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Relationship between cognition, clinical and cognitive insight in psychotic disorders: A review and meta-analysis

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ABSTRACT

The neurocognitive theory of insight posits that poor insight in psychotic illnesses is related to cognitive deficits in cognitive self-appraisal mechanisms. In this paper we perform a comprehensive meta-analysis examining relationships between clinical insight and neurocognition in psychotic disorders. We have also completed a meta-analysis of studies examining 'cognitive insight', as measured by the Beck Cognitive Insight Scale (BCIS), and its relationship with neurocognitive function in patients with psychosis. The clinical insight analysis included data from 72 studies and a total population of 5429 patients. We found that insight in psychosis was significantly associated with total cognition ($r = 0.16$, $p < 0.001$), IQ ($r = 0.16$, $p < 0.001$), memory ($r = 0.13$, $p < 0.001$) and executive function ($r = 0.14$, $p < 0.001$). All of these correlations were stronger when examined in patients with schizophrenia only. In the BCIS analysis we included 7 studies and 466 patients in total. We found that no significant associations were found between the self-reflectiveness sub-component and neurocognition. By contrast there were significant correlations between the self-certainty subcomponent and memory ($r = -0.23$, $p < 0.001$), IQ ($r = -0.19$, $p < 0.001$) and total cognition ($r = -0.14$, $p = 0.01$). We did not find evidence of significant publication bias in any analyses. Overall, our results indicate that there is a small but significant relationship between clinical insight, some aspects of cognitive insight and neurocognition. These findings reflect the complexity of the insight construct and indicate that while the neurocognitive model is important it is likely to be one of many which contribute to the understanding of this phenomenon.

1. Introduction

In clinical psychiatry, the loss of insight is a consistent feature of psychotic illness. This was initially defined by Aubrey Lewis as "the correct attitude to morbid change in oneself, and moreover, the realisation that the illness is mental" (David, 1990). However, a dichotomous characterisation no longer does justice to this construct, which now draws in neurobiology, personality and culture. In the past 20 years interest in this area has grown significantly. Of particular interest have been the neuropsychological and neurobiological correlates of insight. It has been hypothesised that, by its very nature, having insight requires the cognitive mechanisms of self-appraisal. These include frontal executive functioning, different forms of memory and intelligence. Further discussion of this topic can be found in Nair et al. (2013).

In 2006 we reviewed this topic (Aleman et al., 2006) and completed a meta-analysis of the association between neurocognition and insight. Since that publication interest in this area has continued to grow but has also evolved. Many new studies, with larger sample sizes, have investigated this topic. The field has also expanded beyond purely the concept of clinical insight, to new areas such as 'cognitive insight', which is considered to be a type of metacognition (David et al., 2012). Cognitive insight seeks to examine the cognitive processes used and patients' capacity to evaluate their unusual experiences (Beck and Warman, 2004). This is achieved by assessing both their ability and willingness to reflect on such beliefs, and their certainty that these beliefs are correct. A commonly used and well-validated measure of cognitive insight is the Beck Cognitive Insight Scale (BCIS) and only this measure was evaluated in this study (Beck et al., 2004). Again a self-evaluative process, cognitive insight has been hypothesised to be associated with neurocognitive function (Beck et al., 2004).

In view of the above advances we took the opportunity to carry out two meta-analyses in this area. We propose two main hypotheses. Firstly, that both clinical and cognitive insight would be associated with measures of neurocognition. Secondly, frontal executive function would correlate more strongly than general cognitive measures to both clinical insight and cognitive insight.

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2. Material and methods

Methods used in this chapter reflect those used in our previous meta-analysis on this subject (Aleman et al., 2006) in order to produce comparable results and a significant update on the topic.

2.1. Study selection

Our study identification strategy had three phases for both the clinical and cognitive insight analyses. Firstly we searched databases PubMed and Web of Science for relevant papers using the key words. Search terms for the insight analysis were INSIGHT *or* UNAWARENESS combined with PSYCHOSIS *or* SCHIZOPHRENIA combined with COGNITI* *or* NEUROPSYCHOLOG* *or* NEUROCOGNITI* *or* INTELLIGENCE, and MEMORY *or* WCST. The previous insight meta-analysis had used the same search strategy to search for papers prior to April 2004 therefore in this paper we searched papers published from 2004 up until September 2012. This generated 441 results from PubMed and 716 results from Web of Science. A review of these results was then conducted to determine which papers met our inclusion criteria. In total 37 new papers were identified and added to the collection of 35 identified by Aleman et al. (2006) to bring the total in this analysis to 72 papers. For the BCIS analysis the search terms were COGNITIVE INSIGHT *or* BCIS *or* "BECK COGNITIVE INSIGHT SCALE" combined with PSYCHOSIS *or* SCHIZOPHRENIA combined with COGNITI* *or* NEUROPSYCHOLOG* *or* NEUROCOGNITI* *or* INTELLIGENCE, and MEMORY *or* WCST. Studies that were included were published before September 2012. This generated 44 results from PubMed and 57 results from Web of Science of which 7 were included into the analysis.

The inclusion criteria for the papers were as follows: (1) Correlations between insight scales/BCIS and cognitive performance were reported in the study or sufficient information was reported to enable us to compute effect sizes; (2) the sample comprised patient groups with a psychotic disorder, whether affective or non-affective; (3) the article had been published in a peer-reviewed English-language journal; (4) a valid measure of insight was used such as, but not exclusively, the insight item from the Positive and Negative Syndrome Scale (PANSS G12) (Kay et al., 1987), the Schedule for the Assessment of Insight (SAI) (Kemp and David, 1997), the Scale to Assess Unawareness of Mental Disorder (SUMD) (Amador et al., 1993) and the Insight and Treatment Attitudes Questionnaire (ITAQ) (McEvoy et al., 1989); or BCIS (Beck et al., 2004); and (5) a valid measure of cognitive function that represented one of the five cognitive domains, described below: (1) 'Total cognition', (2) IQ, (3) memory, (4) executive function and (5) WCST — categories achieved or preservative errors.

The five cognitive domains were defined in a similar manner to Aleman et al. (2006). 'Total cognition' represented the pooled mean correlation of all cognitive tests examined in a paper; this category also included correlations with 'composite' cognitive scores. The second domain was measures of IQ, including the Wechsler Adult Intelligence Scales (WAIS) and National Adult Reading Test (NART). In cases where only a number of WAIS sub-tests were included, these subtests were pooled. The third domain, memory, included measures of verbal, non-verbal and working memory performance. In addition to the analysis in Aleman et al. (2006) we analysed the associations with each of these memory domains separately. Due to the limited number of studies currently available, this sub-category analysis was not completed for cognitive insight. Fourth was frontal executive function, which included the Trail Making Test B (TMT-B), verbal fluency and the Wisconsin Card Sorting Test (WCST). Finally, a separate analysis limited to the WCST was included for the insight analysis. It had been hypothesised that poor set-shifting, as tested by the WCST, would be particularly associated with poor insight (Young et al., 1993). In the WCST analysis we included categories achieved as well as perseverative errors (PE), which were pooled when both were reported. For further details please refer to Aleman et al. (2006).

Wherever necessary the direction of correlation between insight and cognitive measures was reversed such that all included effect sizes represented the correlation between better cognitive function and better insight. For example, this was often required where SUMD and PANSS scales were used as higher scores represented poorer insight or WCST PE where higher scores represented poorer executive function.

2.2. Data analysis

We used the mean r weighted for sample size as the effect size. Where precise correlation co-efficients were not given they were calculated using techniques detailed in Lipsey and Wilson (2001). One problem faced by those conducting meta-analysis is that of studies not reporting non-significant data. As in the previous meta-analysis we

Table 1
Results of meta-analyses of insight–cognition relationship in patients with psychosis (mixed diagnoses) and those with diagnosis of schizophrenia.

	N	Number of studies	Point estimate[a]	Lower limit	Upper limit	Z-value	P-value	Q-value	P-value	I-squared
Psychosis										
Total cognition	5429	72	0.16	0.13	0.18	11.42	<0.001	55.70	0.92	0.00
IQ	2855	44	0.16	0.12	0.20	8.41	<0.001	35.56	0.78	0.00
Memory	2380	32	0.13	0.08	0.17	5.29	<0.001	37.72	0.19	17.82
Working memory	1663	18	0.13	0.05	0.21	3.28	0.001	37.30	<0.01	54.42
Verbal memory	1048	15	0.20	0.12	0.28	4.66	<0.001	24.13	0.04	41.9
Non-verbal memory	1209	13	0.12	0.04	0.20	2.88	0.004	19.36	0.08	38.02
Executive function	4032	56	0.14	0.11	0.17	8.97	<0.001	45.24	0.82	0.00
WCST	2342	32	0.14	0.09	0.18	5.52	<0.001	39.75	0.13	22.01
Schizophrenia										
Total cognition	1821	34	0.17	0.12	0.21	6.96	<0.001	31.46	0.54	0.00
IQ	951	19	0.20	0.13	0.26	5.94	<0.001	12.86	0.80	0.00
Memory	707	14	0.15	0.05	0.25	2.87	<0.001	22.05	0.05	41.05
Working memory	291	6	0.20	−0.06	0.44	1.52	0.13	21.44	0.13	76.68
Verbal memory	296	5	0.15	0.01	0.28	2.12	0.03	5.12	0.28	21.9
Non-verbal memory	236	5	0.12	−0.16	0.38	0.81	0.42	14.71	<0.01	72.8
Executive function	1333	25	0.14	0.08	0.20	4.75	<0.001	26.74	0.32	10.25
WCST	792	13	0.15	0.05	0.25	2.92	<0.001	21.29	0.05	43.64

[a] Mean weighted correlation co-efficient.