Lack of Insight and Awareness in Schizophrenia and Neuropsychiatric Disorders

James Gilleen, Kathryn Greenwood, and Anthony S. David

Abstract Lack of insight or awareness of illness is a major problem in the management of patients with a range of neuropsychiatric disorders. Insight in schizophrenia has been extensively studied over the past 20 years, and much is known about its clinical associations. In this chapter, we review the literature on insight in schizophrenia and go on to describe the results of a study in which awareness of illness and impairment was compared in three clinical groups matched for premorbid IQ: patients with schizophrenia, Alzheimer's disease, and brain injury. We considered performance and awareness across a number of domains: social behavior, psychopathology, and executive function. Awareness was measured by different methods including clinician ratings and discrepancy scores between patients' own ratings and their relatives' ratings using the Dysexecutive Questionnaire. All groups showed varying levels of deficit in each domain as well as varying levels of awareness. The Alzheimer group showed the most severe lack of awareness of cognitive and behavioral problems, followed by the brain-injured and schizophrenia patients. Low mood was associated with better insight in all groups. We conclude that insight is multidimensional and domain specific but that it also has associations which are common across domains and disorders.

Keywords Alzheimer's disease • Awareness • Brain injury • Insight • Schizophrenia

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Introduction

The terms "anosognosia," "insight," "lack of awareness," and even "denial" are often used synonymously to describe a collection of attitudes and behaviors directed at one's illness. Anosognosia is generally used to convey lack of awareness of specific functions seen after brain injury, such as hemiplegia. In contrast, insight and lack of awareness are typically used to describe the phenomena in psychiatric disorders, such as schizophrenia, and in neurological conditions, such as Alzheimer's disease (AD), where the awareness in question refers to that of being ill in general and, more specifically, the capacity to judge impairment of memory, or finally, the content of symptoms, such as delusions and hallucinations, as not being real [1, 2]. These terms, therefore, differ regarding the *object*(s) of insight to which they refer [3]. This distinction is crucial because awareness of an objective obvious deficit such as hemiplegia would seem to be different in kind from that of an objectively verifiable but invisible deficit such as amnesia, which is different again from a subjective experience such as a hallucination.

Within the schizophrenia field there has been an attempt to fractionate insight into different components or *dimensions* of awareness, which may, to some degree, be independent (e.g. [1, 4–6]). David [1] proposed three dimensions: recognition of having a mental illness, compliance with treatment, and the ability to label unusual events as pathological. Amador et al. [6] split insight into five components: four relate to (un)awareness of having a mental disorder, of the effects of medication, of consequences of illness, and of specific symptoms, and the fifth or final component is the attribution of symptoms to illness. Popular measures of insight include the Schedule for the Assessment of Insight – Expanded Version (SAI-E) [7, 8]; the semistructured interview: Scale to Assess Unawareness of Mental Disorder (SUMD) [6]; the simple clinician-rated Insight and Treatment Attitudes Questionnaire (ITAQ) [9]; and the Birchwood self-report Insight Scale (IS) [10]. All these scales have reasonably good intercorrelation [8]. Many authors have used a single item from general psychopathology schedules, and others, particularly in the dementia and brain injury fields, have made use of patient–carer discrepancy questionnaires such as the Patient Competency Rating Scale (PCRS) [11] and the Dysexecutive Questionnaire (DEX) [12].

Insight into Psychiatric Disorders (Schizophrenia)

Theories seeking to explain awareness in neuropsychiatric conditions broadly fall into three categories. Lack of awareness is conceptualized as a direct manifestation of psychiatric symptomatology (or a symptom in itself), a function of general or specific neuropsychological (e.g., executive) impairment, or a motivated response to a mental disorder to preserve self-esteem and protect against low mood.

Awareness and Symptomatology

Before the early nineteenth century, it would have been seen as a logical contradiction in terms to talk of "insight" into psychiatric symptoms such as delusions, yet at around this time, early French "alienists" began to acknowledge the concept of "partial" insanity, wherein "madness" could be accompanied by lucidity, indicating that some aspects of mental function could be "deranged" while others were preserved [3, 13]. It seems intuitive that awareness would be associated with severity of psychopathology, such that increased severity of delusions and hallucinations would necessarily by their very nature leave the sufferer unaware that their experiences were not real. Several studies have shown a relationship between awareness and global psychopathology in schizophrenia [4, 14–20], whereas others have found associations only with positive symptoms [21–27], or only with negative symptoms [28–31], or with both positive and negative symptoms (e.g., [32]). Other studies find awareness to be associated with specific symptoms such as "formal thought disorder" [33, 34], "degree of grandiosity" [35], or with degree of "unusual thought content" (equivalent to delusions), as measured by the Brief Psychiatric Rating Scale [20, 36].

In an effort to clarify the relationship of awareness and psychopathology, Mintz et al. [32] conducted a meta-analysis of 40 relevant studies and found small negative associations between awareness and global, positive, and negative symptoms, accounting for 7.2%, 6.3%, and 5.2% of the variance in awareness, respectively. This finding would strongly suggest that symptomatology plays only a small part in the degree of awareness displayed by schizophrenia patients. It must therefore be concluded that insight is related to psychopathology: as one increases, the other tends to decrease. Nevertheless the association is weak cross sectionally and variable longitudinally. In other words, lack of awareness or poor insight is more than "just psychopathology" [37].

Several studies have shown that schizophrenia patients present with less awareness than patients with other diagnoses such as bipolar disorder and major depressive disorder [17, 38] and schizo-affective disorder and mood disorder with and without psychosis ([39]; but see [40, 41]), or with similar levels of awareness as bipolar patients but less awareness than patients with unipolar affective disorder [42, 43]. However, others have found no significant differences between different patient groups [4, 30, 34, 44, 45].

Clinical and Demographic Factors

There is little consistency across studies regarding reliable sociodemographic predictors of awareness in schizophrenia (see [3]). For example, age and gender do not appear to be associated with level of awareness, nor does awareness appear to be related to level of education [6]. Studies that report positive findings have occasionally done so in opposite directions, for example, duration of illness and awareness [46, 47].

Age has been found to associate with awareness in only a few studies [6, 22, 23, 42]. A meta-analysis reported that age at onset of the disorder moderated the relationship between awareness and symptom clusters [32], such that acute patient status was also found to act as a moderator variable between awareness and positive symptoms; acutely ill patients were least aware.

Awareness and Neurocognition

Several studies have suggested a relationship between intelligence (IQ) and awareness in schizophrenia [48], whereas others claim a more specific association with executive functioning [15, 18], particularly as assessed using the Wisconsin Card Sorting Test (WCST). The WCST is generally thought to be a measure of set-shifting ability, where impairment has been hypothesized to be analogous to patients' inability to shift from an previously established "set" (that of being well) to a more accurate, postmorbid "set" (of being ill). Cooke et al. [49] examined 29 studies that included a measure of WCST performance and awareness and found 11 studies reported no association between any WCST measure and awareness; 9 studies found all WCST measures correlated with awareness; and 9 found some but not all WCST measures correlated with awareness. All findings were in the anticipated direction, with lower awareness being associated with poorer WCST performance. In total, 12 of the 29 studies reported a correlation between "perseverative errors" and awareness and 9 between "sets achieved" and awareness. It has been suggested that cognitive perseveration may underlie patients "perseverating in denial of illness despite evidence to the contrary" [50], but the evidence remains contradictory [51]. The most comprehensive and quantitative systematic review and meta-analysis of work in this area [52], however, suggests that WCST performance has more in common with awareness than other measures such as IQ, or memory, with 13 studies creating a pooled effect size of $r = 0.23$.

Neuroimaging

As interest in awareness has grown, so has the use of magnetic resonance imaging (MRI) as an investigative tool. The findings to date suggest an association between poor insight and reduced total brain volume [53, 54], frontal lobe atrophy [31], reduced frontal lobe volume [55, 56], reduced cingulate gyrus and temporal lobe grey matter volume [56], and ventricular enlargement [14]. There is, however, some inconsistency in these findings, much study variation in the location of brain–insight correlates, and in some instances a failure to identify any brain abnormalities associated with poor insight [57]. One explanation for this inconsistency could

be measurements or voxel-based morphometry (VBM) methods of analysis. In some studies, a single insight assessment item has been used [44, 58], while in others insight schedules were employed [19, 59]. Shad et al. [59] investigated SUMD scores and brain volume in 14 patients with schizophrenia and found lower awareness of current symptoms to be associated with lower right dorsolateral prefrontal cortex volume, although misattribution of current symptoms was associated with higher right medial orbitofrontal cortex volume. Cooke et al. [60] used VBM in a different but overlapping sample reported earlier [56] and found temporal and parietal grey matter reductions to be correlated with various insight dimensions. Finally, Morgan et al. [109] also used VBM methods in a large sample of first-episode psychosis patients and found deficits, particularly with respect to attribution of symptoms in the cingulate cortex, perhaps related to the midline cerebral system for self-processing [61], as well as right posterior deficits, reminiscent of regions implicated in neurological cases of anosognosia of hemiplegia and neglect [62]. Damage to any of these putative systems could potentially account for impaired self-awareness. Research in other psychiatric disorders is needed before we can say whether these findings are disorder specific.

Mood

One of the more reliable findings in the literature is the positive correlation between awareness and low mood or depression (and between elevated mood and lack of awareness [41]), which has been shown across different patient groups [3, 63]. Although findings are variable, many studies have reported that increased awareness in schizophrenia is associated with greater depressive symptoms [25, 34, 47, 64–69], including a meta-analysis [32]. In this way, low awareness of symptoms and illness is conceptualized as a form of denial to maintain self-esteem and preclude the psychological consequences of acknowledging one has a mental illness.

A critical question is this: Does a depressive mood ensue from awareness of illness, or does a depressive mood foster a more self-critical attitude? The framework of "depressive realism" may help explain this association (see [70]). On the other hand, Rathod et al. [71] reported that patients undergoing cognitive-behavioral therapy (CBT) intervention to improve awareness became depressed subsequent to gaining awareness, but this result was not found in an earlier study [72].

Insight and Awareness in Alzheimer's Disease

Alzheimer's disease (AD) can be characterized by a deterioration in memory and self-care as well as behavioral and mood disturbance. Despite the severity of their impairments, Alzheimer's patients often show profound unawareness of their deficits [73],

even at the earliest stages [74]. Understanding awareness in dementia has important implications [63, 75], as it has been found to be associated with greater perceived burden of care by their carers [76], delayed diagnosis [77], and poorer outcome after rehabilitative treatment [78].

Awareness has been shown to worsen with disease progression [79] and has been found to be associated more frequently with damage to certain anatomical sites, for example, right frontal and parietal lobes [80–82], which are also often found to be associated with anosognosia following brain injury (see [80]). Other studies have found awareness to worsen with disease severity [83], although some have not [84, 85]. Similarly, although some studies have found an association between "frontal"/executive performance and awareness [86, 87], others have not [88, 89].

Less commonly, unawareness is conceived as being a defense mechanism against the knowledge and consequences of illness. As already noted with respect to schizophrenia, defensive denial is proposed to serve to defend Alzheimer's patients from depression, and indeed patients with less insight show less depressive symptomatology [82, 83, 90, 91], but again other studies have not shown this [77, 84, 92], and the direction of causality of this effect is debatable.

Insight and Awareness in Brain Injury

Disturbances to awareness of functional impairments are common sequelae of brain injury [93] and have been suggested to be present, to some level, in between 76% and 97% of postacute patients with brain injury and up to 45% of individuals with moderate to severe brain injury [94]. Such individuals may have multiple medical, physical, and cognitive limitations of which they are often unaware. Brain injury patients may exhibit global deficits in awareness of mental disorder or more circumscribed lack of awareness of specific deficits such as hemiparesis, object agnosia [80], and hemispatial neglect [62]. Paradoxically, patients are often unaware of even the grossest impairments in functioning but may be aware of more minor impairments; and just as seen with delusions in schizophrenia, false beliefs of unimpaired functioning can persist despite overwhelming contradictory evidence.

As a consequence of lack of awareness, patients with brain injury may not be capable of monitoring their own behavior or comprehending the impact of the consequences of their deficits on day-to-day life. Moreover, unawareness has been shown to greatly impede rehabilitation [94] and is associated with lower vocational and residential status [95, 96] (see also [97] for a review of studies pertaining to employment outcome), "less favorable outcome" [98], and perpetuation of socially inappropriate behaviors [99], and has been shown to be associated with increased burden for the respective carer [84]. Therefore, understanding the nature of awareness could have profound benefits for patient prognosis and carer quality of life.

Direct Comparison of Insight and Awareness in Patients with Schizophrenia, AD, and Brain Injury

Most studies of awareness investigate a single patient population. Is there a case for comparing different patient groups on the same measures [100, 101]? As well as perhaps revealing more about the nature of awareness per se, doing so also allows us to observe how awareness may differ in these different groups where pathology is a known factor. By contrasting different patient groups, it may be possible to better elucidate which mechanisms subserve awareness, or alternatively it may reveal that patients from different clinical groups show lack of awareness for different reasons.

Just as patients with schizophrenia have, in addition to their core symptoms, cognitive impairments and behavioral and social deficits, so patients with AD and brain injury may have a range of psychopathologies about which they may or may not have degrees of awareness. Comparison within – as well as between – groups may have important theoretical implications. For example, if patient groups with widely divergent pathologies (e.g., Alzheimer and schizophrenia patients) both have memory deficits, then we can ask whether the same factors associated with awareness of these are consistent across the groups (e.g., [102, 103] for awareness of cognitive deficits in schizophrenia). If the answer is broadly affirmative, it suggests that a common cognitive structure of awareness pertains, and this in turn can prompt overarching cognitive models that need not be overly concerned with diagnosis. Furthermore, if, say, awareness of psychopathology is relatively independent of awareness into cognitive deficits (the correlation was nonsignificant in one recent study [102], regardless of diagnosis), it points to modularity in awareness. Modularity of "awarenesses" is perhaps the most likely pattern from the neurological literature [79] (Fig. 1). Such modularity has seldom

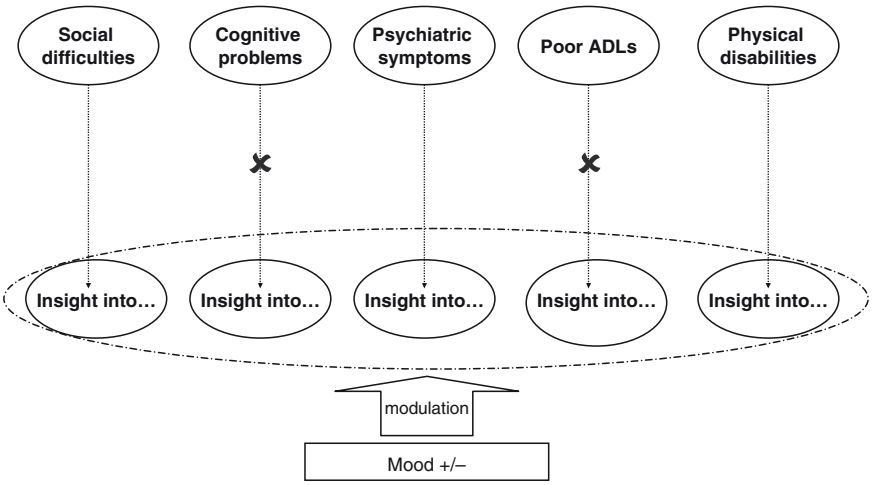

Fig. 1 Model of multiple, modality-specific awareness systems (modularity), each of which may or may not be impaired, but with general modulation by factors such as mood. In this theoretical example, insight is preserved into social difficulties, psychiatric symptoms, and physical disability but not cognitive problems and poor activities of daily living (*ADLs*)

been tested using broad domains such as psychopathology and behavioral problems (alongside neuropsychological impairments). Where it has, as in the large pan-European brain injury study [104], considerable within-diagnosis heterogeneity was found. Similarly, in the dementia field different levels of awareness have been noted by contrasting behavior with cognition [63, 73, 75, 105].

Participants

We recently conducted a study in which we compared different aspects of awareness in three different neuropsychiatric populations: schizophrenia, brain injury, and probable AD (Table 1). The former were mostly subacute, chronic, and treated outpatients plus some inpatients at the Maudsley Hospital, London; the Alzheimer group were locally dwelling subjects identified as part of a larger cohort study. The brain injury patients were a heterogeneous group with a mixture of traumatic, hypoxic, and vascular etiologies and with behavioral problems. We were keen to address to what extent awareness in the same domain differed between neuropsychiatric patient groups and whether differences could be measured using standard scales.

Naturally, the patients were not matched on factors such as age and length of illness. We contend that for the purposes of making inferences about the pattern of awareness deficits in different pathological groups and contrasting profiles of awareness within groups, this distinction is not critical. We acknowledge, however, that there may be subtle period- and age-related effects regarding social influences in accepting illness that require further study.

Table 1 Demographic and insight data on clinical groups

Variable	Schizophrenia	Brain injury	Alzheimer's
Mean (SD)	$n=31$	$n=26$	$n=27$
Age, years	38.3 (10.4)	40.0 (12.1)	82.4 (4.3)
Sex, M/F	16/15	22/4	14/13
Premorbid IQ (NART)	102.3 (12.8)	102.2 (13.8)	109.1 (12.8)
SAI-E	11.2 (7.15)	15.4 (5.7)	7.0 (6.4)
SUMD awareness of mental illness	3.37 (1.6)	1.92 (1.43)	4.04 (1.4)
DEX discrepancy scores[a] (mean and range)	2.48 (–33 to 31)	–14.76 (–55 to 15)	–25.96 (–62 to 13)

NART National Adult Reading Test (estimate of premorbid IQ); *SAI-E* Schedule for the Assessment of Insight–Expanded; *SUMD* Scale to Assess Unawareness of Mental Disorder
[a]Self-rating of difficulties minus informant rating of difficulties yielding a negative score. The more negative, the greater the discrepancy (greater patient unawareness)

Methods

The groups were compared on measures of estimated premorbid IQ (NART) and clinician-rated and patient–carer-rated awareness scales. All were rated on the SAI-E, and the SUMD (it was found that the awareness of mental illness was the most useful item from the scale; many Alzheimer patients were on no medication), and the DEX (see Table 1).

The DEX from the Behavioural Assessment of the Dysexecutive Syndrome (BADS) [106] was originally designed for use with brain injury populations; however, questions concerning functioning apply equally well to dementia and schizophrenia patients. It is a 20-item measure of functioning that addresses problems such as impulsivity, apathy, distractibility, unconcern for social rules, and difficulties with abstract thinking. Informants rate patient functioning, and the patient rates him/herself on the scales, and the difference between patient and informant scores creates a discrepancy score; the greater and more negative the discrepancy between the scores, the greater the unawareness of the patient. Items are scored on a 5-point scale from 0 (never) to 4 (very often). Hence, DEX discrepancy scores can range from –80 to +80. A score of 0 indicates perfect awareness in that the patient agrees with the level of impairment scored by the respective informant.

The validity of the discrepancy index to measure insight and awareness may be questioned because it assumes that the informant is the "gold standard." Informants may overestimate deficits (e.g., because of their own frustration or inability to cope) or underestimate them (e.g., because they are hidden, or because the informant wishes to protect the person they care for). Correlation with clinician ratings may be poor (see [63, 75]). Nevertheless, the methodology has been found to be valuable and consistently shows underestimation of deficits by patients in relationship to informal caregivers.

Results

Between-Group Contrasts

Across the groups, patient and informant ratings of behavioral problems, as measured by the total DEX score, were highly discrepant in the brain injury and AD groups (see Table 1; Fig. 2), representing low awareness of behavioral impairments, but this was much less so in the schizophrenia group, suggesting that patients exhibit different levels of unawareness of behavioral deficits. Importantly, ratings made by either patients or informants in any patient group were not grossly at ceiling or floor, but varied somewhat, suggesting that these scales provided sensitivity in measuring behavioral impairment and, in turn, awareness.

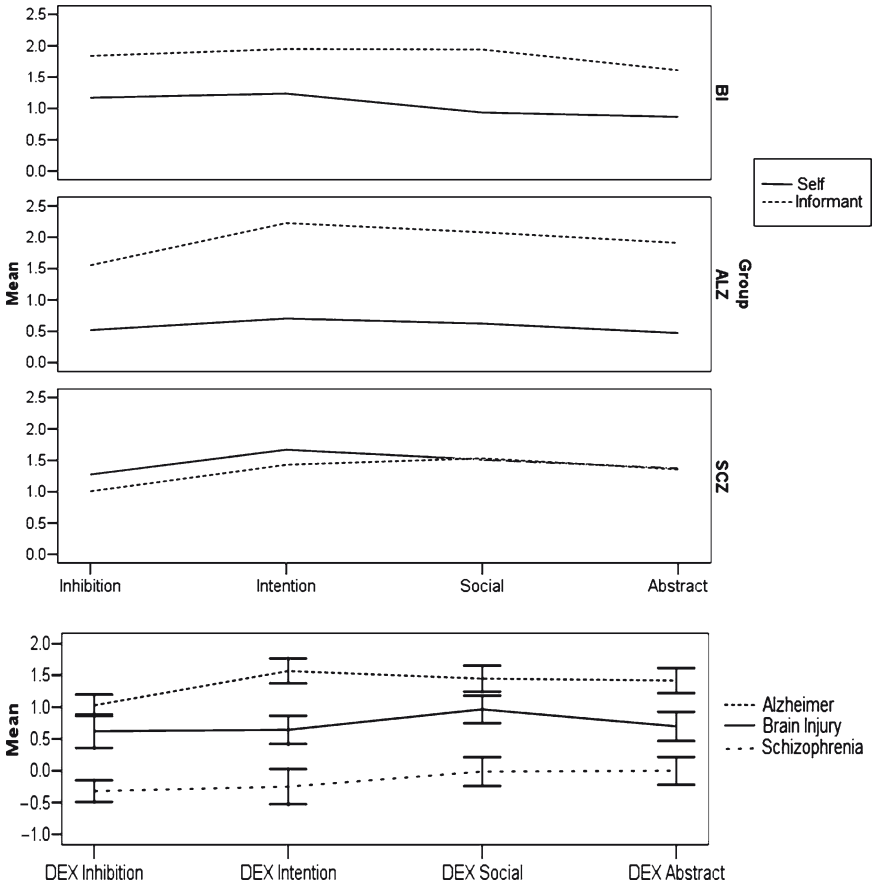

Fig. 2 Graphs show mean Dysexecutive Questionnaire (DEX) self and informant subfactor scores (per individual item) paneled according to patient group. Zero scores reflect the absence of problems. The *lower panel* shows the resultant DEX discrepancy scores for the three groups. For ease of presentation, the sign of the discrepancy score has been reversed so that a more positive value indicates greater discrepancy (i.e., less patient awareness). *BI* brain injury; *ALZ* Alzheimer's; *SCZ* schizophrenia

It was also of interest to see in what dimensions awareness between behavioral domains may differ, and whether there is an extant hierarchy of awareness (i.e., more awareness of motor/sensory versus executive and social cognitive deficits). Comparison of subfactor scores between groups can also reveal whether there are different "profiles" of awareness in different patient groups. From Fig. 2 it can be seen that both the brain injury and Alzheimer groups rated themselves as having few problems with executive functioning including inhibition, intentionality, social interactions, and abstract reasoning. The two groups differed in that the informants in the Alzheimer group rated these patients as having particular problems in intentional behavior, that is, apathy. Comparatively, the schizophrenia group rated themselves as lower

functioning, but their ratings were concordant with the informants' view across all subdomains; this reflects good awareness of behavioral problems. The lower panel shows that this results in lowest awareness for the Alzheimer group, and greatest awareness for the schizophrenia group, but also that there is no consistent profile across patients, failing to support the notion of a hierarchy of awareness.

Pooled Patient Analysis

The entire patient sample was pooled ($n=84$), and Pearson correlational analyses were performed between the awareness and other clinical and symptoms ratings. The DEX discrepancy score correlated with clinician-rated insight (SAI-E) at 0.321 ($P<0.001$) and self-rated depression on the Beck Depression Inventory at $r=0.562$ ($P<0.001$) (Fig. 3); SAI-E also correlated with BDI at $r=0.239$ ($P<0.05$). That is to say, as the discrepancy score became closer to zero or positive, indicating good awareness, so did depression scores increase. DEX scores were correlated significantly negatively with overall psychopathology as measured by the BPRS ($r=-0.570$, $P<0.001$); that is, as the discrepancy became smaller (i.e., awareness increased), so depressive symptoms became worse.

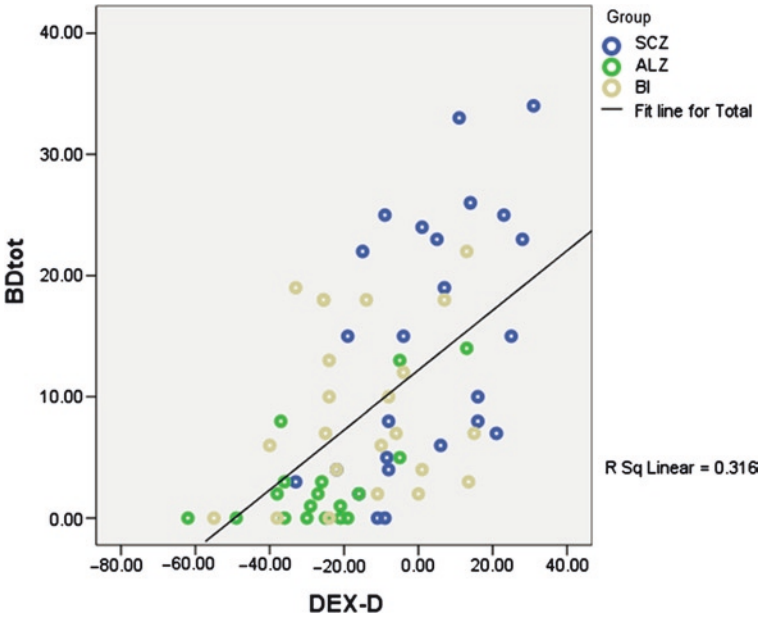

Fig. 3 Scatterplot shows the correlation between DEX discrepancy scores (*DEX-D*) and total Beck Depression scores (*BDtot*) for the three patient groups: schizophrenia (*SCZ*), Alzheimer's (*ALZ*), and brain injury (*BI*). The *regression line* shows that increasing awareness is associated with increasing depression scores

Summary and Conclusions

In summary, insight or awareness in psychiatric disorders such as schizophrenia and neuropsychiatric conditions may be multiply determined, although broadly speaking there is converging evidence for key etiological factors, such as executive function and positive psychopathology, with mood playing a mediating role. Insight is an important indicator of prognosis and outcome. In the data we present here, patients with chronic schizophrenia show good awareness of their functional and executive problems compared to patients with brain injury and AD, despite being mostly unaware of their mental illness and being mostly unable to reattribute their symptoms to mental illness. Pooling the neuropsychiatric patients together showed that overall awareness, as measured by the DEX discrepancy, correlated inversely with symptom severity and positively with mood (worse symptoms, worse awareness; lower mood, better awareness). These results are generally in favor of modularity of awareness with a degree of consistency regardless of diagnosis [107, 108]. We propose, tentatively, that the pattern is consistent with the existence of a common *cognitive* architecture for awareness of psychopathologies that may be disrupted following varied neurophysiological and neuroanatomical dysfunction – as in brain injury, schizophrenia, and AD. This concept would go against focal localization of such an architecture but instead points to a somewhat distributed, or multiple, function-specific system or systems. However, such a system (or systems) appears to rely on general support systems, such as executive processing, and may be modulated by generalized factors such as mood.

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