

repeatedly be demonstrated, mainly by PET and SPECT. Besides the use of radioactive tracers, a major disadvantage of these methods consists in the minor spatial resolution.

We used a functional MRI-approach to overcome this difficulty and investigated 15 chronic schizophrenic inpatients (diagnosed according DSM-III-R) and 30 age- and sex-matched controls. Four sequences of activation (Wisconsin Card Sort) and rest were measured with a clinical 1.5 T scanner (Philips Gyroscan ASC II). The individual correlation slices were matched to an overall correlation map and projected onto the matched anatomical slice after normalization procedures. A priori defined anatomical regions in both groups were compared using the Wilcoxon rank-sign test. Schizophrenics showed a statistically significant decreased activation in the right mesial and lateral prefrontal cortex. There was a trend of an increased activation in the left medial temporal lobe in the schizophrenic patients.

It was possible using fMRI to demonstrate hypofrontality in schizophrenics. Methodological issues concerning the different brain imaging methods will be discussed.

AUDITORY HALLUCINATIONS IN SCHIZOPHRENIA ALTER CORTICAL RESPONSE TO EXTERNALLY PRESENTED SPEECH- AN fMRI STUDY

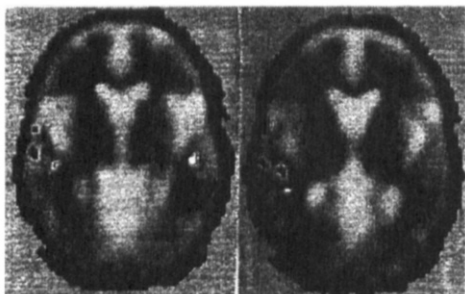
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Functional MRI (fMRI) has been used to demonstrate that auditory hallucinations activate regions of auditory cortex that subserve perception of external speech (e.g. Brodmann's Areas 21, 22 and 42) [1]. We wished to test the hypothesis that schizophrenics experiencing auditory hallucinations, compared with those not experiencing them, exhibit reduced responsibility to external speech in cortical regions activated by auditory hallucinations.

Five schizophrenics experiencing ongoing auditory verbal hallucinations (mean age 31.5) and three schizophrenics with a history of hallucinations but not actively hallucinating (mean age 35.0), all right handed, were presented with alternating 40 s epochs of speech and blank tape through headphones whilst being scanned. Analysis of data, grouped and transformed into standardised space, revealed that activation in predominantly right-sided auditory association cortex (BA 22 and 42) was *less* in the hallucinating than non-hallucinating group.

Figure 1 shows *differences* in response to external speech between 5 hallucinating and 3 non-hallucinating schizophrenics (black pixels: hallucinator's response < non-hallucinator's; white pixels: hallucinator's response > non-hallucinator's). (Left of fig is right side of brain).

Auditory hallucinations appear to alter the pattern of auditory cortex activation in response to external speech. Regions of right-sided auditory association cortex (BA 22 and 42) previously reported to be



active during the perception of auditory hallucinations may become "saturated" and hence less able to respond to external speech.

- [1] Woodruff PWR, Brammer M et al., *Lancet*. 1995, 346, 1035.
[2] Bullmore E, Brammer M, et al., *Mag. Res. Med.*. (in press).

S88. Anhedonia: clinical features and mobility across different diagnoses

Chairmen: P Boyer, G Loas

MEASUREMENT OF ANHEDONIA: A REVIEW OF THE INSTRUMENTS

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The term "anhedonia" was coined by the French psychologist Théodule Ribot, in contrast to "analgesia", to denote a complete absence of pleasure. In 1970 a first attempt was made to operationalize the concept. Instruments developed to measure anhedonia are reviewed and their psychometric properties and conceptual framework discussed. Mostly they have been designed considering anhedonia to be a symptom either of schizophrenia or of depression. Some reliability data are available for most scales, but only some have been investigated as to validity. Of these the MMPI Anhedonia Scale was shown to be more sensitive to neurotic disturbance than to anhedonia. The Anhedonia (Interview) Scale correlated significantly with numerous MMPI scales, which questions its construct validity. The Scales for Physical and Social Anhedonia have been most extensively investigated. They were explicitly developed to measure a lifelong, characterological deficit in pleasure capacity, as it was assumed to exist in schizophrenia. Validation studies yield controversial results, which is partly to be explained by the different methods used. Moreover most studies did not use the revised versions of these scales.

The Pleasure Scale of Fawcett et al was designed to measure a state dependent pleasure capacity deficiency, considered to be specific of a subtype of depression. Its psychometric properties have been investigated by different authors and will be discussed. The distinction between life-long, characterological or trait-dependent and state-dependent seems rather forward. However, when one uses a measure to evaluate current anhedonia, the part played by the trait capacity to experience pleasure is not taken into account. This is a major methodological flaw which must be considered in developing new instruments. Recently developed instruments will be analysed in that vein.

ANHEDONIA IN CHRONIC SCHIZOPHRENIA: A SPECIFIC DIMENSION?

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Introduction: Anhedonia is a common characteristic of schizophrenia namely in the early stage of the disease. For Andreasen anhedonia is a component of the negative syndrome of schizophrenia; for Kirkpatrick and Buchanan anhedonia constitutes one of the main characteristics of the deficit syndrome. But anhedonia is also a common characteristic of depression. Moreover Harrow et al have recently shown that depression in chronic schizophrenia is partly

related to the interference between neuroleptics and the dopamine reward system. The aim of the study presented above is to clarify the status of anhedonia in chronic schizophrenia by using a multivariate analysis (factor analysis). *Method:* Subjects and assessments: 150 subjects meeting the RDC criteria for chronic schizophrenia filled out the Fawcett Clark Pleasure Capacity Scale (FCPCS-PP). The Positive and Negative Syndrome Scale (PANSS) was completed by a clinician. Statistical analysis: a principal components analysis was performed on the intercorrelation matrix of the FCPCS-PP and PANSS items. The number of factors was determined using several guidelines (Kaiser, Cattell). Finally an orthogonal rotation (equamax) was made. Results: a 5-factor solution was retained including positive, disorganisation, negative, anxious-depressive and pleasure factors. The PANSS items were distributed respectively in the positive, negative, disorganisation and anxious-depressive factors; the FCPCS-PP items were distributed in the pleasure factor. No overlap between the different factors for the item loadings in each factor could be evidenced.

Conclusion: The results support the view that anhedonia is a construct that is distinct and separated from depression and negative symptomatology in chronic schizophrenia.

COGNITIVE DEFICITS RELATED TO ANHEDONIA

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Several studies using amplitudes of cognitive Event-Related-Potentials (ERP) as indices of arousal were realised in the perspective of the Sanders model of perceptico-motor information processing (1983) relating computational stages to energetical processes.

Three studies in good healthy subjects showed that ERP amplitudes depended upon the personality characteristics which were correlated with anhedonia. When anhedonia was correlated with depressogenic attitudes, subjects presented a cortical hyperarousal when stimulations were neutral but an hypoarousal after these same stimulations had acquired an affective quality, compared to non-anhedonic subjects, (Pierson et al 1987). When anhedonia/blunted-affect was correlated with high sensation seeking, the frontal ERP indices of orienting were of larger amplitude than in control subjects (Pierson et al, submitted). Another study showed that anhedonia could indeed be included into two different factors, the first one associating harm avoidance, lack of reward dependence and a reduction of some ERP amplitudes when intensity of stimuli increased (instead of an increase in non-anhedonic subjects), the second one associating anhedonia and novelty seeking (Pierson et al, in preparation). Two other studies on depressed patients indicated that patients who presented psychomotor retardation and anhedonia/blunted-affect showed abnormally low amplitudes for several ERP components compared to depressed patients with the same degree of depression but with other emotional characteristics (anxious agitation and impulsiveness). Depending on the complexity of the task, the amplitude reduction concerned only the frontal P3 component (P3a) in a simple task (Pierson et al, 1990, Partiot et al, 1994) or all ERP components in a complex task (Pierson et al, in press).

These results as a whole seem to indicate that anhedonia is not a unitary process. We propose a model which could allow to explain anhedonia by an inadequation between the actual and the optimal level of arousal provoked by stimulations. When the actual level of arousal is low, anhedonia would be due to an hyporeactivity to stimulations and would constitute a primary trait which, in the case of a high optimal level, might be compensated by the development of adaptive behaviors intended to increase arousal (nicotine taking, excessive sensation seeking for example). On the contrary, when the actual level of arousal is high and reflected by hyperactivity to stimulations, and if the optimal level is low, anhedonia or blunted-affect

could be developed secondary and constitute a protective adaptive behavior intended to decrease the actual level of arousal.

A NEW SCALE FOR MEASUREMENT OF HEDONIC TONE

R.P. Snaith.

For purpose of more accurate research into the relation of hedonic tone to disorders, the need for a scale was recognised. The existing scales are long and distorted by cultural bias. It was considered that the new scale should briefly cover the following areas of pleasure response: social, interests, entertainment, personal appearance and appetite. It was realised that sexual response, exact items of food and alcoholic drinks should be excluded as grounds of age and ethnic bias of response. The analysis of a large number of items resulted in a 14-item scale with clear indicating abnormality. The scale is called the Snaith-Hamilton Pleasure Scale (SHAPS).

ANHEDONIA IN DEPRESSION: STATE OR TRAIT

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Anhedonia, the diminished ability to experience pleasure, was proposed by Klein (1974) to be the defining characteristic of endogenomorphic depression, and in DSM-III, anhedonia was the core symptom of melancholia. Studies using the Fawcett-Clark Anhedonia Scale, the Chapman Pleasure Scales, and more recent variants of these two instruments, have confirmed that patients experiencing a major depression are significantly more anhedonic than controls. Historically, anhedonia has also been considered to be a feature of the dysthymic subtype of chronic minor depression, but this has not yet been confirmed using formal measuring instruments. In animal models of depression, behaviour suggestive of anhedonia (subsensitivity to rewards) is seen following exposure to one of a variety of stressful situations, and can be completely reversed by chronic treatment with antidepressant drugs. Anhedonia can also be demonstrated in human volunteers following the induction of a mild depressive mood swing. These data indicate that anhedonia is associated with, and perhaps consequent on, the state of being depressed. Some studies of first-degree relatives and of recovered depressives suggest that anhedonia may also be a trait-like feature of depressive people. However it is difficult to rule out the possibility that these data are complicated by the presence of dysthymia and/or subclinical depressive symptomatology.

S89. Psychiatric education in Europe

Chairmen: G Christodoulou, F Caldicott

WHERE SHOULD WE GO FROM HERE?

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The likely impact of the European Board's work on training and education in psychiatry in European countries will be discussed.

The degree of specialisation in psychiatric services for patients, which is already quite variable across Europe, will be considered in view of the implications that this has for psychiatric training in our member states.

European Directives ensure that free movement of doctors is