductions in BAI scores were achieved by both the CBT ( $t(14) = 7.1, p < .001$ ) and SC ( $t(14) = 2.2, p < .05$ ) interventions but that patients in the CBT group endorsed significantly lower BAI scores ( $t(30) = 2.1, p < .05$ ) than those who received SC. The groups did not differ significantly in post-treatment BDI scores ( $t(30) = .9, n.s.$ ).

Since the groups were comparable in terms of pre-treatment BAI scores, BAI change scores (between pre-treatment and post-treatment) were used as an index of ability to benefit from therapy. A higher BAI change score denotes greater benefit from therapy. In order to test the hypothesis that fluid intelligence is related to ability to benefit from CBT, but unrelated to ability to benefit from SC, correlation coefficients were computed between RCPM scores and BAI change scores while controlling for BDI for each treatment group. The RCPM scores for the CBT group ranged from 19 to 33, while those for the SC group ranged from 21 to 35.

The results of the partial correlation for the SC group showed a significant association ( $r = .58, p < .03$ ) between RCPM scores and BAI change scores, such that patients with higher levels of fluid intelligence displayed the most benefit from therapy. In contrast, no significant correlation was found ( $r = -.16, n.s.$ ) between level of fluid intelligence and ability to benefit from therapy in the CBT group. Further tests revealed that the difference between correlation coefficients was significant ( $t(30) = 2.1, p < .05$ ).

## Discussion

Contrary to previous suggestions by some theorists (e.g. Church, 1983; Knight, 1996; Knight & Satre 1999), the results of this study did not provide support for the notion that age-related decline in fluid intelligence is associated with the ability to benefit from CBT but from non-directive interventions such as SC. More specifically, the results revealed a significant association between fluid intelligence and ability to benefit from therapy in the SC group, but no such relationship emerged in the CBT group.

One possible reason for the present results might lie in the way in which CBT and SC are conducted. CBT is a highly focused and structured therapy, which systematically uses an agenda for the session covering one or two important topics and sets specific homework tasks. The verbal and behavioural reattribution techniques in CBT help patients to draw specific and concrete conclusions about symptoms and reactions towards them. In this respect, the demand on fluid intelligence such as abstract reasoning abilities appears to be low. In contrast to CBT, SC is an open-ended exploratory activity that requires patients to abstract out the meanings and implications

of the therapeutic dialogue, and is less directive. As such, it is more likely to rely on patients' abstract reasoning abilities.

This preliminary study has important implications for research on the effectiveness of psychological therapies, as it highlights the need systematically to evaluate factors that may impinge on therapeutic effectiveness, such as cognitive abilities in older adults. The results suggest that CBT is a suitable therapy for older adults, irrespective of their ability to think in abstract terms. In contrast, the nature of SC may render it more sensitive to a decline in fluid intelligence, and may be better suited to individuals who have no difficulty in making abstract inferences about the therapy itself. It is important that referrers are aware of these factors that may help in deciding which therapies will be the most beneficial for their patients. It may also allow service planners to be more confident that they are resourcing therapies that are most likely to meet the needs of specific patient populations.

This study has several limitations. Sample sizes in each group were small. In addition, we used only one measure of therapeutic benefit and fluid intelligence. Thus, further studies are now required using a broader range of measures of anxiety and cognitive and intellectual function in order to ascertain this relationship and determine whether other cognitive factors prone to age-related decline, such as memory (Cohen & Faulkner, 1989), may affect the ability to benefit from specific psychological therapies.

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