

# **The Understanding and Perception of Emotion in Schizophrenia**

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## **Abstract**

### **The Understanding and Perception of Emotion in Schizophrenia**

**Objectives:** Research is beginning to examine the links between schizophrenia and social cognition – the processes people use to make sense of their social experience (Corrigan & Penn, 2001). Identifying emotion in other people is a vital social skill. A significant body of research shows that people with schizophrenia have problems judging facial emotions. However, an intact understanding of emotion concepts is usually assumed in such research. This thesis aims to establish (a) whether affect recognition difficulties in schizophrenia reflect problems in the understanding or perception of emotion; (b) the relationship of emotional understanding to social functioning; and (c) how far general cognition accounts for differences in affect recognition.

**Method:** The study describes the validation of a set of vignettes that reliably imply specific emotions. These were then administered to participants with a diagnosis of schizophrenia (n = 60), nonclinical controls (n = 40) and learning disabled controls (n = 20). There were two experimental conditions. In the first, vignettes were paired with emotion words. In the second, they were matched with previously validated photographs of emotional facial expressions. A measure of intelligence was administered to all participants, and a social functioning scale was completed for participants with schizophrenia.

**Results:** Participants with schizophrenia and learning disabled controls had significantly more difficulty than nonclinical controls in the understanding and perception of emotion. Once general intellectual functioning was taken into account, however, only the group with schizophrenia showed a differential deficit in affect recognition. No differential deficit was found in the perception of facial emotion in schizophrenia, although performance on some emotions was markedly low. There was no significant correlation between affect recognition ability and social functioning in schizophrenia.

**Conclusion:** People with schizophrenia have a specific and differential deficit in social understanding which is not wholly accounted for by general cognitive functioning.

### **Statement of Originality**

I, Richard Longmore (as sole author) formally state that this thesis represents an original research endeavour. To the best of my knowledge, no previous authors have examined the subject area herein. All other authors' publications informing the contents of this thesis have been recognised and appropriately referenced. The work contained within this thesis was conducted solely by the author, within the period of study towards the Doctorate in Clinical Psychology. None of the work herein has been submitted for another degree in this or any other university.

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## **Chapter One: Social Functioning, Information Processing & Social Cognition in Schizophrenia**

### **Social functioning**

From the earliest clinical descriptions, it has been recognized that people with schizophrenia struggle with interpersonal functioning:

The patients no longer have any regard for their surroundings; they do not suit their behaviour to the situation in which they are, they conduct themselves in a free and easy way, laugh on serious occasions, are rude and impertinent towards their superiors, challenge them to duels, lose their deportment and personal dignity; they go about in untidy and dirty clothes, unwashed, unkempt, go with a lighted cigar into church, speak familiarly with strangers, decorate themselves with gay ribbons. (Kraepelin, 1896/1987; cited in Hooley & Candela, 1999).

Both Kraepelin (1919/1971) and Bleuler (1911/1950) described the “autism” of schizophrenia, which generates what they viewed as the secondary outcome of social withdrawal. Phenomenological studies (for example, De Niro, 1995; Davidson & Stayner, 1997) present a picture of people with schizophrenia as often suffering a sense of loneliness and isolation due to their inability to engage with others. These difficulties would seem to pervade both intimate and instrumental relationships, with the result that people with schizophrenia are far less likely to marry than other people (Loranger, 1984), to obtain sustained employment or to live in comfortable housing. Their social networks tend to be smaller (Randolph, 1998), with lower perceived support (Neeleman & Power, 1994), and they score worse than nonpatients and mood disordered controls on the Quality of Life Scale (Bellack, Morrison, Wixted & Mueser, 1990).

As well as these devastating global effects, interpersonal functioning deficits in schizophrenia create difficulties in day-to-day social interactions. A quote from the ex-wife of a sufferer gives a flavour of these problems:

He didn't seem to be able to get the feel of people, to interpret their gestures correctly. Instead of relying on that intuitive understanding we usually have of what other people are trying to convey, he built up intricate theories that often led him to erroneous interpretations [...] It was as though some strange deficiency prevented him from understanding some things that seem perfectly obvious to most people. (Anonymous, 1994, p.228).

Understanding this 'strange deficiency' presents a clear challenge to research into schizophrenia. Indeed, Penn, Corrigan, Bentall, Racenstein & Newman (1997) go so far as to assert that it is the key challenge, because schizophrenia is 'inherently an interpersonal disorder in which problems result from faulty construction of the social environment and one's place in it.' (p. 114).

Of course, it could be argued that social functioning difficulties in schizophrenia are merely the sequelae of other symptoms or, indeed, that they are the iatrogenic consequences of factors such as neuroleptic medication or social stigmatisation. However, there is now good evidence that social impairments predate the onset of other symptoms (Amminger & Mutschlechner, 1994; Dworkin, Lewis, Cornblatt & Erlingmeyer-Kimling, 1994; Neumann & Walker, 1998), are relatively uninfluenced by neuroleptic medication, and often persist when positive symptoms ameliorate (Scott & Lehmann, 1998). Furthermore, social functioning often predicts the long-term outcome of schizophrenia (Bailer, Bräuner & Ray, 1996; Jonsson & Nyman, 1991; both cited in Meuser & Tarrier, 1998). In short, interpersonal difficulties are not merely a functional corollary of schizophrenia, but rather a defining dimension of the disorder.

Given the centrality of interpersonal functioning difficulties in the onset, course and outcome of schizophrenia, and their importance as a target for psychosocial rehabilitation, the question arises of how these problems might best be researched. Although many other factors have been examined (such as negative symptoms, course of illness, family communication patterns, gender and sociodemographic factors), researchers have been especially interested in the role of cognition in social functioning difficulties.

However, just as social functioning can be described at various levels (from ‘molar’ aspects such as community functioning, through to ‘molecular’ behaviours such as the paralinguistic skills used during conversations), so too can the cognitive processes involved in social functioning be described in different ways. The dominant cognitive model in schizophrenia research has been the information processing model. However, a research paradigm has recently emerged which draws on ideas from social psychology. It claims that individuals with a diagnosis of schizophrenia may exhibit a specific deficit or bias in the cognitive processes used to interpret *social* information. These processes are termed ‘social cognition’. Both the information processing and social cognition models will briefly be considered.

### **The information processing model**

The information processing model of cognition relies upon the notion that mental operations can be broken down into sequential steps that describe how information is handled between stimulus (input) and response (output). Composite operations such as perception, attention, memory and executive control can be examined experimentally.

Researchers set themselves the challenge of understanding which information processing deficits might underlie task performance. With regard to schizophrenia, this enterprise has been made considerably harder by the fact that, as a group, people with a diagnosis of schizophrenia tend to score in the brain damaged range on neuropsychological measures (Dickerson, Ringel & Boronow, 1991). This means that specific deficits have to be judged against a background of general deficit. If such a 'signal' cognitive difficulty were found against this background 'noise' of generalised impairment, it would be termed a 'differential deficit'. The determination of differential deficits in schizophrenia is fraught with methodological difficulty, and this is an issue that will be returned to in the next chapter.

Despite the cogent theoretical basis of the information processing model, efforts to uncover the cognitive correlates of interpersonal functioning in schizophrenia have, to date, proved inconclusive. There are several reasons for this. Firstly, studies have tended to look for correlations between measures of social functioning and performance on neurocognitive test batteries. However, different studies have tended to use different measures of cognitive and social functioning (Green, 1996), and therefore it is difficult to compare findings across studies. For example, with regard to social functioning, some studies have utilised role-play tests as the measure of social skill (e.g. Corrigan & Toomey, 1995; Penn, Mueser, Spaulding *et al*, 1995); some have looked at ward behaviour (e.g. Spaulding, 1978; Penn, Spaulding, Reed & Sullivan, 1996); while others have used ipsitive measures of social problem solving (e.g. Bellack, Sayers, Mueser & Bennett, 1994; Corrigan, Green & Toomey, 1994); yet others have used care setting as a global indicator of community functioning

(Wykes, Sturt & Katz, 1990; Wykes, Katz, Sturt & Hemsley, 1992). In these studies, measures of cognitive functioning have also varied widely, and have included scales such as the Wechsler Adult Intelligence Scale, tests of vigilance such as the Continuous Performance Test, tests of reaction time, and tests of concept formation such as the Wisconsin Card Sorting Test.

The second reason why efforts to uncover the cognitive correlates of social functioning difficulties in schizophrenia have not generated clear results is that studies have tended to be exploratory rather than being based on clear hypotheses. Correlational analyses are often used to compare multiple cognitive and social skills measures in a somewhat “scattergun” fashion. Thirdly, and in consequence of the above points, the results of such studies have often been difficult to interpret in the light of current information processing models. For example, Penn, Mueser, Spaulding *et al* (1995) found that better nonverbal skills (such as appropriate eye contact, use of facial expressions and gesture) were associated with fewer errors on a computer-presented card sorting task designed to measure concept formation and cognitive flexibility. Thus a measure of a complex cognitive process is purported to be predictive of a much more ‘molecular’ social skill. Likewise, Mueser, Blanchard & Bellack (1995) looked at social skills in relation to performance on the Wechsler Memory Scale – Revised (WMS-R; Wechsler, 1987) and found that global role-play skill in women is related to visual memory. They noted that ‘It is unclear why visual memory should be more strongly related to social skill than other measures among females.’ (Mueser *et al*, 1995, p.150).

Furthermore, studies that share theoretical consistency and use identical measures can still yield contradictory results. For example, Corrigan, Green & Toomey (1994) found that the ability to recognise social cues was associated with early visual processing and verbal memory, but not with card sorting performance. Addington & Addington (1999) however, found that perseverative errors on the Wisconsin Card Sorting Test *were* associated with a measure of social problem solving, and also to scores on the Quality of Life Scale.

Overall, it can be said that although social functioning is clearly associated with neurocognitive deficits (Corrigan & Penn, 2001a), no reliable associations of specific information processing abilities and interpersonal functioning have yet been found. The reasons for this relate to the difficulty of operationalising and measuring social functioning, and the lack of clear hypotheses with regard to which cognitive functions relate to which specific social skills. Further problems lie in judging differential deficits against a background of generally lowered cognitive and social performance, and in the issue of intervening variables when comparing cognitive skills with constructs such as ‘quality of life’ (Silverstein, 1997).

### **The social cognition model**

Broadly speaking, the information processing model of cognition has not been successful in elucidating the cognitive correlates of interpersonal functioning difficulties in schizophrenia. Indeed, Penn, Corrigan, Bentall *et al* (1997) note that in studies such as those cited above, neurocognitive measures have typically been able to account for no more than 20% of variance in measures of social functioning. For this reason, some researchers who were prominent in the quest to uncover the

neurocognitive deficits underlying social functioning have lately shifted their efforts to a new paradigm: social cognition.

Social cognition examines the mental processes underlying social interactions. The term has been variously defined. For Fiske & Taylor (1991, p.1) social cognition is simply 'how people make sense of other people and themselves'. Ostrom (1984; cited in Corrigan & Penn, 2001a) describes it as 'A domain of cognition that involves the perception, interpretation, and processing of social information.'

But in what ways is social cognition different from cognition as it is traditionally defined? Proponents of the socio-cognitive approach argue that a clear distinction is found in the object of social cognition. Social stimuli, they argue, are very different from non-social stimuli (which are typically used in information processing research: e.g. nonsense syllables and digit strings). The key differences are as follows:

- 1) Social stimuli are personally relevant, and are affect laden (Fiske & Taylor, 1991). By contrast, the non-social stimuli typically used in neurocognitive research tend to be affectively neutral.
- 2) Social stimuli are dynamic (for example, the changing facial expressions of a conversational partner), while non-social stimuli tend to be static.
- 3) Social stimuli more often gain their meaning from their context: for example, the comparative status between social actors, conflicting goals, *etc.*
- 4) There is a greater concern with the unobservable aspects of social stimuli – we search for the causes underlying the behaviour of others, and attempt to understand their intentions and dispositions (Corrigan & Penn, 2001a).



Social cognition, then, is concerned with the complex processing demands of social stimuli. However, the focal argument relates to whether or not the differences between social and non-social stimuli entail domain-specific cognitive processes. For some researchers, the unique properties of social stimuli lead them to posit unique and distinct cognitive processes. Tooby & Cosmides (1992, p.92) speak of a ‘faculty of social cognition’ that has evolved to process social stimuli. Penn, Corrigan, Bentall *et al* (1997) also take an evolutionary perspective and assert that social cognition reflects the fact that human brains have evolved specifically to solve social problems rather than non-social ones. As such, socio-cognitive processes have primacy:

Social cognition is neither an isolated part of the brain nor an adaptation of processing mechanisms. It is the fundamental way in which all information is understood.  
(Corrigan & Penn, 2001b, p.xiv).

The examination of social cognition in schizophrenia represents a relatively new area of research (Corrigan & Penn, 2001b; Penn, 2000; Penn, Corrigan, Bentall *et al*, 1997; Silverstein, 1997). Because it is concerned with social stimuli and social processing, the hope is that studying social cognition will provide a clearer explanation of social functioning problems in the disorder. The task for researchers who posit distinct socio-cognitive processes is to establish what these processes are, and how they may be biased in schizophrenia. Two examples of research in this area are Richard Bentall and colleagues’ work on attributions and persecutory delusions (e.g. Bentall, 1990; Bentall, Kinderman & Kaney, 1994; Kaney & Bentall, 1992) and Rhainnon Corcoran and colleagues’ work on ‘Theory of Mind’ and “mentalizing” ability in schizophrenia (e.g. Corcoran, Mercer & Frith, 1995; Frith & Corcoran, 1996; Sarfati & Hardy-Baylé, 1999). Both these programmes of research illustrate

the use of socio-cognitive constructs, which have evolved to handle the unique demands of social stimuli.

Apart from causal reasoning and mentalizing ability, however, other socio-cognitive processes can be more difficult to differentiate from their neurocognitive counterparts. An alternative position from the ‘unique processes’ argument is one that recognises socio-cognitive processes as being composed of more molecular neurocognitive processes, but also as possessing unique “systemic” properties. For example, face perception may incorporate the same perceptual processes that apply to the perception of non-social stimuli, but also demonstrate some unique properties (Farah, 1992). Hence, facial perception is a socio-cognitive ability with a neurocognitive base, and can be researched at either of these levels, and within either model of cognition.

A third position on social cognition might assert that although social stimuli are unique in the ways described, that this fact alone does not invalidate the information processing approach to cognition. In other words, that social cognition is simply cognitive psychology applied to social objects. Rather than postulating unique processes or systemic properties, this approach seeks to explain social cognition in terms of more traditional cognitive taxonomies, but it does so by creating more complex representational models. Examples of such models are Barnard & Teasdale’s (1991) interacting cognitive subsystems (ICS) model, and Power & Dalglish’s (1997) SPAARS model (Schematic, Propositional, Associative and Analogical Representational Systems). Such models are increasingly being used as a framework for understanding complex reactions to social stimuli, including

pathological reactions such as depression (Teasdale, 1999) and post-traumatic stress disorder (Dalglish, 1999).

To summarise, the cognitive processes involved in handling social stimuli can be conceived of as unique and distinct; as showing unique properties at this level; or as being the same as those used for all information, but simply operating in a more complex and abstract domain. In practice, research and theorizing on social cognition in schizophrenia can often move between these positions.

The distinction between information processing and social cognition is not an arbitrary one: the two models generate different hypotheses with regard to social functioning problems in schizophrenia. The key question is whether or not these problems are underpinned by a cognitive deficit specific to social phenomena, or a general deficit in information processing. As well as being important for understanding the cognitive mechanisms underlying schizophrenia, answering this question will shed light on wider debates between competing models of cognition.

### **Coda: Complexity and the understanding of social situations**

We have seen that people with schizophrenia often struggle with social processing tasks that most others take for granted. The above sections reviewed two theoretical perspectives on this problem: both related to cognition. The information processing perspective searches for deficits in cognitive skills that are predictive of social functioning. The socio-cognitive perspective looks to demonstrate biases or irregularities in cognitive processes, which are hypothesized to process only social information.

Focusing on the stimuli rather than the processes, however, it could be argued that people with schizophrenia have trouble with interpersonal functioning simply because social stimuli tend to be more complex and abstract. This complexity may represent something of an “Achilles heel” for people with schizophrenia because it involves two types of knowledge or representation in which they may be impaired.

Firstly, social stimuli require social and cultural knowledge in order to be accurately decoded. People with schizophrenia may have less grounding in social knowledge (Cutting & Murphy, 1990) and less cultural familiarity. Secondly, understanding social stimuli requires greater semantic processing. There is good evidence that people with schizophrenia have impairments in semantic memory. Tamlyn, McKenna, Mortimer *et al* (1992) used a sentence verification task in which the participant is required to classify fifty statements as ‘true’ or ‘false’, such as ‘rats have teeth’ and ‘desks wear clothes’. Participants with schizophrenia were significantly slower than controls at verifying the sentences, and also made many more errors. McKenna, Mortimer & Hodges (1994) administered a battery of semantic memory tests (including category fluency – generating as many names of members of a category as possible in a fixed time – picture naming, category sorting and providing definitive features of categories) to a group of 46 participants with schizophrenia, who performed significantly worse than controls in all areas.

Shallice (1988) distinguishes two patterns of semantic memory impairment: ‘degraded store’ is where information is lost completely, and ‘impaired access’ is where the information still exists, but retrieval is inefficient. There is evidence that

the semantic impairment in schizophrenia is of the 'impaired access' type. For example, Allen, Liddle & Frith (1993) measured categorical verbal fluency in patients with chronic schizophrenia and controls on five separate occasions. The task involved naming as many members of a category such as 'fruit' or 'animal' as possible in three minutes. The participants with schizophrenia generated fewer category members than controls on all five occasions: however, by pooling the data from all five testing sessions, the researchers suggested that people with a diagnosis of schizophrenia had as many words available in their semantic store for the categories as controls, but were simply inefficient at retrieving them.

The social knowledge and semantic processing required for effective social functioning might therefore be impaired for people with schizophrenia. This would lead to particular difficulty in integrating stored knowledge with ongoing social performance. If we adopt the word 'understanding' as an umbrella term for the appropriate use of stored knowledge, then it is possible to see the understanding of social situations as being compromised in schizophrenia, and as playing a crucial part in interpersonal difficulties. The key role of understanding in social perception will be taken up again in Chapter Three.

## **Chapter Two: The Perception of Emotion in Schizophrenia**

In Chapter One, it was noted that people with schizophrenia often show difficulties of social functioning, and that schizophrenia is beginning to be explored in terms of the skills and cognitive processes thought to underlie social performance.

A vital skill in social cognition is the perception of emotion in others, in particular facial affect recognition. Charles Darwin, in his 1872 book 'The Expression of Emotions in Man and Animals', first proposed that facial expressions of emotion had evolved as a means of communication. Keltner & Kring (1998) also note the central role that emotional expressions play both in conveying emotions and evoking emotions in others. Hellewell & Whittaker (1998) stress the combined influence of affect perception and social knowledge in the interpretation of affective and social cues. The misreading of such cues in schizophrenia might lead to an inability to recognise the social overtures of others, and a consequent failure to respond in an appropriate manner. It could also lead to a misunderstanding of the intentions of others and, as a result, to persecutory delusions.

Given the centrality of emotion recognition in communication, and the difficulties people with schizophrenia often experience in communicating, it should come as no surprise that a considerable body of research has been undertaken on the perception of facial affect in people with schizophrenia. This chapter will review the findings of this research. Early studies in the field raised some fundamental conceptual and methodological questions, and these will be considered first. The remainder of the review examines how clearly the literature provides answers to the following key questions:

## Key Questions

- 1) Is there a deficit in facial affect recognition in schizophrenia?
- 2) Do other clinical populations – apart from people with schizophrenia – experience difficulty with affect recognition?
- 3) Is there a relationship between affect recognition and adaptive social functioning in schizophrenia?
- 4) Is the deficit a differential deficit, or just one aspect of a broader difficulty?

## Early studies

Early studies of facial affect recognition in schizophrenia are characterised by gradual conceptual and methodological advances between the late 1950s and 1980.

Izard (1959) was the first researcher to use pictures of faces as stimuli for understanding thought disorder in schizophrenia. He used posed photographs as projective stimuli, asking patients with a diagnosis of schizophrenia which face they preferred, and why. He noted that they reported fewer favourable feelings than normal controls. This projective approach contrasts with Levy, Orr & Rosenzweig (1960) who were the first researchers to require specifically emotional judgements (happy versus unhappy) of photographs of faces. They compared fifty men with a diagnosis of acute schizophrenia with “mental retardates”, and found that the groups agreed on happy/unhappy judgements.

The first study to compare affect recognition with a measure of general cognitive functioning in schizophrenia was Spiegel, Gerrard, Grayson & Gengerelli (1962). They used a now defunct measure (the Shipley Institute of Living Scale).

Participants (24 inpatients with a diagnosis of schizophrenia and 12 student controls) were required to sort faces on anchored continua. Using posed photographs of an actor, the instructions were to “arrange the faces in a single row from most angry to most happy”. It was found that patients with schizophrenia performed this task as well as controls, and that this ability was unrelated to level of intellectual impairment, estimated premorbid intelligence, or subtype of schizophrenia. Although they found no link, Spiegel *et al*’s study still highlights the usefulness of measuring general cognitive functioning. Such measurement would be necessary in order to show that affect recognition is not redundant with (explicable in terms of) general intellectual functioning.

Another early study to use continua was undertaken by Iscoe & Veldman (1963). Instead of using photographs, participants were asked to arrange schematic line drawings of emotional faces on a continuum from happy to unhappy. Participants with schizophrenia (n=20) were significantly worse at this task than control groups of adults and children aged 9 to 12. They are reported as often attending to irrelevant cues such as the thickness of the lips or the width of the mouth, rather than the emotion. Iscoe & Veldman’s is the first study to find a deficit in facial affect recognition in schizophrenia. A theme raised in this early study finds an echo in later research. Studies that use schematic or posed stimuli (be they drawings or photographs), instead of presenting participants with *bona fide* expressions of emotion, may in fact be using symbolic (and culturally mediated) representations of what an emotional expression is *supposed* to be like. It could be argued that these schematic or posed expressions bear little resemblance to genuine emotional



expressions. In a recent Australian study, Davis & Gibson (2000) used emotion induction techniques and hidden video cameras to develop dynamic representations of genuine emotional expressions. Interestingly, they found that people with a diagnosis of paranoid schizophrenia (n=10) made more accurate emotion recognition judgements than people with depression and nonclinical controls for the genuine expressions, but not for a comparable set of posed expressions.

In addition to inconsistencies in the use of drawn versus photographic stimuli, a common flaw of the early studies described above is that their stimuli are not standardised. Standardisation is required in order to ensure that a photograph of a happy or sad face is reliably identified as such. Dougherty, Bartlett & Izard (1974) were the first researchers in this field to use standardised stimuli. Their study relies upon Izard's (1971) development of photos of the 'fundamental emotions' validated across eleven different cultures. Participants (31 female inpatients with a diagnosis of schizophrenia, hospitalised for a minimum of five years) undertook a free response task ('tell me, in your own words, how each person feels') and a forced choice task (assigning labels to the photographs as determined in Izard's cross-cultural research). In the forced choice paradigm, people with schizophrenia were significantly less accurate than nonclinical controls (44% correct judgements compared with 78% for controls). Although they labelled 'enjoyment – joy' photos as accurately as controls, they performed significantly worse on expressions that Izard's research claimed were reliably recognised as 'shame – humiliation' and 'disgust – contempt' expressions. This result is the precursor of many later research findings that purport to show that people with schizophrenia have a specific deficit in their ability to recognise 'negative' emotions, as opposed to relatively intact recognition for positive emotions

(Borod, Martin, Alpert *et al*, 1993; Cramer, Weegman & O'Neil, 1989; Mandal & Rai, 1987; Walker, 1981; Zuroff & Colussy, 1986). However, such findings could perhaps be explained as an artefact of the greater variety of negative emotional expressions (and the semantic categories used to describe them) as opposed to the single semantic category of happiness. In other words, recognising negative emotions is harder because there are more of them.

Dougherty *et al*'s study highlights the issue of the relationship between semantic categories (emotion words) and facial expressions. For example, Izard thought of 'shame – humiliation' as one of the fundamental emotions, but Dougherty *et al* found that in their free response task, very few 'shame – humiliation' responses were made by any group. Indeed, 'shame – humiliation' can be conceived of as an emotion relating to self-evaluation (Tangney & Salovney, 1999). As such, there may be less functional utility to its display as a facial expression. Therefore, simply because an emotion may be regarded as 'fundamental' in mental life, this does not mean that it necessarily has a corresponding facial expression. Studies of facial affect recognition are therefore limited to exploring those emotions that are reliably communicated by facial expressions.

A study that limited emotions in this way was that of Muzekari & Bates (1977), who looked at the recognition of happiness, sadness, anger and fear. Participants were 32 inpatients with a diagnosis of chronic schizophrenia, who were compared with 32 student controls. The students were better than the patients at recognising emotions in both the open-ended and forced choice response paradigms.

Both Muzekari & Bates' and Dougherty *et al*'s studies represent a methodological advance in their use of standardised stimuli and multiple response formats. During the 1970s, Ekman & Friesen (1975) developed a further set of validated photographs of expressions of emotion that have come to be widely used in emotion recognition research. Work on the Expressed Emotion construct during this period (e.g. Vaughn & Leff, 1976) also helped to focus greater attention on emotion perception.

These early studies have alerted us to issues such as the use of standardised stimuli, the need to measure general cognitive functioning, and the relationship between semantic labels and facial expressions. The early studies generated mixed results in terms of finding a facial affect recognition deficit in schizophrenia. The following section will review more recent research to see whether it has confirmed or disconfirmed the existence of such a deficit.

### **Is there a facial affect recognition deficit in schizophrenia?**

Studies that have followed the basic design of showing standardised photographs of facial expressions of emotion have generally found that people with schizophrenia display a deficit in facial affect recognition. There are subtle methodological variations in these studies that need to be considered, because of the different task demand characteristics that they impose.

Tasks vary in the extent to which they structure the possible range of responses that participants can make to stimuli. At the extreme end of the range of free response tasks, Pilowsky & Bassett (1980) showed participants photographs displaying expressions of fear, joy, sadness and anger, along with a neutral expression.

Participants were simply asked to describe the photos. Those with schizophrenia were less likely to comment on affect in the photographs, tending instead to describe the physical characteristics of the person pictured. A similar failure to discuss emotion in a free response format was reported in a study by Hellewell, Connell & Deakin (1994) using videotaped emotional scenes.

A more structured form of free response task asks the participant specifically to comment on the *emotion* shown in the photographs (e.g. Dougherty *et al*, 1974; Walker, McGuire & Bettes, 1984). However, even with this guidance, participants with schizophrenia are still less likely to describe emotions, and when they do so, they are less likely to produce an emotion label that agrees with the standardisation sample. These findings provide an interesting contrast to those of Kring (1999) who showed emotion-invoking films to participants with schizophrenia, and found that they reported similar levels of pleasant emotion to controls, and greater levels of negative emotion. Therefore, we can assume that if people with schizophrenia fail to comment on emotion, that this is unlikely to be due to the fact that they themselves experience less emotion, or that emotions are less salient for them.

This difficulty in employing emotional vocabulary in free response tasks may be related to the putative impairment of access to the semantic store in long-term memory, which was discussed in the last chapter. In other words, people with schizophrenia may have an intact emotion lexicon, and understand how to apply it, but simply not be able to access the information efficiently. One experimental means of circumventing this difficulty is to provide participants with a set of word labels

naming different emotions, from which they choose the appropriate emotion to match the face.

This forced choice format has been used in many studies at varying levels of complexity. Word-to-face matching (where the participant selects which word goes with a single face on each trial) can range from Gessler, Cutting, Frith & Weinman's (1989) choice of 'happy' and 'sad' labels, through to Cramer, Weegman & O'Neil's (1989) list of thirteen adjectives – some of which describe orientations rather than emotions (e.g. 'interfering', 'encouraging'). In the contrary face-to-word matching format, the participant is presented with a word label (e.g. 'Happy') and has to select the correct face, usually from a choice of two. This format was adopted by Archer, Hay & Young (1992) and Heimberg, Gur, Erwin *et al* (1992). The most common presentation, however, has been to use word-to-face matching with a choice of six or seven labels describing the 'basic emotions' identified by Ekman & Friesen (1976). These are happy, sad, anger, fear, disgust and surprise, along with an optional label of 'neutral'. The corresponding faces tend to be drawn from the Izard (1971) and Ekman & Friesen (1975) photosets, previously described. Studies adopting this method include Zuroff & Colussy (1986) and Feinberg, Rifkin, Schaffer & Walker (1986). Kerr & Neale (1993) used a mixed set of photos from the Izard and Ekman & Friesen series, and named this task the Facial Emotion Identification Task (FEIT), which has since been used in several studies (Mueser, Doonan, Penn *et al*, 1996; Salem, Kring & Kerr, 1996; Kee, Kern & Green, 1998; Penn, Combs, Ritchie *et al*, 2000).

In all of the above studies, which have involved matching faces with word labels, participants with schizophrenia have performed worse as a group than normal controls. It would seem, therefore, that the deficit in facial affect recognition shown by people with schizophrenia is not merely related to faulty accessing of intact emotion knowledge in the semantic store. Instead, logic dictates that poor performance on these tasks is due either to a *degraded* semantic store (poor understanding of emotions) or that it relates to impaired *perception* of the facial expressions of emotion (*i.e.* the participant has an appropriate understanding of the emotion, but cannot decode the facial expression, in order to match it with that knowledge).

If an experimental procedure could allow the judgement of facial expressions without the involvement of word labels, then it would be possible to disambiguate the semantic/linguistic understanding of emotion from the perception of facial expressions.

One such procedure involves matching pairs of photos on the basis of their emotional expression when their identity is different. The procedure was developed by Hobson, during work on autism (Hobson, Ouston & Lee, 1988) and was imported into schizophrenia research by Borod, Martin, Alpert *et al* (1993). Kerr & Neale (1993) named a version of this task the Facial Emotion Discrimination Test (FEDT), which – as with the FEIT – has been used in several subsequent studies. All of these studies have found a deficit in the ability of people with schizophrenia to match faces in terms of their emotional expression.

As a result of this finding, it could be argued that participants must have a deficit in face processing. Because they are not required to label the expressions, and hence meaning is not at issue, then this poor performance must be due to faulty expression analysis. However, such a conclusion may be somewhat premature. Matching faces on the basis of expression alone is a difficult task that requires participants to suppress other channels of information conveyed by the face (such as identity, gender and age) in order to focus on the 'emotion expression' channel. There is good evidence that people with schizophrenia are particularly poor at cutting out extraneous information in this way (Hemsley, 1977; Frith, 1979). In other words, a deficiency in terms of selective attention would be sufficient to explain poorer performance on this task, without recourse to explanation in terms of a perceptual deficit. Furthermore, face-to-face matching, although it does not require the explicit use of labels, may still involve their implicit use. In other words, the expressions may be encoded semantically, in order to decide whether or not there is a match.

Not all studies of affect recognition in schizophrenia have found a deficit. Joseph, Sturgeon & Leff (1995) showed videotaped scenes to 32 patients in remission from schizophrenia, and found them just as able to identify the dominant emotions as controls. But we can note that the use of videotaped emotional scenes – with several channels of information – does not provide a test of specifically facial affect recognition. A further problem is that the participants were in remission at the time of the study. Burch (1995) found that people with schizophrenia were just as able as nonclinical controls to distinguish between facial expressions of joy and shame. However, recalling Levy *et al*'s (1960) use of happy and unhappy faces, and his finding of no deficit for participants diagnosed with schizophrenia, it is probable that

at this level of complexity, no deficit in affect recognition is apparent. It may also be recalled from the previous chapter that Davis & Gibson (2000) did not find a deficit using genuine, induced expressions of emotion. However, this promising study had only ten participants with schizophrenia, and awaits replication.

Flack Jr., Cavallaro, Laird & Miller (1997) introduced what is probably the most structured response format of any study to date in this field. Using the Ekman & Friesen faces, 15 participants with schizophrenia rated each face on six Likert scales with regard to how much it displayed each of the 'basic' emotions. Hence, each face was rated for anger, happiness, sadness, disgust, fear and surprise. The ratings of people with schizophrenia did not differ significantly from those of controls, and both groups gave the highest ratings to the appropriate emotion for each face. A positive interpretation of this study is that it frees participants from the difficulty of choosing a single label from several alternatives presented in parallel. Instead, it involves separate, serial ratings that may place less of a burden on attention, and allow intact competence to be demonstrated.

However, there are three potential problems with Flack Jr. *et al*'s study. Firstly, participants only rated six faces in total – one for each expression – and this may not constitute a sufficiently rigorous test. Secondly, according to Burch (1995), people with schizophrenia tend to make more extreme typicality ratings of facial expressions when using Likert scales. Such a response pattern may have the effect of pushing up the mean emotion rating to a level similar to controls, and therefore of masking misjudgements by some participants with schizophrenia. An indication that this was happening would be given by a wider standard deviation in ratings for the



schizophrenia group. However, SDs are not reported in Flack Jr. *et al*'s results, and so this possibility cannot be ruled out. Thirdly, the participants with schizophrenia were older than samples used in many studies (mean age 54.5 years), and were outpatients in the US Veterans Administration (VA) system. Although they had DSM III-R diagnoses of schizophrenia, these diagnoses were not independently verified for the study. It is possible that this group reflects the much higher rate of diagnosis for schizophrenia that pertained in the US in the past. Such changes in diagnostic practice need to be considered as sampling issues, in particular when using older participants who may have first been diagnosed many years before. For these three reasons, the study of Flack Jr. *et al* is no more than suggestive, and awaits replication. The study is important, because it holds out the possibility that with a carefully designed response format, people with schizophrenia might show a competence in facial affect recognition equal to controls. This would mean that the problems shown in other studies were due to processing capacity limitations rather than an emotion recognition deficit *per se*.

In this section the question was posed as to whether people with schizophrenia show a deficit in facial affect recognition. Overall, the literature supports the existence of such a deficit. At the simplest level (e.g. happy/unhappy judgements) this deficit may not be apparent (Burch, 1995; Levy *et al*, 1960). This suggests intact processing for the most basic distinction of positive from negative affect. However, impaired performance relative to controls has been shown across a variety of response formats for more fine-grained judgements between emotions.

It was noted that the free response format produced less description of emotion in faces by participants with schizophrenia. However, performance remained poor when verbal labels were provided: hence, the problem is probably more fundamental than one of impaired access to emotion knowledge. It was also seen that matching faces for expression was more difficult for people with schizophrenia, but that this task does not exclude semantic involvement. There is a clear need for further research to tease apart the contributions of emotional understanding and emotional perception to affect recognition in schizophrenia.

### **Do other clinical populations experience difficulties with affect recognition?**

This question addresses the specificity of affect recognition problems. Are they a facet of schizophrenia in particular, or the product of more general factors such as hospitalisation, medication or social exclusion – factors that may apply to other clinical groups, as well as to people with schizophrenia? Evidence on this issue comes from two types of study: those that have examined facial affect recognition in schizophrenia, and have utilised clinical control groups, and those that have focused on affect recognition in other clinical populations.

Studies in the first group – utilising clinical control groups when examining the ability of people with schizophrenia – are not numerous. However, they have generally used groups of inpatients with depression as controls, and have tended to find that the performance of people with schizophrenia is worse than the performance of people with depression on affect labelling (Cutting, 1981) and emotion discrimination – or face-to-face matching (Feinberg *et al*, 1986; Archer, Hay & Young, 1992; 1994). Bell, Bryson & Lysaker (1997) also found the performance of a

group of participants with schizophrenia to be worse than that of a group of substance abusers on judgements of emotion in videotaped scenes.

However, not all studies have found a poorer performance by people with schizophrenia. Walker, McGuire & Bettes (1984) found they did no worse than people with depression on a labelling task, but did achieve lower scores on emotion discrimination for pairs of faces. Furthermore, Zuroff & Colussy (1986) found that inpatients with depression performed as poorly as people with schizophrenia relative to normal controls on Izard's labelling task. Analysis of their results reveals that the poor scores of people with depression were not due to a negative response bias – they performed equally on both positive and negative emotions. Finally, a study by Borod, Martin, Alpert *et al* (1993) compared 20 patients with schizophrenia with 19 patients who had right hemisphere brain damage – both groups were significantly poorer than controls at emotion recognition and identification. However, this group is not a clinical control group *per se*, because it is most likely that brain damage rather than general clinical factors accounts for these results. Indeed, it is a sobering finding that the performance of people with schizophrenia on emotion recognition tasks is as poor as that of people who have damage to the brain area thought to process emotion.

With regard to studies that have focused on affect recognition in other clinical groups, there are findings of poorer performance relative to controls in autism (Hobson, Ouston & Lee, 1988), dementia of the Alzheimer's type (Koff, Zaitchik, Montpare & Albert, 1999) and children with a diagnosis of Attention Deficit Hyperactivity Disorder (Singh, Ellis, Winton *et al*, 1998). Several studies have examined facial

affect recognition ability in people with learning disabilities. There is evidence of a positive correlation between affect recognition and general intellectual functioning for this client group (Gray, Fraser & Leudar, 1983; McAlpine, Kendall & Singh, 1991).

In conclusion, studies have shown that other clinical groups also have difficulty with facial affect recognition tasks. The weight of evidence from direct comparisons suggests that people with schizophrenia perform worse on these tasks than people with depression. Work on facial affect recognition in learning-disabled people indicates a link with general intellectual functioning. This strengthens the argument – made previously – for IQ to be measured in studies of schizophrenia and affect recognition. The ideal methodology in this regard would be to match clinical controls with a sample of people with schizophrenia on IQ, and then compare performance on affect recognition tasks. This would allow general clinical factors and global intellectual functioning to be discounted as explanations for the affect recognition deficit in people with schizophrenia. If this were found, it would strengthen the case of those who claim that poor interpersonal functioning in schizophrenia is rooted in difficulties of social cognition.

### **Is facial affect perception linked to social functioning in schizophrenia?**

It was noted in Chapter One that researchers working within the social cognition model of schizophrenia hope ultimately to explain interpersonal functioning problems in terms of socio-cognitive processes. If this is to happen, they need to demonstrate a correlation between measures of social functioning and such processes. With regard to facial affect perception, four published studies have explored this relationship:

Mueser, Doonan, Penn *et al* (1996); Penn, Spaulding, Reed & Sullivan, (1996); Ihnen, Penn, Corrigan & Martin (1998); and Poole, Tobias & Vinogradov (2000).

Mueser, Doonan, Penn *et al*, (1996) used Kerr & Neale's (1993) tasks of facial emotion identification and discrimination (FEIT and FEDT). Participants were 28 people with chronic schizophrenia, who had been hospitalised for an average of 9.5 years. They compared affect perception task scores to a measure of social skill (a role play test) and a more general measure of social adjustment – the Social Behaviour Schedule (SBS; Wykes & Sturt, 1986). An omnibus test of their results (which tests for the significance of correlations when multiple comparisons are made between measures) showed an overall relationship between social competence and facial perception. More specifically, the use of Pearson correlations found:

- a) Facial emotion identification (labelling the emotion from a choice of six words) was positively correlated with nonverbal skill in the role-play test, and was associated with more functional social behaviours on the Social Behaviour Schedule subscales for social mixing and personal hygiene.
- b) Facial emotion discrimination (judging whether two faces are showing the same or a different emotion) correlated with SBS subscales for social mixing, altered activity levels, and personal hygiene.

The strongest relationship was between facial affect recognition and the more global measure of social functioning (the SBS) rather than the more 'molecular' social skills measured by the role-play test. Why this should be so is not clear.

Penn, Spaulding, Reed & Sullivan (1996) compared affect perception as indexed by a labelling task using the Ekman & Friesen (1975) photos, with ward-based social

functioning as measured by the Nurse's Observation Scale for Inpatient Evaluation (Honigfeld & Klett, 1966). As with Mueser *et al* (1996), Penn *et al*'s participants were inpatients with chronic schizophrenia (n=26). It was found that accuracy on the facial affect perception task was associated with adaptive ward behaviour (social competence, social interest and neatness) but was not significantly correlated with lower levels of maladaptive ward behaviour (although the association was in the right direction).

Ihnen, Penn, Corrigan & Martin (1998) used the FEIT and FEDT (Kerr & Neale, 1993) with clinically stabilised outpatients with schizophrenia. Affect recognition was compared with several indices of social skill as measured by two unstructured role-plays. Results showed that performance on the emotion identification task was moderately associated with global social skill, but that this association did not remain significant after applying the Bonferroni correction.

The most recent of the four published studies exploring whether affect recognition ability is linked to social functioning is that of Poole, Tobias & Vinogradov (2000). They studied the performance of forty community-based outpatients with schizophrenia on facial and vocal affect recognition. The facial affect recognition task used 42 Ekman & Friesen photos (six for each of the basic emotions plus 'neutral' faces) with seven word labels. Along with a short form of the WAIS-R (Wechsler, 1981), they also administered the Positive and Negative Syndrome Scale, Extended version (PANSS-E; Kay, Fiszbein & Opler, 1987) and the Quality of Life Scale (QLS: Heinrichs *et al*, 1984). Therefore, this comprehensive study compared

affect recognition with cognitive functioning, symptomatology and global social competence.

The findings of Poole *et al* are worth reporting in detail. Firstly, they found that affect recognition was positively correlated with WAIS-R IQ, more particularly with the Verbal Comprehension and Sustained Attention subscales. This echoes work on affect recognition in participants with learning difficulties, reviewed in the previous section, which showed a similar link with IQ. Secondly, poorer affect recognition was associated with the PANSS-E disorganised and positive symptom subscales, but not with the negative symptom subscale. This result replicates the finding of Corwin (1996) who also examined affect recognition in relation to PANSS-E symptomatology (incidentally, Corwin also found that short form WAIS-R IQ was significantly positively correlated with composite scores on her emotion recognition tasks). However, other studies – including Mueser *et al* (1996), reported above – have found an association between affect recognition and negative symptoms. Thus the picture with regard to affect recognition and symptom subgroups is unclear. Thirdly, Poole *et al* found that affect recognition was positively correlated with three out of the four QLS subscales: Interpersonal Relations (covering friendship, family and sexual issues), Intrapsychic Foundations (concerning curiosity, sense of purpose and hedonic experiences) and Community Participation (the degree of participation in common activities). The subscale that was not significantly correlated with affect recognition was Vocational functioning. Even after the effects of symptom severity and general cognitive functioning were partialled out, affect recognition was still significantly associated with impoverished interpersonal relations. Impaired affect recognition was also related to bizarre, socially disruptive behaviours such as

inappropriate social and sexual displays, choice of clothing and appearance. Poole *et al* suggest that these results may reflect a deficit in self-monitoring and self-regulation of social behaviours occurring in a subset of patients with schizophrenia.

They conclude that:

Concurring with several prior studies, our analysis indicated that impaired processing of social information in schizophrenia involves *both* general intellectual deficits (executive-attentional, verbal-semantic) and specific difficulties interpreting social cues. (Poole *et al*, 2000, p.656).

As such, they seek to integrate both the social cognition *and* information processing positions.

From the four studies reviewed here, it can be concluded that ability on facial affect identification tasks is positively correlated with more global measures of social functioning such as ward-based behaviour, self-care and quality of life. The association with more molecular social skills is less certain.

It was noted in Chapter One that Penn *et al* (1997) expressed the hope that studies of social cognition would account for greater variance in measures of social functioning than neurocognitive research had managed to achieve (typically no greater than 20%).

In Poole *et al*'s (2000) study, affect recognition was found to be significantly correlated with QLS subscales: however, these correlations actually account for less than 20% of variance in QLS scores. Mueser *et al*'s (1996) study, on the face of it, fares somewhat better: 40% of the variance of some Social Behaviour Schedule subscale scores is explained by affect recognition scores. However, it needs to be borne in mind that, while Poole *et al* (2000) measured general cognitive functioning and partialled out its influence, Mueser *et al* (1996) made no such measure. It may be the case that general cognitive functioning is a co-correlate of both affect recognition



ability and social functioning. Furthermore, and perhaps more seriously, the Social Behaviour Schedule subscales referred to in Mueser *et al*'s study (social mixing, inappropriate behaviour, altered activity level and personal appearance/hygiene) are not part of the original measure (Wykes & Sturt, 1986), have not been developed in any subsequent studies by the schedule's creators, and are not used in any other studies using this measure. It would therefore appear that Mueser *et al* (1996) have devised these subscales themselves. It is unfortunate, in light of this possibility, that they do not report correlations for overall SBS scores and affect recognition. For these reasons, their findings of high correlations ( $>0.6$ , Pearson's  $r$ ) between subscale scores and affect recognition should be treated with care.

At the current time, although tests of facial affect recognition have found an association with social functioning, they have not accounted for greater variance than studies of neurocognition.

### **Is the deficit a differential deficit, or part of a wider difficulty?**

Thus far, we have seen that the balance of research evidence suggests that there is a deficit in facial affect recognition in schizophrenia, that this deficit is more marked in people with schizophrenia than it is in people hospitalised with depression, and that problems with affect recognition seem to be linked to social functioning difficulties. An unanswered question, however, relates to the precise location of the deficit in the cognitive system. A heuristic model of levels of processing provides a useful framework for thinking about the origins of affect recognition problems. Moving from specific to general processes, etiological hypotheses are possible at each of the following levels:

- a) Facial affect processing: the problem lies specifically in the processing of facial expressions of emotion.
- b) Facial processing: people with schizophrenia have difficulties with all aspects of facial perception – for example, age, gender and identity recognition – and facial affect recognition is simply one aspect of this difficulty.
- c) Visuospatial processing: people with schizophrenia have general problems with visual perception.
- d) Social cognition: people with schizophrenia have problems processing social as opposed to non-social stimuli.
- e) General cognition: problems with facial affect are secondary to overarching cognitive problems such as limited attentional ability.

Therefore, it can be seen that the poor performance of people with schizophrenia on tests of facial affect recognition does not rule out the possibility that the deficit lies at a more general level of processing. For this reason, performance on facial emotion tasks needs to be compared to performance on control tasks. Precisely where the researcher believes the deficit or processing bias to lie will determine their choice of control task. If they believe that there is a differential deficit in facial affect recognition, then a control task might be selected that involves face processing in another channel: for example, Benton's Facial Recognition Test (Benton, Van Allen, Hamsher *et al*, 1978), or a test involving judgements of age. Likewise, if the researcher believes that facial affect recognition problems are due to the social nature of affective stimuli (e.g. Penn *et al*, 1997), then they might want to match a facial emotion task with a non-social perceptual task, and also with a third task that involves another form of social perception, besides affect recognition: this design would allow

the difficulty to be located in social perceptual tasks in general, while ruling out a *differential* deficit in facial affect recognition.

#### Studies finding a differential deficit in affect perception

Cutting (1981) compared a facial emotion task in which participants had to judge which of two faces seemed most friendly, with a control task involving colour typicality judgements (e.g. was muddy brown or bright red more typical of the colour red?) A second control task asked participants to state which of two faces was the older. Cutting found that the group of participants with schizophrenia performed more poorly than controls on the emotion recognition task, and equally as well as controls on the colour and age discrimination tasks. He took this as evidence for a specific and differential deficit in facial affect recognition.

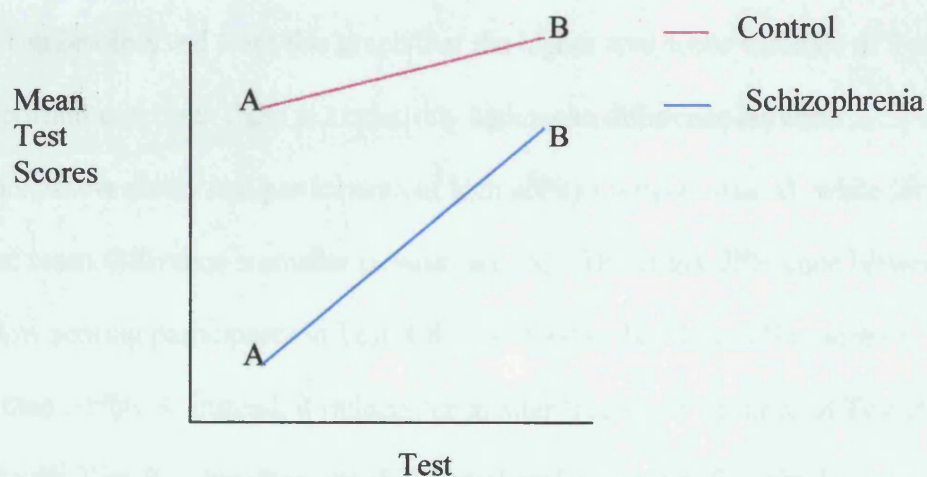
Other studies finding a differential deficit in affect recognition include those of Archer, Hay & Young (1994), who compared an emotion recognition task using dynamic stimuli (video clips of people posing facial expressions) with their own facial identity recognition task, and Borod *et al* (1993), who found that people with schizophrenia performed worse on an emotion identification task than on a visual matrices test and the Benton Facial Recognition Test (Benton *et al*, 1978). This latter test examines the ability to recognise facial identity. The test items involve matching the identity of a target face with up to three pictures in an array of six photographs of faces.

Unfortunately, the identification of differential deficits in schizophrenia is not simply a matter of presenting different tasks and seeing which task produces the worst scores

for the group with schizophrenia compared with the control group. A methodological problem has arisen that has proven problematic for research in this area for the past twenty-five years or so, and that has still not been satisfactorily resolved.

Chapman & Chapman (1973, 1978) provide the original and most succinct description of this problem. Imagine, for the purposes of illustration, that researchers want to establish whether or not people with schizophrenia have a differential deficit in an ability, *A*. They might decide to give two tests – Test *A* to measure Ability *A*, and a control task, Test *B* to measure Ability *B*. They administer these tests to a group of participants with schizophrenia and a control group. The researchers expect that scores of the participants with schizophrenia might be lower on both tests, but they expect them to be markedly lower on Test *A*, if there is a differential deficit for Ability *A*, as shown in Figure 2.1:

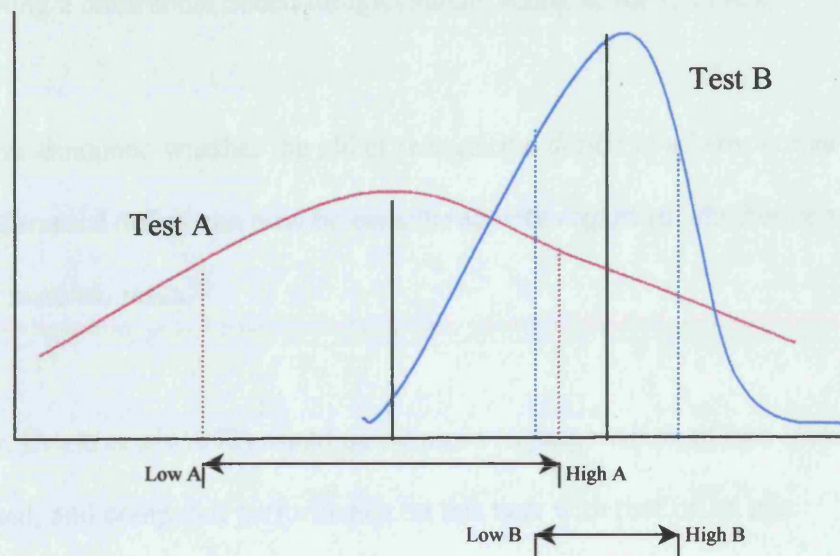
**Figure 2.1: Hypothetical performance on two tests of ability for schizophrenia and control groups**



Thus, there appears to be an interaction effect between group and test. However, such a finding would *not* allow the researchers to conclude that participants with schizophrenia have a differential deficit in Ability *A*. It may instead be the case that

Test *A*, has greater discriminatory power than Test *B*. If this were so, Test *A* would produce a greater variance in scores than Test *B*. This situation is shown in Figure 2.2:

**Figure 2.2: Distribution of true scores for two hypothetical tests of ability** (after Chapman & Chapman, 1978).



In Test *B* the variance is smaller because it uses easier items with less discriminatory power. It can be observed from this graph that the higher true score variance of Test *A* has an important outcome: there is a relatively high mean difference between participants of low ability and participants of high ability ( $M_{\text{HighA}} - M_{\text{LowA}}$ ), while for Test *B*, the mean difference is smaller ( $M_{\text{HighB}} - M_{\text{LowB}}$ ). The larger difference between high and low scoring participants in Test *A* does *not* mean that they differ more on Ability *A* than Ability *B*: instead, it reflects the greater true score variance of Test *A* compared with Test *B*. Therefore, the differential performance deficit obtained on pairs of tests that differ on true score variance does not indicate anything about a differential deficit in the abilities measured by the tests.

The problems inherent in comparing performance on pairs of tests should now be clear. The solution suggested by Chapman & Chapman is to match tests in terms of their true score variance, and in terms of their discriminatory power. Only in this way can we be sure that relatively poorer performance on one test represents a differential deficit in ability. Research studies that adhere to these psychometric requirements are said to be adopting a differential deficit design (Salem, Kring & Kerr, 1996).

Studies that have examined whether the affect recognition deficit in schizophrenia represents a differential deficit can now be considered with regard to whether or not they have used matched tasks.

Heimberg, Gur, Erwin *et al* (1992) asked participants to judge which of two faces was happy or sad, and compared performance on this task with that on an age judgement task (which of two faces is the older?) Participants with schizophrenia were more impaired on the emotion discrimination task. Interestingly, although the tasks were not matched, Heimberg *et al* argue that the relatively poorer performance of participants with schizophrenia cannot be ascribed to task difficulty. This is because the control group showed the opposite pattern of performance: for them, age discrimination was actually a harder task than emotion recognition. Hence there is a “crossover effect”, whereby the task that was harder for the controls was easier for the people with schizophrenia, and the task that was harder for the people with schizophrenia was easier for the controls. Where a crossover effect is obtained, the results cannot be explained purely in terms of differences in the psychometric properties of the tests, and must instead be due to differences of ability between the participant groups. Crossover effects provide researchers with a profile of results that



obviate the necessity for task matching. This is important, because for many research projects using non-standardised measures, matching tasks to the standard suggested by Chapman & Chapman is simply not practical.

The only study to use matched tasks and find a differential deficit in facial affect recognition is that of McGuire, Walker & Bettes (1984). They used an emotion identification task (involving labelling faces) and an emotion recognition task (comparing pairs of faces for expression) along with a facial identity discrimination task based on the Benton Test (Benton *et al*, 1978). The tasks were pretested in order to match discriminatory power. The group of participants with schizophrenia did worse on the emotion tasks, which suggests an affect recognition deficit distinct from the ability to process identity.

#### Studies finding a generalised deficit

Feinberg *et al* (1986) compared twenty inpatients who had a diagnosis of schizophrenia with twenty inpatients with a diagnosis of depression and the same number of nonclinical controls on Hobson's tasks (Hobson, Ouston & Lee, 1988). It may be recalled that these involve matching pairs of faces from the Ekman & Friesen (1975) series for identity when the emotional expression differs, and for emotion when the identity differs. An additional labelling task involved picking an appropriate affect label from a list of seven. Again, the comparison in this study is between facial affect processing and facial identity processing. Participants with schizophrenia did worse than the normal controls on all the tasks, and worse than the depression control group on the emotion tasks. Feinberg *et al* take these findings to show a generalised deficit in face processing. However, an alternative 'two factor'

explanation for their results is possible. Firstly, general clinical factors (such as limited attention or lowered motivation) affect the scores on all tasks (hence the group of participants with depression and the group of participants with schizophrenia perform worse than the nonclinical controls on all tasks). Secondly, a more specific affect recognition problem in the group of participants with schizophrenia is superimposed upon this general deficit (hence the group of participants with schizophrenia performs worse than the controls with depression on the emotion tasks). Indeed, Feinberg *et al*'s conclusion that there is a general facial processing deficit in schizophrenia is not only not warranted by their own results, but is further problematised by their use of unmatched tasks.

Other studies that have found a generalised deficit in facial processing have attempted to match the emotion and control tasks, but have done so with only limited success. Novic, Luchins & Perline (1984) used the Izard (1971) photos to test facial affect recognition (matching faces on the basis of emotion) along with items from the Benton Test of Facial Recognition (Benton *et al*, 1978). They attempted to match the tests for discriminatory power: thus, the mean percentage of control subjects correct on each identity recognition item was 77%, and affect recognition items were selected to mirror this, with a mean percentage of 79% correct. However, this process had the outcome of leaving intact just six items in each test. Furthermore, all the photos showing positive emotions were discarded during the matching procedure. On these few remaining items, 17 participants with chronic schizophrenia showed a worse group performance than controls on affect recognition, but this difference ceased to be significant once the results of the facial identity task were partialled out.



Gessler, Cutting, Frith & Weinman (1989) also attempted a differential deficit design, comparing happy/sad and old/young judgements of pairs of faces. Items were selected to be equally “difficult”, and people with acute schizophrenia were found to be equally impaired on the emotion and age discrimination tasks, suggesting a generalised deficit in face processing. However, it should be noted that item difficulty does not equate with discriminatory power (Kline, 2000), and it is doubtful that Gessler *et al* have matched their tasks in such a way as to remove the problem of true score variance.

Kerr & Neale (1993) have made the most concerted effort of any published study in this area to psychometrically match their affect recognition tasks (the FEIT and FEDT, previously described) to a control task – the Benton Facial Recognition Test (Benton *et al*, 1978). Kerr & Neale acknowledge in a footnote just how difficult this was. It was particularly hard for them to find a subset of the Ekman & Friesen (1975) and Izard (1971) faces that would yield adequate reliability and optimal mean item difficulty: for example, following Lord (1952) they aimed for a mean item difficulty of 0.64 (i.e. 64% of the standardisation sample correct) on the FEIT, but actually achieved a final level of 0.80. This was because it was hard to find faces that were difficult to judge, but which were still reliably associated with the intended emotion and, as a consequence, the internal consistency reliability of their emotion tasks suffered.

Despite this, Kerr & Neale managed to match an adequate number of items of approximately equal discriminatory power, and in their subsequent study found that participants with schizophrenia showed a general deficit on all the tests, rather than a

differential deficit on affect recognition. Unfortunately, having gone to such lengths to match their tasks, Kerr & Neale's presentation of their results does not allow direct comparison of the performance of the group with schizophrenia and the control group on the various tests, and so it is necessary to accept their conclusion in good faith.

#### An alternative to the differential deficit design

This review has found mixed and inconclusive results with regard to the existence of a differential deficit in facial affect recognition in schizophrenia. Studies have overwhelmingly used facial tasks (such as identity and age judgement) as control tests, thus ignoring potentially interesting comparisons with other levels of processing. While some studies have attempted to draw conclusions from unmatched tasks, others have made less than successful attempts at matching. The review has illustrated the degree to which research in this area has struggled with the issue of differential deficit design.

But why has this issue proven such a problem? A strong argument can be made that the differential deficit design, and the accompanying methodology of task matching, have been misapplied to social stimuli. When Chapman & Chapman (1973, 1978) made their original observations on discriminatory power, they had in mind test items that have objective 'right' and 'wrong' answers. Social judgements are not of the same order. They rely on consensus. Hence, a sad face is not objectively sad; rather, it is sad because people judge it so. This is important, because it means that it is not possible to make social stimuli more 'difficult' in the same way that one might set a more difficult maths problem or memory task. As Kerr & Neale (1993) found,

making emotional expressions more difficult is merely to make them more ambiguous, and this ambiguity results in lowered reliability.

So, how might it be possible to compare performance on tasks using social stimuli, if task matching on the basis of item difficulty merely sacrifices the construct validity of the stimuli? We have already discussed a potential methodological means of sidestepping the need for task matching, and that is the use of 'crossover' designs: experiments that predict a reversal in the task performance profile between two groups. However, crossover effects are likely to be difficult to predict.

A second approach is to match tasks in terms of the processes they examine. In other words, the task demands of the experimental and control tests could be designed to be as closely matched as possible, except for the process of interest. Any difference in scores between the two groups is likely to be due to the manipulated difference between the tests, and the psychological process or processes that this difference is designed to isolate. Such a form of experimental psychology, based upon thorough task analysis, would allow the use of non-standardised measures with less need for psychometric matching, and has the potential to explore precisely specified differential deficits.

#### Neuropsychological evidence for modular processing of facial information

It has been noted that most studies examining whether or not affect recognition represents a specific or general deficit have used other facial perception tasks as control tasks (such as identity or age discrimination tasks). However, there is converging evidence from clinical neuropsychological case studies that different

social signals from the face may be analysed separately, and that abilities such as facial identity recognition, age judgements and emotion perception might actually be modular.

Bruyer, Laterre, Seron *et al* (1983, cited in Ellis & Young, 1988) studied a stroke patient whose prosopagnosia had left emotion recognition ability intact. Kurucz & Feldmar (1979) noted the opposite pattern of impairment after chronic organic brain syndrome, with the ability to recognise identity intact, but the ability to judge emotion impaired. Similarly, in an interesting series of studies with brain-injured war veterans, Young, Newcombe, de Haan *et al* (1993) found a double dissociation in the ability to match faces on the basis of emotion and identity. Finally, evidence from neuro-scanning studies (e.g. the PET-scanning study of George, Ketter, Gill *et al*, 1993) suggests that different brain regions are involved in recognising emotion and identity.

Given the findings of these neuropsychological studies, it may be something of an oversimplification to infer that poorer facial identity or age discrimination performance in schizophrenia rules out a *specific* deficit in emotion perception. There may instead be different and overlapping modular deficits in operation.

### **Conclusions and ways forward**

This chapter has conducted a thorough review of the literature on facial affect perception in schizophrenia. It has shown that studies have adopted a great variety of experimental designs and stimulus materials. Four questions on the nature of facial

affect recognition in schizophrenia were used to structure discussion of the considerable body of research in this area.

The first question related to whether or not there is an affect recognition deficit in schizophrenia. The balance of findings was in is in favour of such a deficit. A careful comparison of response formats suggested that lowered performance might be due to either a poor understanding of emotions, or to impaired perception.

The second question examined whether other clinical groups also had difficulty with facial affect recognition. This was seen to be the case. However, studies of schizophrenia using clinical controls suggest that people with schizophrenia may have a more marked deficit than other groups. The putative role of general intellectual functioning in affect recognition was also highlighted: studies of learning disabled clients suggest a correlation between affect recognition measures and IQ, and there is preliminary evidence of a similar association in schizophrenia (Corwin, 1996; Poole *et al*, 2000).

The link between affect recognition and social functioning was the subject of the third question. The four published studies to address this question provide a tentative indication of an association with more global indices of functioning, but intervening variables such as general intellectual functioning remain a problem for these studies. It was noted that the examination of affect recognition had not accounted for greater variance in social functioning than previous studies of neurocognitive processes.

The final question looked at the basis and specificity of the affect recognition deficit. It was noted that an affect perception impairment could reflect a more general cognitive deficit – for example, a problem with all aspects of face perception, or a difficulty in parallel feature extraction. One means of examining this possibility is the inclusion of a control task that makes similar demands to the affect judgement task, but does not involve affect judgement. Studies using such control tasks have produced mixed results – some imply a selective impairment in affect perception, but others do not. This confusion has in part arisen from psychometric issues concerning the matching of non-standardised tasks. It was suggested that matching the demand characteristics of experimental and control tasks as closely as possible might allow greater confidence in ascribing differential performance to differences in ability.

An alternative means of examining the specificity of the affect recognition deficit in schizophrenia is to compare the *understanding* of emotion with the *perception* of emotion. Therefore, while previous comparisons have focused on facial affect recognition versus other facial recognition processes, it might be more revealing to compare facial affect recognition with the semantic categorization of emotions. This would allow a more direct exploration of whether or not a differential deficit in facial affect recognition is apparent in schizophrenia, or whether the problem lies at the more general level of the understanding of emotions. In order to look at these issues, an experimental task would be required that taps the understanding and perception of emotion in parallel.

Comparing the semantic/linguistic understanding of emotion with the facial perception of emotion in schizophrenia is not merely a matter of theoretical interest.

Better understanding of the cognitive mechanisms underlying affect recognition difficulties in the disorder would allow the development of more precisely targeted rehabilitation strategies.

The following chapter will review the research literature on social knowledge in schizophrenia, and will then describe the development of a measure of the understanding of emotion.

## **Chapter Three: The Understanding of Emotion**

### **Social knowledge in schizophrenia**

The previous chapter reviewed research on affect perception in schizophrenia. It was repeatedly noted that emotion recognition tasks rely on semantic categorisation as well as facial perception. Therefore, the difficulty people with schizophrenia have in emotion recognition may reflect a problem in understanding emotion categories rather than a deficit in perceiving emotional expressions *per se*.

In this section, this possibility will be further explored by reviewing research on how people with schizophrenia represent social information. As with all research on schizophrenia, a great deal depends on the way in which tasks accommodate the confounding influences of amotivation and inattention, to ensure that they are measuring social understanding rather than reflecting general cognitive impairment.

Social competence may in part be a function of a person's knowledge of the rules concerning what is appropriate behaviour in a given situation, and what is not. This perspective has been embodied in social psychological work on scripts and schemas. Schank & Abelson (1977) looked at the organisation of knowledge into scripts. They showed that people could generally identify the steps involved in common social situations (e.g. the script for dining in a restaurant, or visiting the doctor). Script theory has been little utilised in clinical psychological research, but it follows that if people with schizophrenia have social functioning difficulties, then this may be related to deficiencies in their representation of social knowledge in scripts.



Chan, Chiu, Lam *et al* (1999) directly examined this possibility by looking at the structure, sequencing and detail of the scripts of people with a diagnosis of schizophrenia for dining in a restaurant. In a ten-minute free recall task, participants were asked to generate a detailed list, in order, of the things that happen when going to a restaurant. They were also asked to judge how frequently certain given events might be expected to occur in a restaurant (e.g. *look at menu* – always; *yell at waiter* – occasionally; *type a letter* – rarely). Finally, they were presented with eight typical events, and asked to put them in order of occurrence.

The participants with schizophrenia generated fewer events than controls in free recall, and those events they did name were of higher typicality (according to the previous research of Bower, Black & Turner, 1979). In the frequency task, participants with schizophrenia showed greatest relative decline in the ability to recognise events that happen occasionally. Both these findings suggest that while highly typical, ‘core’ aspects of a script are maintained, the more detailed knowledge may be lost. It may be recalled from the previous chapter that facial affect recognition studies similarly showed that the core of affective schemas – for example, happy versus sad judgements – may be intact, while more fine-grained distinctions are impaired. Chan *et al* conclude that there may be a “bottom up” breakdown in the hierarchical organisation of the semantic representation of events in schizophrenia.

Criticisms of Chan *et al*’s study are that the results may simply reflect differential experience (people with schizophrenia are, perhaps, less likely to dine regularly in restaurants). Also, the free recall task was of ten minutes’ duration, and this would have severely tested the ability of participants with schizophrenia to maintain

attention, monitor and plan a response. This task would clearly be confounded by other cognitive factors. Nonetheless, despite these caveats, Chan *et al*'s remains a valuable and innovative study into schema structure in psychosis.

Patrick Corrigan and colleagues have looked at social understanding in schizophrenia from the perspective of social cue extraction (Corrigan, 1994; Corrigan & Addis, 1995; Corrigan, Green & Toomey, 1994). They have devised a measure called the Social Cue Recognition Test (SCRT; Corrigan, Davies-Farmer & Stolley, 1991) which involves showing eight videotaped vignettes of social situations. After each vignette, participants have to answer 36 true/false questions about what the actors said and did (which Corrigan terms 'concrete cues') and the rules, affects and goals guiding their behaviour (which Corrigan terms 'abstract cues', because they have to be inferred from the concrete cues). Corrigan and colleagues have repeatedly found that people with schizophrenia are significantly less sensitive to abstract cues than to concrete cues (Corrigan, Buican & Toomey, 1996; Corrigan & Green, 1993), even though the two types of cue were matched for difficulty and reliability during SCRT standardisation (Corrigan & Green, 1993). Furthermore, Corrigan suggests that this deficit for abstract social cues is not merely a reflection of general intelligence, because scores on cue extraction are not correlated with scores on a measure of verbal intelligence – the Vocabulary subtest of the WAIS-R (Corrigan, 1994).

Corrigan's work suggests that people with schizophrenia have a specific difficulty with social understanding. However, there are some methodological problems with the SCRT. Firstly, Corrigan states that concrete and abstract cues are equally difficult to recognise. But the performance of controls reveals ceiling effects for both types of

cue. For this reason, it cannot be assumed that the two classes of cue are of equal difficulty. Secondly, after each vignette, participants are asked 36 questions: there is clearly a burden on memory during this task that is likely to confound the results.

Another means of examining the social knowledge of people with schizophrenia is to focus on the “common sense” information that people possess regarding social situations. Cutting & Murphy (1990) developed the Social Knowledge Questionnaire (SKQ), which consists of eighteen multiple-choice questions. Four of these are ‘non-social’ questions from the Cognitive Estimates Test of Shallice & Evans (1978) (e.g. ‘What is the age of the oldest person in Britain today?’) Six are designed to tap ‘everyday’ knowledge of the state of the world (e.g. ‘What do you think would be the main consequence if suddenly there were no police?’) Finally, eight of the questions assess likely behaviours in social situations (e.g. ‘How would you tell a friend politely that they had stayed too long?’) A group of twenty participants with schizophrenia performed significantly worse than a clinical control group of twenty “manics” on a subset of nine questions thought to have the greatest social content. This is taken to show a specific deficit in social knowledge among the participants with schizophrenia.

A further constellation of studies on the matter of social knowledge in schizophrenia has formed around the concept of ‘Theory of Mind’ – the ability to reflect on and infer the mental state of other people (Premack & Woodruff, 1978). Although it is beyond the scope of this thesis to describe these studies, we can note that some of them have dealt with the ability of people with schizophrenia to comprehend and use nonliteral language. People with schizophrenia have been shown to have greater

difficulty than normal controls with the understanding of hints (Corcoran, Mercer & Frith, 1995), in their ability to select tactful and polite responses in a series of hypothetical scenarios (Corcoran & Frith, 1996), in their understanding of metaphors (Anand, Wales, Jackson & Copolov, 1994), and in their understanding of irony (Mitchley, Barber, Gray *et al*, 1998). Such studies show the difficulty people with schizophrenia have in going beyond literal meanings to infer the intended meaning of a statement.

To summarize, this section has examined research on how people with schizophrenia represent social knowledge. There is converging evidence from a number of studies that social knowledge is impaired in the disorder. Social scripts seem less complex and differentiated. “Common sense” social information is reduced, and the ability to infer the pragmatic aspects of speech is also inferior to controls. The ability to gauge more abstract social cues (including affective reactions) appears to be compromised. However, methodological problems in a number of these studies means that it is not clear how far this research reflects shortcomings in social understanding, or simply general cognitive impairment. Furthermore, the link between social knowledge and social functioning has not been systematically explored, and so the behavioural manifestations of problems in representing social information remain a mystery.

Given that we are concerned with the understanding of emotion, what might these studies indicate? If social knowledge is arranged in the form of scripts – consensual knowledge concerning how people generally behave in given situations – then knowledge about the social situations in which specific emotions are appropriate may also be organised in scripts. If this were so, it would be possible to examine the

understanding of these emotion scripts in people with schizophrenia. This possibility will now be explored.

### **Emotion scripts and the antecedents of emotion**

Emotions are complex phenomena that are amenable to exploration at a number of different levels. For example, according to Lang's 'three systems' model (Lang, 1985, 1988; cited in Oatley & Jenkins, 1996) there are physiological, behavioural and verbal aspects of emotion. This thesis is concerned with the cognitive processes that mediate between external environmental events and emotional responses. In theoretical writings on emotion, two types of construct have been proposed as both playing a part in this linkage: attributions and appraisals (Oatley & Jenkins, 1996).

Attributions are knowledge 'about' emotions that allow us to discuss emotions without necessarily feeling them, and to know the likely emotional outcomes of various combinations of events. They do not in themselves result in emotion, and for this reason they are sometimes known as 'cold cognitions'. Appraisals, on the other hand, are an evaluation of the personal meaning of events and their impact on personal goals. Appraisals are necessary for emotions to occur, and for this reason they are sometimes termed 'hot cognitions'.<sup>1</sup> Attribution can be thought of as a distal variable that requires appraisal (a proximal variable) in order for emotion to be generated (Lazarus & Smith, 1988). Given our focus upon the understanding of

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<sup>1</sup> In fact, the literature on emotion is capricious in its use of terminology. "Appraisal" is variously used to mean either attributions, appraisals, or as an umbrella term for both. The distinction made here between attribution and appraisal follows Leon & Hernandez (1998), and is adopted for the sake of clarity.

emotion concepts in the form of scripts, it is attributions rather than appraisals that concern us here.

How might such attributions or 'emotion knowledge' be represented in memory?

Plutchik (1980) believed that there are a number of 'primary' emotions related to basic types of adaptive behaviour (e.g. approach/avoid) that are, in turn, responses to evaluations of the environment (e.g. pleasure/threat evaluations). Hence, emotions at this level are adaptive mechanisms that guide behaviour according to species-wide patterns. If Plutchik is correct, we might expect a "common knowledge" of emotions to be superimposed upon these universal exigencies. Scherer, Wallbott & Summerfield (1986) examined the situational determinants of emotion in a large, cross-national study. They found considerable *within*-nation agreement concerning which situations lead to particular emotions. For example, anger was considered to be elicited by interpersonal problems, damage to social property, and unnecessary inconvenience. Hence, although Scherer *et al* (1986) note the commonalities of emotion understanding, they highlight the contribution of culture (and language) to the demarcation of emotion categories.

Emotion scripts represent a more recent theoretical extension of work on commonly held attributions for emotion. Fitness & Fletcher (1993) examined participants' personal experiences of different emotions in terms of the elicitors, cognitions and reported physiological reactions. Participants were also asked to generate an account of a *typical* episode of each emotion, such as might happen to anyone. They found a high correlation between each individual's recalled personal experience and their accounts of typical episodes. Fitness & Fletcher concluded that emotion knowledge

is prototypical in structure, and script-like in nature. Fitness (1996) counters Plutchik's (1980) evolutionary perspective, believing that common knowledge of emotions comprises socially constructed narratives providing detailed information about needs, goals, intentions and behaviours.

A particular aspect of emotion scripts is the setting events in which specific emotions are predicted to occur. These setting events are also known as emotion elicitors or antecedents. Scherer *et al* (1986) (as noted above) found that members of the same culture tend to agree about the typical antecedents for emotions. Indeed, some researchers have attempted to specify which antecedents go with which emotions, in a kind of 'emotion calculus'. For example, Ekman & Friesen (1976) describe the elicitors for anger as follows:

- i) frustration resulting from interference with one's activity;
- ii) a physical threat;
- iii) an insult;
- iv) seeing someone do something that violates one's values;
- v) another person's anger directed at oneself.

Lazarus (1991, 1994) states that events map variously onto a universal set of 'core relational themes', which then map invariantly onto specific emotions. For Lazarus (1994) the core relational theme underlying anger is '[...] a demeaning offence against me and mine.' (p. 194). Wierzbicka (1992) has also attempted to specify emotion scripts (which she prefers to call "scenarios") in terms of a set of semantic primitives. Unfortunately, these suggestions are not substantiated by empirical research and, as such, have the status of theoretical proposals. However, they

represent a valid attempt to specify the attributions that may mediate environmental events and emotions.

Boucher & Brandt (1981) undertook an innovative cross-cultural study of the universality of antecedent events. They asked fifty Malaysian and fifty American young adult participants to write down a situation in which one person caused another to feel one of six emotions. A separate participant group of thirty American students then judged these elicitors. Overall, 66% of the American elicitors and 69% of the Malaysian elicitors were paired with the intended emotion. Boucher & Brandt saw this result as demonstrating the universality of emotion elicitors.

The existence of commonly identified antecedents in emotion scripts is further attested to by the developmental study of Stein & Levine (1999). Children between 2.5 and 6.0 years were asked to recall events that evoked happiness, sadness, fear and anger. Stein & Levine found that a set of recurring 'event themes' emerged in their accounts. Even at this early stage of development, emotions appear to be related to classes of events in a systematic way.

It would seem, therefore, that knowledge about emotions shows commonalities between people. Although their appraisals, and therefore their actual experience of emotion, will depend upon individual goals and drive states, their attributions (or 'cold cognitions') with regard to eliciting events appear remarkably similar. Whether this is down to evolutionary adaptation (Plutchik, 1980) and is therefore culturally universal (Boucher & Brandt, 1981; Lazarus, 1994) or whether it is culturally



constructed (Fitness, 1996) and therefore culturally relative (Russell, 1991) remains a moot point.

With regard to the current study, however, two points of interest emerge. Firstly, the predictability of emotion scripts and emotion antecedents offers a means of exploring the emotional understanding of clinical populations. Are their emotion scripts the same or different? We have already seen that people with schizophrenia have difficulty with some aspects of social knowledge, and it might be the case that this extends to knowledge of emotions. One could speculate that such difficulties of emotion attribution would cause particular problems in interpreting the behaviour of other people. It might also be linked to specific symptoms and behaviours such as alexythymia and inappropriate displays of emotion.

Secondly, it was noted at the end of Chapter Two that disambiguating the contributions of semantic understanding and facial perception to affect recognition would require a methodology that allowed both to be tested in parallel. Emotion elicitors offer the means towards such an end. If a set of elicitors could be developed that are reliably associated with specific emotions, then an experimental task could be developed in which participants are required to pair each elicitor with its appropriate emotion label (thus testing semantic categorisation) and also with the appropriate facial expression (thus testing the facial perception of emotion). To make an analogy, emotion elicitors offer a means of triangulation to compare the understanding and perception of emotion in schizophrenia.

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### **Developing a measure of the understanding of emotion**

This section will describe the development and validation of a set of short descriptions of antecedent situations that are reliably identified as leading to specific emotions. These elicitors will subsequently be used to look at the understanding of emotion in schizophrenia. The aim is to discover whether affective situations are harder for people with schizophrenia to understand.

The descriptions, or vignettes, were developed by the author with reference to the work of Linda Camras and colleagues on emotion elicitation in children (Camras & Allison, 1989; Ribordy, Camras, Stefani & Spacarelli, 1988).

Camras & Allison (1989) required 43 eight-year-olds and 10 adult students to describe situations in which each of six emotions would be felt. The six emotions are those identified by Ekman & Friesen (1976) as ‘basic’ emotions: happy, sad, fear, anger, disgust and surprise. Camras & Allison found that the children could accurately identify the emotion in stories produced by other participants. Camras & Allison also classified the stories according to 24 “thematic categories” which describe the event themes underlying the story. There was significant agreement between raters on the classification of stories according to this framework. For example, the following is one of their thematic categories:

“Protagonist experiences desirable event, activity, person or object; includes actual or anticipated contact.”

This thematic category was considered to best describe 46 out of the 53 stories produced to illustrate the emotion of ‘happiness’; it also best reflected 16 out of 53 ‘surprise’ stories. No stories for the remaining four emotions were classified in this category.

The thematic categories produced by Camras & Allison (1989) were used as templates in the current study to generate vignettes. This was done in order to produce a set of descriptions that covered the thematic range of eliciting situations for each emotion. For example, in Camras & Allison's study, participants produced 52 descriptions in which the emotion of 'sadness' would be felt. These descriptions were then classified across the thematic categories. Those thematic categories in which 'sadness' stories predominated above those for all the other emotions were as follows:

- i) 'Protagonist separated from desired object or person by virtue of death/departure or loss; no culpable agent indicated' (25 out of the 52 'sad' stories were categorised as reflecting this theme. For all the other emotion stories, only two 'fear' descriptions were also categorised here. Hence, it is a strong 'sadness' theme, and was used to generate vignettes in the current study that might be expected to be identified as producing sadness).
- ii) 'Protagonist does not receive desired object, response, experience' (7/52 sad stories).
- iii) 'A relative is injured or distressed' (4/52).
- iv) 'Protagonist demonstrates inefficiency (falls, makes error, cannot perform) (4/52).

The remaining twelve 'sad' stories not accounted for in the above categories are spread across other thematic categories in which other emotions predominate.

The use of Camras & Allison's thematic categories for vignette generation was, in some instances, supplemented by adapting actual vignettes reported in Ribordy *et al* (1988). Once again, these vignettes were developed in work with children, and validated by 45 five and six-year-olds as reliably reflecting the intended emotion. For example, the vignette: "At Christmas, Johnny got a new toy house that he had wanted" was identified by 86% of five and six-year-olds as leading to happiness (from a choice of three emotion words on each trial). In the current study, this vignette was adapted to: "At Christmas, Jane got a present she had wanted for a long time" and the choice of how she might feel was made from all six emotion labels, plus the label 'neutral' if participants believed she would not feel anything.

As a further refinement, an attempt was made in the current study to include situations that had a 'social' content (i.e. they directly involved other people) along with situations that were non-social in content. Additional principles, which were adopted in vignette development, were that they should be as short as possible in order to reduce the burden on attention. The language used was also made as clear and simple as possible, and the situations described were intended to be comprehensible for people who may have been socially isolated or disadvantaged. Furthermore, it was important that the vignettes should not allude to the affects themselves, their synonyms, or associated mental orientations (e.g. 'liking', 'fun' or 'love' for happiness vignettes). The aim was that emotion labels should be elicited purely from *event* descriptions, without intervening descriptions of the mental state of the protagonist.

In line with these principles, 39 vignettes were developed for validation, designed to reliably elicit the six Ekman & Friesen (1976) 'basic' emotions of happy, sad, fear, anger, disgust and surprise. These emotions were chosen for the current study because they have corresponding facial expressions in the Ekman & Friesen photoset (1975). The aim of this preliminary study, it may be recalled, was to produce vignettes that could be reliably paired with facial expressions as well as with the emotion words.

A questionnaire was developed in order to validate these vignettes with a nonclinical sample. The vignettes were randomly ordered within the questionnaire. There were two versions of the questionnaire, which reversed the sex of the protagonist in each vignette across the two versions. Hence, vignettes with 'Jane' as the protagonist in Version A, became vignettes with David as the protagonist in Version B. Likewise, 'John' scenarios became 'Linda' scenarios in Version B. No significant differences were found in the emotion selected for each vignette on the basis of the sex of the protagonist. Version A of the questionnaire is presented in Appendix One.

The questionnaire was administered to a convenience sample of 118 adult participants drawn from Leicester University and local health service staff and students.

Descriptive statistics were not collected for this sample, because the aim was to derive a subset of items with maximum construct and face validity for use in the main study, rather than examining issues such as test reliability and discrimination. Sixty participants completed Version A, and fifty-eight completed Version B. As can be gleaned from Appendix One, the questionnaire had a forced choice response format.

The task simply involved indicating how the participant believed the *protagonist* would be feeling in each situation, from the six basic emotions plus ‘neutral’.

Appendix Two presents the results for each vignette, grouped according to the emotion label they were designed to elicit, and showing the percentage response obtained for each emotion label.

The four vignettes that most reliably elicited each of the six emotion labels were selected for use in the main study. These are given in Table 3.1, along with the percentage of the validation sample (N=118) that correctly identified the intended emotion.

**Table 3.1: The four most reliably identified vignettes for each of six emotions**

<b>Happy</b>	<b>Percent Correct</b>
1) John is at a party with all his favourite people.	100
2) John is thinking about his holiday next month, and looking forward to relaxing in the sun.	98
3) Jane has made up with her friend after a bad argument.	95
4) John had worked hard, and was praised for the good job he had done.	92
<b>Sad</b>	
1) Jane has discovered that her best friend must move far away.	98
2) John has a pet dog. John has found out that the dog is sick and is going to die.	97
3) John's favourite jumper has worn out, and he has to throw it away.	89
4) At Christmas, Jane didn't get any of the presents she had hoped for.	84
<b>Surprise</b>	
1) When Jane opened the biscuit tin, a jack-in-the-box sprang out.	91
2) Jane opens the newspaper and sees a picture of herself.	90
3) While walking round a corner, John bumps into someone he hasn't seen in many years.	87
4) John is out walking on his own, when suddenly a voice behind him shouts "Hello!"	80
<b>Disgust</b>	
1) Jane bit into an apple, and found a dead worm inside.	94
2) John has just tasted something bad.	88
3) Someone was sick on John during lunch.	88
4) Jane's friend took off his shoes, and his feet smelled.	75

## **Fear**

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1) Jane was out walking when a fierce-looking dog started to run towards her.	99
2) Jane can smell smoke, and thinks the house is on fire.	98
3) Jane had a bad nightmare, and woke up sweating.	96
4) John was riding in a friend's car. His friend was driving very fast on an icy road.	93

## **Anger**

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1) Someone else had made a mistake, but Jane got blamed.	95
2) Jane was trying to say something important, but she kept on being interrupted.	93
3) Someone had torn up John's favourite magazine.	89
4) Jane asked a shop assistant for help, but the shop assistant ignored her.	74

As can be seen from Table 3.1, the top four vignettes in each emotion category allowed participants to identify the emotion label correctly at a far higher rate than chance alone would predict (14%). Indeed, only two vignettes out of 24 achieved recognition rates lower than 80%. This shows a commonality in judgements of emotion elicitors. It should be remembered that the vignettes are not providing *definitions* of emotion categories: they do not specify necessary or sufficient features of the emotions concerned. Rather, they describe events that seem to reflect emotion scripts that are commonly held.

In line with other studies (e.g. Boucher & Brandt, 1981) the vignettes for happiness and fear were the most readily identified, and this would suggest highly prototypical event themes for these emotions. However, even for the emotion of disgust – which had the least reliably recognized vignettes – the top four scenarios still produced a mean recognition rate of 86.25%. Put another way, 6 out of 7 adults correctly labelled the vignettes for disgust, when one would expect the rate to be 1 in 7, on the basis of chance alone.

It is possible to use these elicitors as an empirical measure of the understanding of emotion scripts. Of course, it has previously been noted that social judgements such as these are not objectively 'right' or 'wrong': however, the great majority of previous studies in the field of social cognition in schizophrenia have adopted the expedient position of treating consensual social judgements as representing correct answers for psychometric purposes. Given the high level of consensus for the vignettes, it is reasonable to treat responses that name the intended emotion as 'correct' answers.

During the course of piloting the vignettes for the main research study, minor changes to the wording of five of the vignettes were made in order to further enhance the clarity of the vocabulary and syntax. For example, 'Jane has discovered that her best friend must move far away' becomes 'Jane has *found out* that her best friend must move far away'. The final version of the vignettes is given in the recording sheet in Appendix Three.

## **Conclusions**

This chapter has paved the way for an examination of the understanding of emotion in schizophrenia. Given that there are currently no published clinical studies of the understanding of emotion scripts in schizophrenia, the chapter has reviewed research on social knowledge in schizophrenia, and studies of emotion scripts in the general population.

Research into social knowledge in schizophrenia is in the vanguard of the integration of ideas from social and clinical psychology (see Kowalski & Leary, 1999). Studies in this area have conceived of social knowledge in different ways: for example, script



knowledge, 'common sense' knowledge, social cue extraction and Theory of Mind ability. Despite this, the studies reviewed in this chapter have all found people with schizophrenia to have deficits in social knowledge. Due to their methodology, however, it was unclear the extent to which these difficulties reflected problems of general cognitive functioning, rather than specific difficulties in representing social information.

Studies of the antecedents of emotion in the general population have shown that there are commonalities in the way that people interpret environmental events in terms of the emotions they evoke. Research on emotion scripts even suggests that our memory of personal emotional episodes is congruent with our scripts for typical emotional episodes. Some theorists suggest that these common event-emotion linkages are universal, hard-wired adaptations; others suggest they are culturally constructed. Either way, emotion scripts and elicitors provide a means of exploring the understanding of emotions.

The previous section detailed the development of a set of short descriptions of antecedent events. There was high consensus in terms of the emotions these events were believed to elicit. This set of vignettes provides an empirical means of examining emotion script knowledge among clinical populations. More specifically, these elicitors offer a method for comparing emotion knowledge and emotion perception in schizophrenia.

## **Chapter Four: Research Questions and Hypotheses**

This research study is a quasi-experimental examination of the ability of people with schizophrenia to interpret the emotional states of others. In Chapter One, it was noted that some researchers believe schizophrenia is essentially a disorder of social cognition (Corrigan & Penn, 2001b). Affect recognition is an important socio-cognitive skill, and the study will look to test several hypotheses concerning this ability, which in turn relate to the debate on social cognition in schizophrenia.

The previous chapter described the development of a set of vignettes which are reliably associated with the six basic emotions postulated by Ekman & Friesen (1976), and which also correspond with photographs of facial affect in the Ekman & Friesen (1975) photoset. These vignettes, along with the photos, offer an empirical means of examining the understanding of emotion in parallel with the perception of emotion. In order to do this, performance on two experimental tasks is compared. In the first task, participants are asked to match the vignettes with the appropriate emotion label (word task), while in the second task they are required to pair the vignettes with the appropriate facial expression (face task). This methodology represents an advance on previous studies, where emotion labels were simply paired with faces, without examining the underlying understanding of emotion categories. Thus it was impossible to tell whether lowered performance on such tasks was due to a perceptual deficit or a semantic deficit.

## **Research questions**

The design of this study allows the exploration of several research questions, which will now be described.

### **1) Is there an affect recognition deficit in schizophrenia?**

A global deficit in affect recognition would be demonstrated by poorer performance across the affect recognition tasks as a whole. In Chapter Two, it was noted that the great majority of studies on affect recognition in schizophrenia found such a deficit. In line with this literature, it is hypothesised that such a deficit will be found in the current study.

### **2) Is there a differential deficit in facial affect recognition?**

If there is an affect recognition deficit in schizophrenia, then where in the cognitive system does the difficulty lie? In Chapter Two, the literature on differential deficit in facial affect recognition was reviewed. Some studies maintain that there is a differential deficit in the ability of people with schizophrenia to perceive emotional facial expressions relative to other tasks of facial perception. However, other studies have found that an affect recognition deficit is merely one aspect of a broader pattern of deficits in perceiving the face.

The current study examines the issue of differential deficit from a different angle.

The comparison made is not between two facial processing tasks, but between two emotion processing tasks: the identification of emotion labels and emotional

expressions. Different patterns of performance on these tasks would provide information on the specificity of the cognitive deficit in affect recognition:

- i) As script understanding is required to process the vignettes, and the vignettes are used in both conditions, then equally poor performance on *both* the word labelling and facial expression tasks would indicate a primary problem with the *understanding* of emotion in schizophrenia.
- ii) If performance on the word labelling task was relatively intact, while that on the facial expression task was relatively impaired, this would indicate the existence of a differential deficit in facial affect recognition. In other words, there would be a primary problem in the *perception* of emotion in schizophrenia.

Previous studies on affect recognition have not investigated the understanding of emotion concepts. However, related studies on social knowledge in schizophrenia (discussed in Chapter Three) have found deficits in social understanding. As such, it can be hypothesised that the affect recognition deficit in schizophrenia is related to the understanding of emotion concepts rather than the perception of facial expressions of emotion.

### **3) Is affect recognition linked with social functioning in schizophrenia?**

In Chapter One we saw that researchers exploring social cognition in schizophrenia are attempting to link indices of social functioning to socio-cognitive processes such as affect recognition (Penn *et al*, 1997). Such an association would demonstrate that these processes have validity as a means of understanding the social difficulties

experienced by people with schizophrenia – greater validity, perhaps, than more traditional information processing models.

Chapter Two describes four affect recognition studies that have explored the link with social functioning. These studies compared more global aspects of social functioning with affect recognition, and found some evidence of a link between the two. Even so, the associations that were found were either modest (Poole *et al*, 2000) or psychometrically flawed (Mueser *et al*, 1996).

The design of the current study incorporates a measure of social functioning – the Social Behaviour Schedule (Wykes & Sturt, 1986) – as a means of further exploring this issue. This allows affect recognition and social script understanding (scores from the ‘word’ condition) to be compared with social functioning. Given its centrality in social cognition (Fiske & Taylor, 1991), it can be hypothesised that script understanding will be associated with social functioning in schizophrenia.

#### **4) Do affect recognition problems in schizophrenia merely reflect lowered general intelligence?**

People with schizophrenia often score poorly on IQ tests, showing a decline from premorbid levels. The measurement of IQ in schizophrenia research is therefore desirable in order to show that any specific deficit on cognitive tasks is not merely due to lowered *general* intelligence. However, accounting for the influence of lowered IQ is problematic for two main reasons. Firstly, measuring IQ is a time-consuming process. Secondly, it can be difficult to compare the performance of

participants with schizophrenia and control groups in order to partial out the effect of differences in IQ. These difficulties will be considered in turn.

### Measuring IQ

The gold standard of intelligence scales is the Wechsler Adult Intelligence Scale, now in its third edition (WAIS III; Wechsler, 1997). However, given the difficulties of prolonged attention which are characteristic of many people with schizophrenia, this test usually takes more than one session to administer, and can therefore be impractical for research purposes.

Many studies of ability in schizophrenia have used the Nelson Adult Reading Test (NART; Nelson, 1982) as a quick-and-easy estimate of IQ. However, the NART is thought to estimate premorbid IQ. This leaves intact the possibility that the poor performance of people with schizophrenia may be due to lower *current* IQ.

Furthermore, recent research suggests that the NART may not provide an accurate IQ estimate – current or premorbid – where IQ deviates to any extent from the general population mean (Russell, Munro, Jones *et al*, 2000). Given that it is preferable to match participants on current IQ, and the need for an easy-to-administer test, some studies have used the Quick Test (Ammons & Ammons, 1962), which involves matching fifty words to the most appropriate of four pictures. However, the pictures used in this test are now somewhat dated. Other studies have used a selection of WAIS subtests, from which the derivation of IQ scores can be somewhat uncertain.

Fortunately, the recent publication of the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999) offers a rapid estimate of current IQ that uses both verbal

and nonverbal tests. This allows general cognitive ability to be taken into account in analyses. The WASI is used in the current study, and will be described in the following chapter.

### Comparing groups

Determining the influence of lowered IQ on test performance in schizophrenia is a difficult matter. The ideal experimental design would be to match participants with schizophrenia and control group participants on IQ. This would allow any remaining differences in group performance to be ascribed to other sequelae of schizophrenia, apart from general intellectual decline. In practice, however, matching can be very hard to achieve because it entails finding control participants who fall within the same IQ range as the participants with schizophrenia. Indeed, very few research studies adopt a matched design.

One possible solution is to use analysis of covariance to partial out the effects of differences in IQ on task performance. However, this procedure can be unreliable if the absolute IQ levels of the groups differ greatly. Instead, the current study uses regression analysis to assess the proportion of variance in emotion task scores that is accounted for by IQ scores. Should group differences remain after IQ is removed from the regression equation, then such differences must emanate from other sources besides general cognition.

The current study has also adopted a second means of accounting for the influence of general cognition on affect recognition scores. Rather than attempting to match participant groups on IQ *before* testing, it is perhaps more feasible to conduct post-

*hoc* pair-matching of a subset of participants, and then see if significant differences in affect recognition scores remain between these two sub-groups. In attempting this method, control groups have been selected in order to increase the likelihood of finding matches. Details of these control groups are given in the following chapter.

As noted in Chapter Two, there is some evidence from previous studies for the involvement of general cognition in emotion recognition in schizophrenia. Both Poole *et al* (2000) and Corwin (1996) used short forms of the WAIS-R and found similar correlations with affect recognition scores (for Poole *et al*'s study,  $r = .44$ ,  $p = .002$ ; for Corwin,  $r = .42$ ,  $p = .003$ ). It may be recalled that an association between affect recognition and general intelligence was also reported in studies of people with learning disabilities.

Given that all psychological tests involve processes such as attention, motivation and the central executive coordination of cognitive skills (the so-called “g-factor”), it is usually the case that a participant’s performance on different tests will correlate to some degree. Therefore, in the current study the hypothesis is made that an association between IQ and affect recognition scores will be found, but that significant group differences in emotion recognition performance will remain after IQ scores are accounted for, confirming specific problems of social cognition in schizophrenia.

### **Research summary**

The study expects to find an overall deficit in affect recognition ability in schizophrenia. This will be due to a deficit in the semantic categorisation of



emotions. Deficits in affect recognition will be linked with social functioning problems. General cognitive functioning will not account for affect recognition ability. Hence, there is a specific and differential deficit in the understanding of emotion in schizophrenia that is linked with social difficulties in the disorder.

### **Hypotheses**

#### **Hypothesis One:**

Participants with schizophrenia will score significantly lower than controls on a test of affect recognition.

#### **Hypothesis Two:**

Participants with schizophrenia will show a deficit in the understanding of emotion, rather than a deficit in the perception of facial expressions of emotion. Therefore, they will perform equally on tasks that involve pairing emotional scenarios with word labels and photographs of emotional expressions, relative to controls.

#### **Hypothesis Three:**

For participants with schizophrenia, affect recognition ability will correlate negatively with a measure of social functioning difficulties.

#### **Hypothesis Four:**

Differences in affect recognition scores between the schizophrenia and control groups will remain significant after controlling for differences in general cognitive functioning (as measured by IQ).

## **Chapter Five: Methods**

### **Research participants**

Sixty participants between the ages of 18 and 65, and with a diagnosis of schizophrenia were recruited from the Rehabilitation Service of Leicestershire & Rutland Healthcare NHS Trust. Diagnoses were confirmed in consultation with the participants' psychiatrists as meeting the Research Diagnostic Criteria of the International Classification of Diseases (DCR-10; World Health Organisation, 1993). Exclusion criteria for the study were as follows:

- 1) Recorded brain injury or any history of neurological disease.
- 2) Any secondary ICD-10 Chapter V (Mental & Behavioural disorders) diagnosis.
- 3) Any history of substance abuse or dependence (other than nicotine), or current substance abuse.
- 4) Sensory problems likely to prevent adequate perception of the experimental materials.
- 5) Non-native speaker of English.

A nonclinical control group of forty participants was recruited from among Rehabilitation Service nursing and auxiliary staff. Exclusion criteria were the same as those listed above, with the additional criterion that controls should have no history of psychotic illness.

A second control group was also used in the study. This comprised twenty participants with a mild learning disability. This control group was used in an attempt

to find additional matches for the schizophrenia group in terms of general intellectual functioning. These participants were recruited among students attending courses at a local college, and from day centres for people with learning difficulties throughout Leicestershire. In addition to the above exclusion criteria, learning disabled participants were also excluded if they had an *acquired* learning disability (because events such as head injury may have a specific impact upon the perception and understanding of emotion), or if they had a recognised genetic basis to their learning disability, such as Down's Syndrome or Williams Syndrome (where the profile of abilities may be uneven (Bouras, 1999)).

## **Measures**

### **Affect recognition tasks**

Instructions for the following emotion tasks, along with a version of the response sheet are given in Appendix Three. The use of different versions of the emotion tasks is explained in the section on Procedures.

#### **1) Perceptual matching task**

Seven 10cm x 15cm photographs from the Ekman & Friesen (1975) series were set out in two rows in front of the participant. These depicted a woman – 'PF' – displaying seven facial expressions, which have been reliably identified as showing the emotions 'happy', 'sad', 'fear', 'anger', 'disgust' and 'surprise', along with a neutral expression. These photos are reproduced in Appendix Four.

The researcher used a second, identical set of photographs and showed the participant a photo from this set, drawn at random. The participant was asked to "Show me the

photo that's just the same as this one". There were three trials. If the participant failed a trial, they were asked to "look carefully" and allowed a second attempt at matching. If they still failed, a fourth trial was administered. Failure on this trial was used as an exclusion criterion for the study, as it meant that the participant could not *perceptually* differentiate and match the photos. Just one participant from the group with schizophrenia, and three from the learning-disabled control group were excluded on this basis, and data from these participants is not included in the study.

## **2) Emotion word task**

Seven word cards were set out in front of the participant. These showed the words 'happy', 'sad', 'fear', 'anger', 'disgust', 'surprise' and 'nothing'. The researcher read a series of twelve vignettes (two for each emotion, in random order, from the vignettes listed in Table 3.1) and the participant was instructed to either point to, or say, the emotion word that best described how the *protagonist* would be feeling in each situation. If they believed the protagonist would not feel any emotion, they were asked to point to the 'Nothing' card. Responses that corresponded with the intended emotion were scored correct.

## **3) Emotion face task**

Once again, a set of seven facial affect photos was placed in two rows in front of the participant. The set of photos was either the male set (JJ) or the female set (PF), from the Ekman & Friesen (1975) photos, as shown in Appendix Four. These sets were chosen for the study because of their high reliability.

The remaining twelve vignettes were used, and the participant was instructed that each time they had to point to the face that best showed how the protagonist would be feeling. Responses that corresponded with the intended emotional expression were scored correct.

#### **4) Word-to-face matching**

The seven photos used in the emotion face task were set out in front of the participant, along with the seven word cards in random order. Participants were asked to match each face with the word they felt best described it, by placing the word card underneath the appropriate photo. Errors were recorded for subsequent analysis.

#### Other measures

##### **General cognition**

The Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999) was administered to participants as a measure of general cognitive functioning. The two-subtest version of the WASI was used. This comprises the Vocabulary and Matrix Reasoning subtests. These subtests provide useful non-social parallels to the cognitive skills tapped in the emotion tests. Hence, the Vocabulary subtest measures verbal knowledge and fund of information, while the Matrix Reasoning subtest measures nonverbal fluid reasoning.

It should be noted that neither of these subtests is timed and therefore, in contrast with other intelligence scales, IQ is estimated without the influence of speed of processing. Given that people with schizophrenia often have particular problems in this area, it may be the case that the two-subtest version of the WASI advantages

participants with schizophrenia, when compared with other intelligence scales.

Indeed, it was noted that participants with schizophrenia often took considerably longer than participants from the control groups to complete testing. This issue will be returned to in the Discussion Chapter.

### **Social functioning**

The social functioning of participants with schizophrenia was measured using the Social Behaviour Schedule (SBS; Wykes & Sturt, 1986). The SBS is reproduced in Appendix Five. It is designed to measure observable behaviours in chronic psychiatric populations. Twenty-one areas of problematic behaviour are assessed on a five-point scale. As well as producing an overall score, two further scores can be derived from the SBS: the number of items scoring three or more constitute the BSS score (Behaviour Score – Severe); alternatively, the number of items scoring two or more makes up the BSM score (Behaviour Score – Moderate). The global score and the BSM score were calculated for this study.

Wykes & Sturt (1986) found an interrater reliability of 0.86 for the SBS. Wykes (1998) notes that staff members can complete the scale reliably. In the current study, a member of staff who had known him or her well for at least six months completed the SBS for each participant with schizophrenia.

### **Procedures**

Participants were tested individually in a quiet room. All participants gave written, informed consent to take part in the study. The participant information sheet and consent form are given in Appendix Six.

All participants received the same test protocol, apart from some modifications to the procedure for those learning disabled controls who were unable to read (these are described subsequently). All participants received the four emotion tasks first. The emotion word task and the emotion face task had four different versions; this allowed counterbalancing for the gender of the faces/protagonist, the order of the task (word task first versus face task first) and the set of vignettes to be paired with words/faces (thus, any given vignette was paired with words for half the participants, and with faces for the other half).

It was considered best not to require individual participants to pair the vignettes with *both* words and faces. Administering the vignettes for both response formats might have led to cueing of the second response. Besides which, it was found during piloting that administering all 24 vignettes for both word and face responses lengthened the procedure beyond the attention span of many participants.

Table 5.1 shows the counterbalancing of the sex of the protagonist and task order across the four versions:

**Table 5.1: Questionnaire versions for counterbalancing task order and gender of protagonist**

TASK ORDER	<u>Face/Word</u>  <u>Word/Face</u>	GENDER	
		<u>Female</u>	<u>Male</u>
		Version One	Version Two
		Version Three	Version Four

For learning disabled participants who could not read, the procedure for the Emotion Word task was modified as follows: after each vignette, the emotion words were read to the participant while pointing to the appropriate word cards in turn. This enabled the participant to select the emotion they believed the protagonist would be feeling in the situation. During the face-to-word matching task, learning disabled clients were given the word cards one at a time, were told what the word was, and were asked to pair the word with the appropriate face. They were given verbal reminders of what the emotion word was, as and when required.

Following completion of the emotion tasks, all participants were administered the WASI, with the Vocabulary subtest always following the Matrix Reasoning subtest.

The whole procedure generally took between three-quarters and one-and-a-half hours to administer. All participants (with one exception) completed testing in a single session. Two participants failed to complete the emotion tasks (both were participants with schizophrenia) and their data was excluded from the study. A further three participants (again, all from the group with schizophrenia) failed to complete the WASI. Data from these participants were retained in the study: in two cases, WASI IQs were prorated from single subtest scores; in the remaining case, the participant did not complete any subtests, and was excluded from analyses involving IQ. For two participants in the schizophrenia group, the Social Behaviour Schedule was not completed, and consequently their data were excluded from analyses comparing social functioning with emotion task performance.



## **Chapter Six: Results**

### **Demographic variables**

Demographic information on the participants is given in Table 6.1.

**Table 6.1: Demographic data for research participants**

<b>Participant Group</b>	<b>Sex M:F</b>	<b>Age Mean [Range]</b>	<b>Years of Education Mean [Range]</b>	<b>Current IQ Mean [Range]</b>
Schizophrenia (n = 60)	36:24	44.2 [21 - 64]	11.3 [8 - 16]	87 [55 - 128]
Normal Controls (n = 40)	18:22	43.2 [21 - 62]	11.6 [10 - 16]	103 [64 - 128]
Learning Disabled Controls (n = 20)	9:11	31.3 [18 - 53]	N/A	61 [55 - 77]

With regard to the above information, t-tests showed that differences in age between the schizophrenia and normal control group participants were not significant (n.s.) at the .05 level ( $t = 0.42$ ;  $p > .05$ , n.s.), nor were differences in terms of years of education significant ( $t = -1.0$ ;  $p > .05$ , n.s.). However, the learning-disabled control group was significantly younger than both the group with schizophrenia ( $t = 4.6$ ;  $p < .001$ ) and the normal controls ( $t = 3.8$ ;  $p < .001$ ). This reflects the fact that eight out of the twenty learning disabled participants were recruited from a local training college, where the students were typically in their late teens and early twenties. As regards ethnicity, 115 of the participants were White (British / Irish), two participants in the schizophrenia group were of Caribbean origin, one was Indian, and one was of mixed (Asian – Caribbean) ethnicity. In the learning-disabled control group, one participant was Pakistani.

In terms of current IQ, the group with schizophrenia scored significantly lower than the normal controls ( $t = -4.6$ ;  $p < .001$ ) and significantly higher than learning disabled controls ( $t = 6.3$ ;  $p < .001$ ). A chi-square test of gender distribution did not show any

significant differences between the groups in terms of the numbers of men and women in each group ( $\chi^2 (2) = 2.7$ ;  $p > .05$ , n.s.).

### **Emotion task scores**

Data for participants' performance on the four emotion tasks is summarised in Table 6.2. The data was tested for normality using the One-Sample Kolmogorov-Smirnov Test. It emerged that the normal control group's scores on the word task did not sufficiently approximate a normal distribution to justify the use of parametric tests ( $z = 1.72$ ;  $p < .005$ ). Therefore, non-parametric Mann-Whitney U-tests were used to compare the scores between pairs of groups.

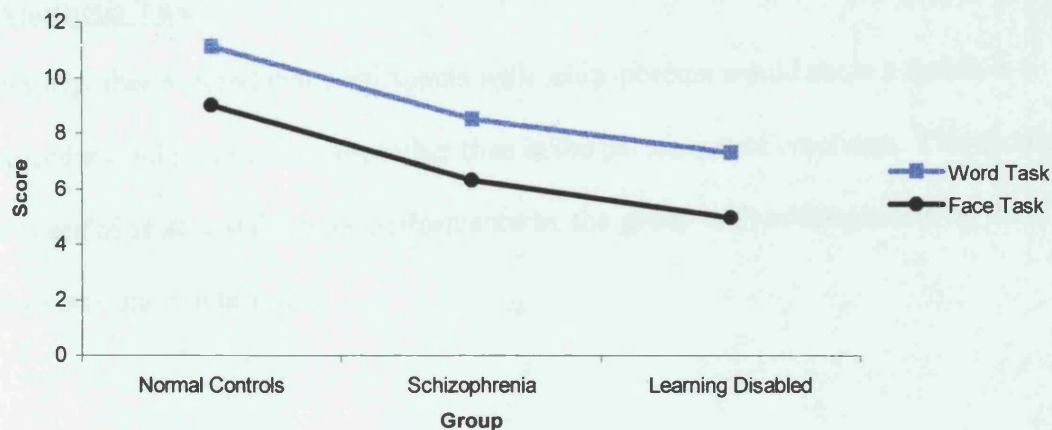
**Table 6.2: Mean emotion task scores by group**

Participant Group	Emotion Task Mean Total Score Word+Face (Max.=24)	Word Task Mean Score (Max. = 12)	Face Task Mean Score (Max. = 12)	Labelling Task Mean Score (Max. = 7)
Control (n = 40)	20.10 (SD 2.79)	11.10 (SD 1.08)	9.00 (SD 2.03)	6.75 (SD 0.67)
Schizophrenia (n = 60)	14.83* (SD 3.98)	8.50* (SD 2.21)	6.33* (SD 2.38)	5.17* (SD 2.35)
Learning Disabled (n = 20)	12.25*# (SD 4.18)	7.30* (SD 2.75)	4.95*# (SD 1.85)	4.60* (SD 2.28)

\* Mann-Whitney U-test, comparison with normal control group. Two-tailed,  $p < .001$

# Mann-Whitney U-test, comparison with schizophrenia group. Two-tailed,  $p < .05$

**Figure 6.1: Mean emotion task scores by group**



Performance on the emotion tasks was not significantly correlated with participant age ( $r = .00$ ;  $p > .05$ , n.s.), or with participant gender ( $r = .01$ ;  $p > .05$ , n.s.). There was, however, a significant correlation between emotion task scores and current IQ, as measured by the WASI ( $r = .67$ ;  $p < .001$ ).

### **Hypothesis One**

It may be recalled that Hypothesis One stated that participants with schizophrenia would score lower than the control groups on the affect recognition tests, confirming an affect recognition deficit. It can be seen from Table 6.2 that this hypothesis is only partially confirmed. The group with schizophrenia scored significantly worse than the normal controls on all the affect recognition tasks, but did not score worse than the learning disabled control group. Indeed, the learning disabled controls scored significantly worse than the group with schizophrenia on the face task (pairing the vignettes with the appropriate emotion photograph), and this in turn contributed to their significantly worse combined task scores. It is, therefore, only possible to say that participants with schizophrenia scored significantly lower than *normal* controls on tests of affect recognition.

### **Hypothesis Two**

This hypothesis stated that participants with schizophrenia would show a deficit in the understanding of emotions, rather than in the perception of emotions. This would be revealed in an equally poor performance by the group with schizophrenia on the word task and the face task.

Figure 6.1 shows main effects for the emotion task type (word versus face) and for group membership. These main effects are confirmed by Kruskal-Wallis One Way Analyses of Variance. Comparing the word task and the face task shows that the face task is more difficult across all three participant groups ( $F(11, 108) = 10.1; p < .001$ ). There is also a significant main effect for group membership ( $F(2, 117) = 38.5; p < .001$ ). However, Figure 6.1 does not show an interaction effect between group and task type. Therefore, there is no *differential* deficit in the group with schizophrenia's performance on the face task as opposed to the word task. An equal degree of deficit on the face task and the word task is suggestive of a primary deficit in the understanding of emotion.

Comparing the word and face task results for individual emotions, however, presents a more complex pattern of findings. Table 6.3 gives the percentages correct on each emotion for both the normal control group and the group of participants with schizophrenia. It also shows the performance of the participants with schizophrenia expressed as a percentage of the normal control group's performance. This gives an effective measure of relative deficit on tasks of differing difficulty.

Table 6.3 shows that the participant group with schizophrenia had a considerably worse *relative* performance on the face task, as opposed to the word task, for four of the six emotions. However, this difference may have been disguised in the overall results by the schizophrenia group's out-performance of the control group on the 'Fear faces'. Performance on the 'Fear' vignettes in the face task shows an unusual pattern, in that fear is the second best recognised facial emotion for the participants

with schizophrenia (behind ‘Happy’), but it is by far the worst recognised for the normal control group (54%).

**Table 6.3: Percentage correct for normal control and schizophrenia groups for each emotion and response category**

Emotion/Task	Normal Control Group: % Items Correct	Schizophrenia Group: % Items Correct	Schizophrenia Group Performance as % of Control Group Performance
Happy Words	99	87	88
Happy Faces	98	71	72
Sad Words	90	74	82
Sad Faces	83	49	59
Fear Words	100	79	79
Fear Faces	54	55	102
Anger Words	84	60	71
Anger Faces	76	44	58
Surprise Words	90	70	78
Surprise Faces	74	53	72
Disgust Words	93	58	62
Disgust Faces	68	44	65

Two possible explanations for this pattern of results are that participants with schizophrenia are hypersensitive to fear situations, or alternatively that there is a particular problem in the measure with regard to the pairing of fear vignettes with fear faces. This issue will be explored in the Discussion Chapter.

Overall, Table 6.3 is suggestive of a relative deficit for people with schizophrenia on the *face* task, when compared with normal controls, and of particular difficulties with the facial emotions of anger, sadness and disgust.

Further analysis of results at the level of individual emotions is aided by considering the response dispersion. Response dispersion refers to the distribution of responses for each type of vignette, and this allows any patterns of error to be taken into account. Appendix Seven gives the response dispersions for the normal control and schizophrenia groups on the face and word tasks.

It can be noted from Appendix Seven that participants with schizophrenia show a much greater range of responses. While interpretation of this information has to be guarded (because the error patterns for individual vignettes within the same emotion category can be quite distinct), it is still possible to discern some idiosyncratic response patterns on the part of participants with schizophrenia for particular emotions.

There is a greater tendency on the part of participants with schizophrenia to choose 'Anger' faces in response to 'Sad' vignettes (17% of their total responses to the 'Sad' vignettes) and 'Sad' faces in response to 'Anger' vignettes (18% of their total responses). Given that this response pattern does not hold for the word task (where the word 'Anger' is chosen for 'Sad' vignettes 3% of the time, and 'Sad' for 'Anger' vignettes 6% of the time), then it is possible to interpret these results as denoting a perceptual difficulty with anger and sadness expressions, rather than a conceptual shift in terms of the emotion categories. Indeed, 'Anger' and 'Sad' faces caused

participants with schizophrenia greatest difficulty, and they achieved their lowest mean accuracy on these items relative to normal controls.

Some other interesting results emerge from the response dispersions in Appendix Seven. For participants with schizophrenia, ‘Surprise’ scenarios can often be seen as evoking the emotion of ‘Fear’ (12% of responses for participants with schizophrenia, as compared with 3% of responses for controls on the word task). Furthermore, participants with schizophrenia are much more likely to pick the ‘Neutral’, non-emotional face in response to a ‘Happy’ vignette than controls (14% of responses, compared with 0% of responses for controls).

To summarise, the overall emotion task data does not show an interaction between task type (word / face) and group (schizophrenia / normal control / learning disabled control), despite main effects for both factors. This suggests that the lower performance of participants with schizophrenia on the emotion tasks is due to an overall difficulty in the understanding of emotional situations, rather than a specific difficulty with the facial perception of emotion. However, closer examination of the data for individual emotions suggests a more complex pattern of abilities. Table 6.3 and Appendix Seven appear to show a greater *relative* difficulty for ‘Sad’ and ‘Anger’ faces, along with a relative sensitivity for ‘Fear’ faces. It may be the case that sensitivity to emotions in schizophrenia is not a unitary phenomenon.

Alternatively, there may be psychometric differences between the vignettes, which have distorted the results for particular emotions. Either way, the ambiguities of the data do not permit any definitive conclusions as to whether there is a differential deficit in the understanding and perception of emotion in schizophrenia.

### **Hypothesis Three**

This hypothesis concerned the connection between social cognition and social functioning. It stated that affect recognition ability among participants with schizophrenia would correlate negatively with scores on the Social Behaviour Schedule (SBS; Wykes & Sturt, 1986; see Appendix Five). In other words, lower affect recognition scores would be associated with higher problem scores for social functioning.

Pearson correlation coefficients did not find a significant correlation between the total SBS scores for participants with schizophrenia and their emotion task performance ( $r = -.04$ ;  $p > .05$ , n.s.). The BSM score (Behaviour Score – Moderate) is a measure of the *number* of behavioural social problems a participant displays which are of moderate to high intensity. It was found that the BSM score also did not correlate significantly with emotion task scores in the current study ( $r = .05$ ;  $p > .05$ , n.s.). Therefore, the current study did not find a link between affect recognition ability and social functioning as measured by the SBS.

### **Hypothesis Four**

This hypothesis stated that differences in affect recognition scores between the schizophrenia and control groups would remain significant after controlling for differences in general cognitive functioning (as measured by WASI IQ). In other words, that there is a specific deficit in social information processing for people with a diagnosis of schizophrenia, over and above any general cognitive deficit they may have.



Before embarking on analyses pertaining to this particular issue, the importance of general cognitive functioning to performance on the emotion tasks needs to be iterated. Table 6.4 shows that IQ is associated with emotion task performance not only across all three participant groups as a whole, but also *within* each of the groups, considered individually.

**Table 6.4: Within-group correlations between WASI and emotion task scores**

	All groups	Schizophrenia Group (n = 60)	Normal Control Group (n = 40)	Learning Disabled Control Group (n = 20)
Emotion task total score	0.67*	0.54*	0.42*	0.59*
Word task score	0.61*	0.52*	0.21	0.55*
Face task score	0.62*	0.42*	0.46*	0.51*
Labelling task score	0.53*	0.53*	0.28	0.08

\*Pearson, two-tailed,  $p < .01$

That correlations are not significant for the normal control group for the word and labelling tasks may be due to ceiling effects: the task scores may not vary sufficiently for correlations to occur. Despite this, Table 6.4 demonstrates the importance of measuring the influence of general cognition on task performance.

It is now possible to turn to the question of whether or not differences in IQ account for group differences in emotion task performance. This issue is examined by means of three statistical procedures. Partial correlations are used to ascertain whether group performance on emotion tasks differs significantly after controlling for IQ. Stepwise multiple regression analysis examines the proportion of variance in emotion

task scores accounted for by differences in IQ, and the proportion accounted for by group membership (although multiple regression is a parametric procedure, it is generally considered robust for the analysis of data that, to a limited extent, violates parametric principles (Dawson-Saunders & Trapp, 1990)). Finally, a subgroup of participants with schizophrenia is pair matched with control participants on IQ, and their performance on the emotion tasks compared using the Wilcoxon Signed Ranks Test.

The partial correlations procedure describes the linear relationship between two variables while controlling for the effects of one or more additional variables. Zero order and partial correlations controlling for IQ are given in Table 6.5. These correlations represent the degree of association between emotion task total score (a composite of the word and face task scores) and group membership (which is entered into the statistical analysis as dummy variables).

**Table 6.5: The correlation between group membership and emotion task total score: Zero order and partial correlations controlling for IQ**

Group	Control	Schizophrenia
<b>Schizophrenia</b>		
Zero order	0.59**	
Controlling IQ	0.47**	
<b>Learning Disabled</b>		
Zero order	0.75**	0.27*
Controlling IQ	0.07	0.08

\* Two-tailed,  $p < .05$

\*\* Two-tailed,  $p < .01$

Table 6.5 shows that the difference between the schizophrenia and normal control groups' performance on the emotion tasks remains significant even after the difference in IQ level between group members has been controlled for. Other group differences – between participants with schizophrenia and learning disabled controls, and learning disabled and normal controls – become non-significant once IQ is partialled out.

Given that both WASI IQ and group membership correlate significantly with total emotion task scores, both were entered as independent variables into a stepwise multiple regression analysis. This was done in order to determine their relative contributions to the emotion task total score for the schizophrenia and normal control groups. The results of this analysis are given in Table 6.6.

**Table 6.6: Summary of stepwise multiple regression analysis comparing schizophrenia and normal control groups**

<b>Independent Variables</b>	Emotion Task Total Score		
	$\Delta R^2$	F	Sig.
WASI IQ	0.38	61	$p < .001$
Group	0.13	52	$p < .001$
Total $R^2 = 0.51$			

The adjusted multiple coefficient of determination ( $\Delta R^2$ ) shows that 51% of the variance in emotion task scores in the normal control and schizophrenia groups ( $n = 100$ ) is explained by the variables of IQ and group membership: IQ explains 38% of the variance, while 13% is explained by group membership. In other words,

approximately  $\frac{3}{4}$  of the explained variance in scores on the emotion tasks is attributable to IQ, while about  $\frac{1}{4}$  is related to group membership. Therefore, there is something about schizophrenia – *apart from* the deficit in general cognitive functioning – that causes difficulty in socio-emotional judgements.

The final procedure used to examine the relationship between general cognition and affect recognition involves looking at the emotion task scores of a subgroup of participants with schizophrenia who are pair matched with controls on IQ. The criterion for pair matching was that IQ should be either identical or in the range  $\pm 1$  point. For example, a participant with schizophrenia who had an IQ of 77 could be matched with a control participant from either group with an IQ score of 76, 77 or 78. Using this procedure, thirty matched pairs were found. Of these, 21 pairs were exact matches. Table 6.7 shows summary demographic data for the pair matched subgroups, while Table 6.8 gives their mean scores on the emotion tasks.

**Table 6.7: Demographic data for IQ pair matched groups**

Participant Group	Sex M:F	Mean Age (SD)	Mean Years of Education (SD)	Mean Current IQ (SD)
Schizophrenia (n = 30)	15:15	43 (12)	11.4 (1.6)	90 (19)
Controls (n = 30)	15:15	40 (13)	11.6 (1.7)	90 (19)

**Table 6.8: Mean emotion task scores for IQ pair matched groups**

Participant Group	Emotion Task Mean Total Score	Word Task Mean Score	Face Task Mean Score	Labelling Task Mean Score
Schizophrenia (n = 30)	15.2*	8.8*	6.4*	5.0
Controls (n = 30)	18.6	10.4	8.2	6.1

Wilcoxon Signed Ranks Test

\* Two-tailed,  $p < .01$

With regard to the demographic data in Table 6.7, t-tests showed no significant difference between the groups in terms of age ( $t = 1.04$ ;  $p > .05$ , n.s.) or years of education ( $t = -0.25$ ;  $p > .05$ , n.s.).

Table 6.8 shows that when IQ is matched, there is still a significant deficit in the schizophrenia group's scores on the emotion tasks for the word and face tasks, while the difference on the labelling task approaches significance ( $w = 1.86$ ;  $p < .06$ ). These results are not merely an artefact of outlying data, because in 24 out of the 30 matched pairs, the control participant outscored the participant with schizophrenia on the combined emotion task score. Conversely, participants with schizophrenia outscored controls in just five pairs, with one tie.

To summarise, this section has examined the relationship between schizophrenia, general cognition and emotion recognition. While IQ is positively correlated with emotion task scores in all three groups, partial correlation analysis has shown that a significant difference remains in the affect recognition ability of participants with schizophrenia, even after the influence of IQ is controlled for.

Multiple regression analysis was used to compare the relative contributions of IQ and group membership to the emotion task scores of the schizophrenia and normal control groups. Approximately half the variance in emotion task scores was accounted for by these two variables, and of this, roughly  $\frac{3}{4}$  was explained by differences in IQ, with  $\frac{1}{4}$  being due to group membership (i.e. residual factors, apart from IQ, that pertain to having a diagnosis of schizophrenia).

Finally, a subgroup of thirty participants with schizophrenia and thirty control participants were pair matched for IQ, and their performance on the emotion tasks compared. It was found that the participants with schizophrenia performed significantly worse than the controls on both the emotion word and face tasks.

The findings from these three analyses, taken collectively, allow the null hypothesis for Hypothesis Four to be rejected. Differences in affect recognition scores between the schizophrenia and control groups remain significant, even after controlling for the influence of general cognitive functioning, as measured by IQ.

## **Chapter Seven: Discussion – Findings and Limitations of the Study**

This chapter will summarise the main findings of the study. Some limitations of the project design will then be considered. The following chapter will present a more wide-ranging discussion of the implications of the project in the context of theories of emotion, and will examine the clinical implications of the findings.

### **Main findings**

#### **1) People with schizophrenia have an overall deficit in the understanding and perception of emotion.**

This study has shown that people with schizophrenia have an overall deficit in the understanding and perception of emotion, when compared with normal controls. This is demonstrated by their significantly lower scores on all the tests of emotion recognition: the word task, the face task and the labelling task.

In terms of methodology, results on the labelling task (pairing the emotion labels with the appropriate face) replicate numerous earlier findings of a deficit in word-to-face matching in schizophrenia (see Chapter Two). The tasks matching vignettes with words and faces, however, are a new type of task. They use simple scenarios that have been standardised to be reliably associated with specific emotions. The poorer performance of people with schizophrenia on these tasks demonstrates that their understanding of emotion scripts is less consensual than that of the general population.

This finding is particularly important because shared meanings are central to social interaction. For example, we cannot take it for granted that people with

schizophrenia will know that loss evokes sadness, or that one might reasonably expect people to be happy at parties. The majority of people understand socio-emotional scripts such as these implicitly, and it requires an effort of imagination to appreciate how confusing life might be without them. Understanding emotion in relation to events allows us to develop explanations of the motives, actions and reactions of others. In turn, these explanations are the basis of empathy and pragmatic communication. Indeed, it could be argued that emotion scripts are the frameworks within which we structure our own emotional responses to events (Fitness & Fletcher, 1993).

## **2) People with schizophrenia have a differential deficit in social understanding.**

Of course, this is not the first study to show a deficiency of social understanding in schizophrenia. Other studies that have done so were described in Chapter Three. For example, Cutting & Murphy (1990) showed that people with schizophrenia are less socially knowledgeable. Corrigan and colleagues found that people with schizophrenia are less sensitive to abstract social cues (e.g. Corrigan, Buican & Toomey, 1996; Corrigan & Green, 1993), while Chan *et al* (1999) found that people with schizophrenia have less differentiated event schemas. Where the current study extends these findings, however, is in accounting for the influence of general cognition. This is the first study to show that people with schizophrenia have a differential deficit in *social* understanding, above and beyond the influence of a decline in general cognitive functioning.

This differential deficit was demonstrated by means of partial correlations, multiple regression analysis and a comparison of the performance of a subgroup of



participants who were pair matched on IQ. Partial correlations were used to compare how the participant groups performed on the emotion tasks, once the effect of WASI IQ was controlled for (Table 6.5). Although the participant group with mild learning disabilities scored significantly worse than both the normal controls and the group of participants with schizophrenia on the emotion tasks, these differences ceased to be significant once the influence of IQ was taken into account. However, for the participant group with schizophrenia, a quite distinct result emerged. Performance on the emotion tasks remained significantly poorer than the normal control group's, even after differences in IQ between the two groups were partialled out. As further confirmation of this finding, a stepwise multiple regression analysis showed that group membership continued to account for significant unique variance in emotion task scores, once the variance due to IQ was removed (Table 6.6).

Perhaps the clearest demonstration of the existence of a differential deficit in the understanding of emotion in schizophrenia was the *post hoc* analysis of the performance of pairs of schizophrenia and control group participants, matched on IQ. There was a very close match between these subgroups in terms of demographic variables (Table 6.7), and yet the group with schizophrenia still scored significantly lower on the emotion tasks than controls (Table 6.8).

To summarize, these three analyses have shown that people with schizophrenia have a differential deficit in their ability to process social stimuli. The relevance of this finding with regard to theory and clinical practice will be discussed in the following chapter.

### **3) No link was found between affect recognition ability and social functioning problems.**

Although the study found that people with schizophrenia have a specific deficit of social understanding, it failed to demonstrate any link between affect recognition ability and social functioning as measured by the Social Behaviour Schedule (SBS; Wykes & Sturt, 1986). There are several potential explanations of this finding.

Firstly, the finding may be veridical, and the problems of social understanding revealed in the study might not have any detrimental impact on overt social functioning. This possibility reminds us that while it is one thing to demonstrate a distinct profile of cognitive abilities in a clinical group, it is quite another to demonstrate their importance in day-to-day functioning or clinical outcome.

Secondly, the SBS may not be the optimal measure for revealing the social consequences of impaired social understanding. The SBS tends to focus upon the 'major difficulties exhibited by patients with long-term impairments' (Wykes & Sturt, 1986; p.2), such as hostility in social interactions, unacceptable habits, depression *etc.* While it may be the case that these areas are vital for the assessment of needs and the planning of programmes of rehabilitation, the influence of problems of social understanding may be exerted upon more 'fine-grained' aspects of social performance. In Chapter One, it may be recalled, the ex-wife of a sufferer gave a telling account of the impact that difficulties of social reasoning had on her spouse:

It was as though some strange deficiency prevented him from understanding some things that seem perfectly obvious to most people. (Anonymous, 1994, p.228).

The loss of this “intuitive grasp” of social meanings, rather than being manifested in gross social behaviour, may be more noticeable in the loss of conversational synchrony and paralinguistic skills, and in conversational oddity:

He didn't seem to be able to get the feel of people, to interpret their gestures correctly. (Anonymous, 1994, p.228).

Indeed, several studies using role-play tests demonstrate the difficulties people with schizophrenia experience with these ‘micro’ social skills (e.g. Mueser, Blanchard & Bellack, 1995; Penn, Mueser, Spaulding *et al*, 1995). Furthermore, there are likely to be other variables that intervene between idiosyncratic socio-emotional understanding and socially dysfunctional behaviours. For example, the adoption of coping strategies is likely to be important. An instance of such a strategy is given in the anonymous account:

Instead of relying on that intuitive understanding we usually have of what other people are trying to convey, he built up intricate theories that often led him to erroneous interpretations. (Anonymous, 1994, p.228).

The final potential reason why a link between affect recognition ability and social functioning has not been shown in the current research relates to the fact that social functioning problems were only measured for the participants with schizophrenia. Therefore, the study only examines *within-group* differences in social functioning for people with schizophrenia, rather than *between-group* differences for all participants. This would have the effect of discounting any deficit that might be common to all, or most, people with schizophrenia, and instead focusing upon what might be much less salient differences between them. This is a tricky problem to solve, however, because it would entail finding a social functioning measure that meaningfully differentiated between all the participants.

To summarize, the lack of a link between affect recognition and social functioning in this study may be due to the fact that there is no link, to the SBS being the wrong

instrument to reveal the social behaviours which are affected, or to the narrow focus on within-group differences at the expense of common functioning deficits.

**4) No differential deficit in the perception of facial expressions of emotion was found for people with schizophrenia.**

This study has also failed to provide a clear answer to the major question of whether or not there is a differential deficit in the perception of facial expressions of emotion in schizophrenia. It may be recalled that different patterns of results on the face and word tasks would allow different conclusions to be drawn about the likely location of any deficit in the cognitive system: poor performance on both the word and face tasks would suggest a deficit in the understanding of emotion, while a relatively impaired performance on the face task would point to specific difficulties of *facial* affect recognition.

Figure 6.1 indicates that the face task was more difficult than the word task for all three participant groups. The parallel lines of the figure show that there is no discernible interaction effect between group and task type. This appears to provide strong evidence that there is no differential deficit in facial affect recognition for people with schizophrenia. However, an examination of the results for specific emotions in the word and face response formats paints a more complex picture.

Table 6.3 gives the results for participants with schizophrenia and normal controls on the vignettes for specific emotions (happy, sad, fear *etc*), while further comparing the word and face response formats for each emotion. Appendix Seven shows the ‘response dispersion’ for each emotion. This is simply the pattern of errors, and allows us to know, for example, that people with schizophrenia picked the ‘Neutral’

face in response to ‘Happy’ vignettes on 14% of trials, while this error was not made at all by participants in the normal control group.

This data allows consideration of the results at the level of individual emotions. It would seem to show that rather than having a *unitary* problem with either the understanding or perception of emotions, people with schizophrenia have a more uneven pattern of performance, and demonstrate particular difficulties with specific emotions. Some emotions give greater difficulty in terms of conceptual understanding (e.g. disgust), while with others it seems particularly hard to identify the appropriate facial expression (e.g. anger and sadness).

Let us consider the emotion of sadness. People with schizophrenia correctly paired the word ‘Sad’ with the sadness vignette on 74% of the word task trials. For normal controls, the figure was 90%. On the face task, however, this performance slipped to just 49% correct, compared with 83% for controls. People with schizophrenia were therefore 25 percentage points lower in their sad face task performance, than in their sad word task performance. This compares with a 7-percentage point decline for normal controls between the two tasks. So, although the face task is harder for both groups, it is inordinately harder for the participants with schizophrenia. Nor is this due to differences in the vignettes used in each task, because – it may be recalled – the same vignettes are used in both tasks, balanced across different versions of the questionnaire. Likewise, the problems associated with using facial photographs, each with its own particular nuances of expression, have been reduced in this study by using both male and female photos (see Appendix Four). Instead, the results would seem to indicate a particular difficulty in judging sad faces on the part of people with

schizophrenia. It is a specific and differential difficulty, because it is not evident in the performance on sad words (i.e. the conceptual understanding of sadness is relatively strong).

An examination of the results for the pairing of anger vignettes with the anger facial expressions suggests that people with schizophrenia also experienced particular difficulties in identifying typical facial expressions for the emotion. In this case, consulting the response dispersion tables in Appendix Seven proves illuminating. Participants with schizophrenia wrongly paired anger vignettes with the sad face on 18% of trials (compared with 3% for normal controls). They also incorrectly selected the fear expression on 11% of anger trials (compared with an error rate of 3% for controls). Once again, these errors only applied to the face task and not the word task (where responses of 'Sad' and 'Fear' for anger vignettes were just 6% and 3% respectively).

Therefore, it would seem that there are difficulties in the perception of facial expressions of sadness and anger in schizophrenia. We know that these difficulties are not due to semantic/conceptual problems in distinguishing sadness and anger, because there is a relatively stronger performance for these emotions on the word task. Thus, explanations of this anomalous performance in terms of the *meaning* these emotions have for people with schizophrenia are unlikely to be valid. Rather, the problem would seem to be located in the *perception* of the faces.

As well as relative difficulty in the perception of anger and sadness, Table 6.3 and Appendix Seven also show that people with schizophrenia have a particular problem

in their *conceptual* understanding of disgust. This problem would seem to be more marked than their general deficit in understanding emotion categories. Overall, people with schizophrenia correctly identified the disgust vignettes on 58% of trials, compared with 93% correct for normal controls. Response dispersion data shows that participants with schizophrenia erroneously chose ‘Surprise’ on 14% of disgust trials, while they selected ‘Anger’ as the emotion label for 13% of disgust vignettes. This compares with figures of 3% and 4% respectively for nonclinical controls. While surprise and anger responses to the disgust vignettes are not inappropriate, they perhaps show a less precise semantic discrimination between the emotion categories. Interestingly, on the face task, participants with schizophrenia were more inclined to respond to the disgust vignettes by pointing to the facial expressions for sadness (18%), fear (18%), and anger (14%), while the rate of correct identification of the disgust expression was 44%. Once again, this shows a greater response dispersion within the negative emotions for people with schizophrenia.

There are two caveats to the foregoing analysis of results at the level of individual emotions, one of which is statistical and the other conceptual. Firstly, nonclinical controls performed at ceiling levels for some emotions on the word task: most notably, they achieved 99% of responses correct for the happy vignettes, and 100% correct for the fear vignettes. As mentioned in Chapter Three, this probably reflects highly prototypical schemas for these emotions. However, in the context of statistical comparison, the *measured* gap between the normal controls and the other groups may be an underestimate of the true gap in ability. For this reason, intergroup comparisons of word task performance need to be treated with care. Secondly, it should be borne in mind that the individual vignettes within emotion categories have

in themselves produced highly varied results. Therefore, a relative difficulty in understanding or perceiving specific emotions reflects an *aggregate* difficulty across the vignettes for that emotion, and does not necessarily mean there is a weakness on *all* items. In short, some scripts for the emotion may be more intact than others.

## Conclusion

In this section, the main findings of the study have been set out. These can now be summarized as follows. People with schizophrenia have a deficit in the understanding and perception of emotion. Although their level of general cognitive functioning is implicated in this deficit, it does not fully account for it: therefore, there is something about schizophrenia that specifically impairs *social* understanding. Within the group of participants with schizophrenia, levels of emotional understanding and perception were not found to be linked with social functioning difficulties. This may be due to psychometric problems in operationalising social functioning. Finally, a global differential deficit in the perception of facial emotion in schizophrenia was not found. Instead, a more fine-grained pattern of conceptual and perceptual difficulties emerged. Examples include semantic difficulties with the emotion of disgust, and perceptual problems with the facial expressions of sadness and fear.

## Limitations of the research design

This section will discuss aspects of the research design which could be improved upon, and which have limited the conclusions which can be drawn from the study.



One of the most prominent problems with the study design relates to the validation of the measure of affect recognition. Although the vignettes were validated with the emotion word labels in the preliminary study described in Chapter Three, there was no comparable validation of the vignettes with the photographs of faces. Because Ekman & Friesen's (1975) facial stimuli had been validated by them as reliable exemplars of specific emotions, and because the vignettes themselves had been validated with the emotion labels, it was assumed that there would be a parallel validity between the vignettes and the faces. This assumption was not fully justified.

The introduction of meaningful scenarios in the vignettes meant that while they were reliably paired with the appropriate emotion word, the situation with the faces proved more complex. This was a particular problem with the 'Fear' vignettes. We can note from Table 6.3 that while normal control participants paired the fear vignettes with the appropriate word on 100% of trials, they only paired them with the appropriate face on 54% of trials – comfortably their worst performance for any emotion on the face task. The reasons for this can be understood by examining their results for individual fear vignettes. There were particularly low identification rates for two of them:

- i) Jane/John can smell smoke, and thinks the house is on fire. (35% correct).
- ii) John/Jane had a bad nightmare, and woke up sweating. (48% correct).

On the first of the above vignettes, 43% of the control participants selected the 'disgust' face. It can be seen from Appendix Four that the disgust expressions could be interpreted as someone smelling something unpleasant (i.e. smoke). On the second of the vignettes, 39% of participants chose the 'Surprise' face. While there was no doubt that John/Jane would feel fear, how they would actually *look* when

awakening from a nightmare is more ambiguous. The 'Surprise' expression better represented this situation for a substantial minority of participants.

Furthermore, there are display rules attached to facial expressions, which mean that although an emotion might be felt, it is not always expressed (Ekman, 1972; cited in Oatley & Jenkins, 1996). This is clearly illustrated by one of the fear vignettes that was used as a practice item in the study: 'Jane/John is alone and lost in a strange city.' The most usual choice of facial expression for this scenario was either sadness or neutral. As one participant put it, while pointing out the fear face: "They'll feel afraid, but they're not going to look like this, are they?"

These examples show that the interpretation of facial expressions in relation to meaningful scenarios can be unpredictable. Therefore, there is a clear need for the vignettes to be validated with the faces. Such validation would have weeded out vignettes such as those described above, in favour of ones that are reliably paired with *both* the intended emotion word and face.

A further problem with the study design is that it did not include a clinical interview for the participant group with schizophrenia, in order to independently establish diagnoses. Instead, diagnoses were verified in consultation with consultant psychiatrists as meeting DCR-10 Research Diagnostic Criteria (ICD-10; WHO, 1993). A clinical interview would have had the additional advantage of allowing the relationship between affect recognition ability and specific symptoms to be explored.

Some researchers criticise the validity of the schizophrenia construct on the ground of its heterogeneity of presentation and low predictive validity (e.g. Bentall, 1990).

Correlational and factor-analytic studies of the co-occurrence of symptoms suggest that several different syndromes may fall under the umbrella term 'schizophrenia'.

Given this heterogeneity, one school of thought is that research in this area should proceed by selecting sub-divisions of psychiatric phenomena for study: thus participants should be selected on the basis of showing particular symptoms or signs. This 'symptom approach' is thought to facilitate theoretical development, because it allows for psychological models of single symptoms rather than attempting to characterise schizophrenia itself (Bentall, 1990; Frith, 1992; Neale, Oltmanns & Harvey, 1985; Persons, 1996). Furthermore, important correlates of specific signs or symptom clusters may be lost in the comparison of a 'schizophrenic' group with a control group. A hypothetical example from the current study illustrates this point. If people with paranoid delusions were *hypersensitive* to facial affect, while people with negative symptoms were *hyposensitive*, such differences would be lost within group means if a heterogeneous group of people with schizophrenia were recruited as participants.

The arguments for the single symptom approach are powerful ones. However, some counterarguments can be made which support the current study's unitary approach to schizophrenia. Firstly, specific symptoms are not always clearly demarcated, and they often interact with one another. Therefore, the symptom approach may not do justice to the complex clinical presentation of the disorder. Secondly, there is evidence that problems of social understanding and social functioning cut across other symptoms, rather than being associated with any one symptom cluster. People

with positive, negative and disorganised symptoms can experience such problems (Bellack, Morrison, Wixted & Mueser, 1990). Indeed, such is the importance of social functioning deficits that some taxonomies of schizophrenia represent social relating as a separate symptom cluster (e.g. Strauss, Carpenter & Bartko, 1974). There is currently no clear theoretical model linking social functioning with specific symptoms in schizophrenia, and most studies in the field still use the schizophrenia construct (Hooley & Candela, 1999). As such, the current study can justifiably claim to be a preliminary examination of social understanding across the whole disorder.

Although it did not form a focus of the project (and therefore was not reported in the results section) we can note in passing the results of a comparison that was made between participants with an ICD-10 diagnosis of paranoid schizophrenia ( $n = 33$ ) and those with an ICD-10 diagnosis of residual schizophrenia ( $n = 15$ ). Paranoid schizophrenia in the ICD-10 is characterised by the presence of the so-called 'positive' symptoms such as delusions and hallucinations, while a diagnosis of residual schizophrenia indicates the presence of 'negative' symptoms such as passivity and poverty of speech. T-tests were used to compare the performance of these subgroups, because the data for them was parametric. Participants with a diagnosis of residual schizophrenia were significantly older than those with a diagnosis of paranoid schizophrenia (a mean age of 49.7 years, compared with a mean of 42 years:  $t = -2.1$ ;  $p < .05$ ). They also scored significantly lower scores on the WASI, obtaining a mean IQ of 78.7, compared with a mean IQ of 91.4 for the group with a diagnosis of paranoid schizophrenia.

Although the group with a diagnosis of residual schizophrenia did significantly worse than the group with a diagnosis of paranoid schizophrenia on the emotion tasks as a whole ( $t = 2.3$ ;  $p < .05$ ), a stepwise multiple regression analysis entering emotion task score as the dependent variable and ICD-10 diagnosis and WASI IQ as independent variables found that only IQ was significant in predicting the variance of emotion scores. Therefore, we can say that once differences in general cognitive functioning are accounted for, there is no significant effect of ICD-10 subtype on emotion task scores. Although ICD-10 diagnoses of paranoid and residual schizophrenia are not isomorphic with the positive and negative symptom clusters, there is still sufficient overlap for these results to stand as evidence that negative symptoms are related to a specific decline in general cognition, rather than a differential deficit in social cognition.

A further problem in the design of the study relates to the procedure of the face-labelling task. In this task, the participant is presented with the seven facial photographs and the seven word labels all at the same time, and has to pair the labels with the appropriate face. Therefore, if an incorrect pairing is made early in the procedure, it removes the correct face for another label from the task, and inevitably leads to more errors. Instead of presenting the stimuli all at once, in parallel, the word labels should have been presented one at a time, and then removed once they had been paired with a face. In this way, the degrees of freedom for each word label would have been the same, and any errors would not have been compounded.

Although the procedure was generally robust with regard to potential sources of experimenter bias, an exception was the Vocabulary subtest of the WASI, which

requires participants to say what they think various words mean. To ensure bias-free assessment, the transcripts of Vocabulary subtest answers should have been scored blindly by an independent assessor. Because this precaution was not taken, the possibility remains that a bias towards participants with schizophrenia might have inflated their WASI IQ scores, and resulted in the false finding of a differential deficit on the emotion tasks.

In earlier chapters, mention was made of the problems arising from the use of unmatched task in research on cognitive deficits in schizophrenia, and whether or not the notion of “task difficulty” was an appropriate one for research in social cognition, where lower consensus merely threatens the reliability of the stimuli. The solution arrived at in this study has been to match the tasks in terms of the processes involved, rather than in terms of statistical difficulty. Hence, the only difference between the word and face tasks has been in the use of facial photographs instead of word cards. The assumption was that this would isolate any specific difficulty in facial affect recognition, and allow this to be identified as a differential deficit. However, there is a problem with this assumption. Absolute differences of task difficulty could still result in greater true score variance in the face task, and the erroneous identification of a differential deficit (see Figure 2.2). This issue is given added importance because the face task was found to be more difficult for participants in all the groups. Although not an issue in this study (because of other problems with the validity of the face/vignette pairings, outlined above), any differential deficit that had been found in overall face task performance for people with schizophrenia could have been attributable to the demands of processing seven faces as opposed to seven words, and not to a differential deficit in facial *affect* recognition.

How might this problem be solved? One solution is to match the tasks for response dispersion during validation; in other words, to adopt the accepted wisdom of psychometric test construction, and reinstate the notion of ‘difficulty’. A second solution is to further simplify the tasks in order to decrease the demands on general processes such as attention and parallel processing. One means of achieving this might be to use stimulus arrays of three words/faces instead of seven. In this way, we could be more confident that differences in performance between groups were about affect recognition ability rather than confounding psychological processes.<sup>1</sup>

A further potential limitation of the research design may be the use of a forced choice response format. Could this create artificial agreement about emotions and scripts that would not exist in a free response format? Frank & Stennet (2001) examined this possibility with regard to the facial affect recognition paradigm by adding the label ‘None of these is correct’ to the usual emotion word labels. They found that this addition did not alter the agreement rates for face-word pairings. This was taken as evidence for the categorical decoding of emotions and provides some justification for use of the forced choice response format in the current study.

The final limitation of the research design to be discussed here is that no account was taken of neuroleptic use among participants with schizophrenia. Neuroleptic dosages need to be considered because they may influence performance on neuropsychological tests, and are therefore an extraneous variable. It is possible to

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<sup>1</sup> While general cognitive factors such as speed of processing and attention may compromise the ‘real-world’ performance of skills such as facial affect recognition, this is not the same as identifying a specific deficit in affect recognition ability in the cognitive system. To do so requires that general processes are treated as confounding variables in experimental tasks, and that the cognitive ability of interest is the one that is tested.

use tables of neuroleptic equivalence such as those provided in Foster (1989), which allow different drugs to be compared in units equivalent to 100mg of chlorpromazine. However, research by Cassens, Inglis, Appelbaum & Gutheil (1990) suggests that chronic administration of neuroleptics does not impair test performance, except on tasks requiring motor functions. Despite this, the situation is unclear with regard to the influence of neuroleptics on affect recognition tasks, and the current study would have benefited by taking medication into account.

### Conclusion

This section has examined some limitations in the design of the current research. The most serious criticisms of the study relate to the construction of the face task, and the degree to which a comparison of word and face task performance is possible. The two major problems are:

- a) The faces were not validated with the vignettes.
- b) The difference in difficulty between the tasks does not rule out explanation of the results in terms of general processing, as opposed to affect recognition.

These design flaws have compromised the study's ability to test for a differential deficit in facial affect recognition in schizophrenia. Fortunately, examination of the other hypotheses in the study has not been affected. In addition, remedies for these problems have been suggested that may allow the issue to be addressed more successfully in future research.



## **Chapter Eight: Discussion – Theoretical and Clinical Implications**

Having outlined the findings of the study, and discussed some limitations of the research design, this chapter will attempt to place the findings in a broader theoretical and clinical context. Some suggestions will also be made for further research. Finally, preliminary thoughts on the nature of emotion in schizophrenia will be outlined, integrating the findings of the current research with more general theories of emotional understanding.

### **Theoretical implications**

The emergence of the understanding of emotions in self and others is well researched in developmental psychology (e.g. Harris, 1989). However, ideas from this literature have not yet informed adult clinical research, despite the face validity of emotional understanding as a means of conceptualising distress. The concept of scripts (Schank & Abelson, 1977) has also yet to make an impact in clinical psychology as a tool for explaining and remediating difficulties of social functioning. In addition, the study of emotion in psychopathology is in its infancy (Flack & Laird, 1998). Against this background, it is difficult to integrate the findings of the current research with those of other studies. While some researchers are beginning to take up the challenge of describing social cognition in schizophrenia (e.g. Corrigan & Penn, 2001b) there is still a great deal of work to be done. The following points may offer some directions for this work.

**1) There is a specific deficit in social understanding in schizophrenia.**

Schizophrenia has most usually been regarded as a neurocognitive disorder, and most psychological research has been directed towards finding cognitive deficits underlying its diverse signs and symptoms. The current study suggests that schizophrenia is more markedly a disorder of *social* understanding.

**2) Both general and social cognitive processes are involved in the deficit of social understanding.**

The results of the current study suggest that the deficit in social understanding in schizophrenia may be underpinned by *both* a general deficit in information processing (as measured by WASI IQ) *and* a cognitive deficit specific to social stimuli.

Therefore, both the information processing and social cognition models described in Chapter One have a part to play in elucidating the difficulties of social understanding in schizophrenia, and generating clinical strategies to ameliorate them. This conclusion concurs with that of Poole *et al* (2000), whose study of affect perception, general cognition and quality of life found that the impaired processing of social information “[...] involves both general intellectual deficits [...] and specific difficulty interpreting social cues [...]” (p.656).

WASI IQ was found to account for 38% of the variance in composite emotion task scores (Table 6.6). This is nearly three times the variance accounted for by residual factors pertaining to a diagnosis of schizophrenia. Furthermore, the demographic variables of age, gender and years of education did not account for any unique variance in emotion task scores. Therefore, general cognitive processes make a strong contribution to this ostensibly social task. As such, claims that social

cognition is distinct from general cognition, and is wholly subserved by cognitive processes specialised for social stimuli are probably overstated. There is no separate “faculty of social cognition” as claimed by Tooby & Cosmides (1992).

### **3) The deficit in social understanding in schizophrenia may be developmental.**

While general cognition explains some of the variance in emotion task scores, it does not explain all of it. After accounting for differences in IQ, people with schizophrenia are still poorer at understanding and perceiving emotions (Table 6.8). What do the results of the study suggest about the aetiology of this differential deficit in social cognition?

One possible explanation is that poorer perception and understanding of emotion in people with schizophrenia is simply the result of an impoverished social environment, due in part to stigmatisation. However, the control group of people with mild learning difficulties did not show the same *differential* deficit as the group of participants with schizophrenia. Therefore, any explanation of the results in terms of social exclusion would rely upon demonstrating that people with schizophrenia suffered greater exclusion and stigmatisation than people with learning disabilities.

Although there are no other clinical studies of emotional understanding, and very few normative studies, some comparison can be made between the results of the current study and those of Ribordy *et al* (1988). It may be recalled that they developed emotion vignettes with a sample of 45 five and six-year-olds children. Nine of their vignettes were adapted for use in the current project. For example, Ribordy *et al* (1988) used the following ‘Sad’ vignette:

Susie's favourite sweater that she liked a lot was very old and worn out.

She had to throw it away and gave it to her mom to get rid of.

In the current project, this became:

Jane's favourite jumper had worn out, and she had to throw it away.

For the nine comparable vignettes, taken together, Ribordy *et al*'s child participants identified the correct emotion label on 79% of trials. For nonclinical adult controls in the current study, the mean accuracy on these vignettes in the word task was 96%, while for people with schizophrenia it was 65%. Therefore, the adults with schizophrenia were less accurate than Ribordy *et al*'s sample of five and six-year-old children.

The comparison of the current study with that of Ribordy *et al* is not a precise one. The children were required to choose the target emotion from a choice of just three word labels, while in the current study the choice was made from all seven words. Nevertheless, the comparison gives some sense of absolute differences in the categorical understanding of emotion scripts, and the extent of the deficit in schizophrenia.

Possible cognitive explanations of the poorer performance of people with schizophrenia include the following:

- a) The understanding of emotion scripts is intact, but they are difficult to access in long-term memory.
- b) The understanding of such scripts has eroded since the onset of schizophrenia.
- c) The scripts were not well learned in the first place, due to premorbid, developmental difficulties of social learning.

If the poorer performance of people with schizophrenia was due to difficulty accessing intact meanings from long-term memory, or in selecting appropriate emotion analogues, then this difficulty might be expected to influence all emotion scripts equally. However, for some scripts people with schizophrenia performed strongly. For example, for the script ‘John has a pet dog. John has found out that the dog is sick and is going to die.’ participants with schizophrenia identified the intended emotion of ‘Sad’ on 96% of trials. Therefore, an explanation in terms of impaired access would need to explain how access to some scripts remained intact.

The second possibility outlined above is that script understanding is premorbidly intact, but deteriorates after the onset of schizophrenia. The results of the current study suggest that such an erosion of social understanding would have to be profound, and in excess of any decline in general cognitive skills. The Vocabulary subtest of the WASI requires participants to define words. Since we know that emotion task performance was comparatively worse than WASI performance, then the deterioration in skills would have to be specific to the semantic knowledge involved in social scripts, and in excess of any decline in semantic knowledge necessary for the definition of words. Therefore, any explanation in terms of a post-onset erosion of social skills would have to explain both the degree and specificity of the decline in social understanding.

The third potential explanation for the differential deficit in social understanding in schizophrenia is that the deficit reflects premorbid developmental difficulties of

social learning. Spaulding & Poland (2001; p.223) term this the “compromised acquisition factor” for the development of social cognition in schizophrenia. Hooley & Candela (1999) review a number of studies suggesting that interpersonal difficulties are apparent premorbidly. Retrospective studies generally show that people with schizophrenia often have childhood social histories characterised by social isolation (e.g. Cannon-Spoor, Potkin & Wyatt, 1982). High-risk studies (where the close relations of people with schizophrenia are studied prospectively) have shown that adolescents at risk for schizophrenia are rated lower in social competence than children at risk for affective illness (Dworkin, Lewis, Cornblatt *et al*, 1994). It is feasible that these premorbid difficulties of social functioning might be accompanied by developmental problems of social understanding. Indeed, Cornblatt & Keilp (1994), in a review of studies of attention in schizophrenia, hypothesize a premorbid impairment in social information processing that predicts later social functioning deficits. Neumann & Walker, (1998) also suggest that abnormalities of social *comprehension* are apparent long before the onset of the clinical symptoms of schizophrenia, but they offer no research evidence to substantiate this claim.

An explanation of the deficit in social understanding in terms of compromised social learning would be consistent with poorer premorbid social functioning. It would also obviate the need to explain how such knowledge, once acquired, might be differentially susceptible to deterioration, and is therefore more theoretically parsimonious. While it is promising, the hypothesis of a developmental deficit in social understanding awaits testing.

#### **4) Social cognition may not be a unitary construct.**

The current project measures and compares different socio-cognitive skills (both the understanding and perception of emotion) rather than just one skill. This has allowed consideration of the way in which these skills may be structured, instead of simply establishing a unitary deficit in social cognition. Understanding the structure of social cognition, according to Penn & Corrigan (2001a), is the first step towards understanding its aetiology, and eventually even its underlying neuropathology. The profile of strengths and weaknesses with regard to specific emotions, and even specific vignettes, suggests that it may be an oversimplification to treat social cognition as a single construct.

#### **Clinical implications**

This section outlines ways in which the findings of this project might inform clinical practice. Clinical applications include approaches to rehabilitation, methods of assessment, and strategies for communication with clients with schizophrenia.

##### **1) Strategies for rehabilitation.**

The finding of a differential deficit in the understanding and perception of emotion in schizophrenia suggests that direct work on emotional education in schizophrenia may be a useful element of psychosocial rehabilitation. The experimental materials used in the current study could easily be adapted to explore individual emotion scripts and meanings. Materials that have been developed primarily for use with clients who have learning disabilities might also prove helpful. The discussion of third person emotional reactions in hypothetical situations could provide a useful therapeutic tool, and may strengthen the availability of emotion scripts.

The study's finding that general cognitive processes are implicated in affect recognition provides some theoretical justification for the practice of cognitive rehabilitation. This rehabilitative technique assumes that training on non-social cognitive tasks will not only remediate the targeted cognitive impairment, but will also generalize to social skills. Two examples of such an approach are training on early information processing in the span of apprehension task (Kern, Green & Goldstein, 1995) and training on the Wisconsin Card Sorting Test in order to reduce cognitive inflexibility (Nisbet, Siegert, Hunt & Fairley, 1996). Spaulding & Poland (2001) discuss the relatively new approach of Cognitive Enhancement Therapy (CET; Hogarty & Flesher, 1999) which is particularly relevant in the context of the current research because it aims to enhance the specific cognitive abilities which it claims are necessary for the "gistful" activation of social roles and scripts. Such processes include selective attention, working memory and executive functioning. The efficacy of such treatment strategies, and the cogency of their theoretical base await confirmation in clear research findings.

## **2) Assessment.**

Poole *et al* (2000) suggest that affect recognition ability should form part of the initial psychological assessment of people diagnosed with schizophrenia. A modified version of the tasks used in this study would provide a potentially useful method for measuring two important aspects of social cognition - affect recognition and social script understanding. It could generate both quantitative and qualitative information on these abilities. Such an assessment could inform therapeutic goals, treatment interventions and strategies for communication.



### **3) Communication**

Difficulty in the perception and understanding of emotion is likely to have a profound influence on everyday communication. Emotion scripts help to structure social explanations. As noted in the last chapter, it would be difficult to overstate the importance of such shared meanings to communication about motives and events. Communication with people with schizophrenia therefore needs to be as explicit as possible, and to make use of both verbal and nonverbal channels. This may help to increase understanding at the expense of ambiguity. One strategy is to provide a brief explanation for emotions. For example:

“I really like...because...”

“I feel sad about this because...”

This could have the effect of strengthening and elaborating emotion scripts over time. Such explanations of emotion may also have the corollary outcome of preventing potentially harmful misattributions and misunderstandings of negative emotions (for example, a person with schizophrenia erroneously believing that anger is directed towards them).

### **Further research**

Several areas for further research are suggested by the methodology and findings of the current study. Perhaps the most immediately apparent is the validation of the emotion vignettes with the photographs of facial affect (Ekman & Friesen, 1975; see Appendix Four). As noted in the previous chapter, this would enable a more thorough investigation of whether or not people with schizophrenia have a differential

deficit in facial affect perception. Other potential areas for further research relate to the parameters, origins and influences of social understanding in schizophrenia.

These will now be described.

### **Social understanding and specific symptoms.**

A modified version of the emotion tasks used in this study would be a useful measure for examining social understanding in relation to specific symptoms in schizophrenia.

In particular, those symptoms and signs relating to emotion could be chosen for study: affective flattening, alexythymia and anhedonia. For example, does alexythymia (the lowered use of emotion words) relate to problems in the language system (a type of aphasia) or a difficulty with emotions? A comparison of performance on the word and face tasks could answer this question. Does affective flattening represent a defence mechanism against hypersensitivity to emotion, or rather a breakdown in the ability to make emotional attributions? Differentially poorer performance on the word task would suggest the latter. The emotion tasks developed in this research allow the elements of emotional perception and understanding to be distinguished, and may therefore aid the comprehension of emotion-related symptoms and problems.

A particularly interesting issue relates to script understanding and the development of delusional thinking. It is possible to define delusions as modes of thinking that defy commonly held scripts. Does delusional thinking therefore reflect a less consensual understanding of social scripts in general, or is the social reasoning of people prone to delusions intact, apart from when it pertains to the subject of the delusion? Once again, the vignettes could be used to investigate this fundamental question.

### **Social understanding and the developmental hypothesis.**

In the previous section on the theoretical implications of the study, the hypothesis was made that problems of social understanding may predate the onset of schizophrenia. This hypothesis could be explored by repeating the current study with a population of adolescents at risk for schizophrenia, and establishing whether levels of social understanding are predictive of the development of schizophrenia.

The relationship of social understanding to the longitudinal course of schizophrenia would also prove a matter of theoretical and clinical interest. For example, does the understanding and perception of emotion improve during remission? Is more consensual social understanding a favourable prognostic indicator? The current study focused on participants with a long-standing diagnosis of schizophrenia. It would be interesting to study changes of understanding in an acute population, in order to see how social understanding related to fluctuations in symptoms.

### **Social understanding and social functioning.**

Although the current study did not find a link between performance on the emotion tasks and scores on a measure of social functioning difficulties, social skills can be conceptualised at various levels, and the issue merits further exploration. For example, it may be the case that problems of social perception and understanding have a greater influence on ‘micro’ social skills, rather than leading directly to more

global social functioning problems. Mueser & Bellack (1998) have classified such social skills as follows:

- a) Nonverbal skills, such as eye contact, facial expressions and gestures.
- b) Paralinguistic elements, such as voice tone, inflection, pitch and rate of speech.
- c) Verbal content; the selection of words and phrasing.
- d) Interactive balance, such as turn taking in conversation and the use of verbal encouragers.

The assessment of such skills has tended to involve role-play tests. Interactions are videotaped and rated on social skills dimensions such as those outlined above.

Measuring social skills at this level would provide a more meaningful test of the hypothesised link between social cognition and social performance. Social perception would perhaps influence nonverbal and paralinguistic skills, while social understanding might be expected to underlie appropriate verbal content and interactive balance.

### **Preliminary thoughts on the nature of emotion in schizophrenia**

Having discussed the theoretical and clinical implications of the study, and having outlined possible directions for future research, this final section will offer some preliminary ideas on the relationship between emotional understanding and the *experience* of emotion in schizophrenia. These ideas will draw upon the findings of the current research, along with normative theories of emotion and cognition.

As noted in Chapter Three (p.59), emotions can be described as physiological, behavioural and cognitive events (Lang, 1985, 1988; cited in Oatley & Jenkins,

1996). The current project has been concerned with emotions as cognitive events – more precisely, with people’s understanding of emotional concepts. While the conceptual understanding of emotion is a reasonable subject for emotion research (Parrott & Hertel, 1999), Parkinson & Manstead (1993) are critical of the use of vignettes in research on emotional appraisal. They claim that in real life, symbolic processes do not necessarily mediate emotional reactions. However, as we shall see, just because *some* emotional responses may not be mediated by symbolic processes, this does not mean that prototypes or scripts of emotion are not crucial in determining the way in which emotions function.

Stein & Levine (1999) describe some of the main links between cognition and emotion:

- 1) Cognition helps us to make sense of our emotions.
- 2) Appraisals lead to the experience of emotion.
- 3) Emotion influences subsequent thinking and behaviour.

These processes occur both consciously and unconsciously. They provide a useful framework for thinking about the interface between cognition and emotion, and how it might be distinctive in schizophrenia. Each will be considered in turn.

### **1) Cognition helps us to make sense of our emotions.**

Emotions typically relate to objects and events (e.g. one is afraid *of something*, one is in love *with someone*). In this sense, emotions are *intentional* – they are about things in the world, other than themselves (Oatley & Jenkins, 1996). Prototypes and scripts of emotion may help us to understand the intentionality of our emotions (Fitness & Fletcher, 1993). If emotion scripts are less available to guide the thinking of people

with schizophrenia, then it may be harder for them to make sense of their emotions – to know what they are feeling and why. More contentiously, we can speculate that this reflects a partial breakdown of the intentionality of emotions in schizophrenia. It may be that emotions occur without an obvious trigger, coming ‘out of the blue’ and lacking intentional context. They would thus resemble transient moods over which the person has little sense of control.

## **2) Appraisals lead to the experience of emotion.**

Many theorists of emotion believe that emotions are caused by appraisals of the relevance of events to a person’s goals (e.g. Frijda, 1986). More complex models of appraisal postulate different levels of representation, wherein different types of information can lead to emotion. An example is the SPAARS model of Power & Dagleish (1997). SPAARS stands for Schematic, Propositional, Associative and Analogical Representational Systems. According to this model, emotion can be generated through an associative level of representation, where it occurs automatically through learned stimulus-response pairings. More crucially for the current discussion, emotion can also be generated at the schematic level. Here, the meanings of events are interpreted with respect to the individual’s goal structure. It is also at this level that higher order schemas about the self, others and the world are represented, along with social scripts. The current research has shown that people with schizophrenia tend to have fewer consensual emotion scripts at the schematic level. It can be hypothesised that this might result in the triggering of socially inappropriate affective responses.

Therefore, SPAARS outlines a role for script understanding in appraisal, and the generation of emotion. It also models the influence of different types of information on the way in which emotion is experienced. Of particular relevance in schizophrenia may be the influence of motivation and drive states on goals. If motivation is lowered in schizophrenia, then goals are likely to be less prominent, and appraisal theories would predict that emotions would consequently occur less frequently.

### **3) Emotions influence subsequent thinking and behaviour.**

Damasio (1994) believes that emotions play a vital role in helping people choose between conflicting courses of action. He calls this the ‘emotion guidance system’.

Rather than laboriously weighing the pros and cons of each of the many options encountered in everyday life, emotions allow people to reject unattractive choices, while emotionally appealing possibilities are selected for further consideration.

Damasio’s thesis draws upon case studies of people with damage to the frontal lobes of the brain, and he notes that they often show particular difficulties with planning, as well as blunted emotional responses.

It is possible to speculate that such difficulties may also be a feature of schizophrenia.

If a person is faced with several choices, they might imagine themselves in some of the situations, and gauge the emotion that this gives rise to. Script knowledge may well play a part here as a heuristic means of speeding up this process, determining which choices are worth attending to, and which rejecting. The hypothetical emotional scenarios used in the current study can be viewed as analogues of this process. It would seem that people with schizophrenia are less able to draw upon scripts to guide their choice of emotion in response to the vignettes. Therefore, it

may be the case that people with schizophrenia also find analogical emotional reasoning problematic when making decisions in their own lives. The heuristic use of emotions in planning (either via the schematic use of scripts, or the analogical generation of proprioception) may therefore be less natural for people with schizophrenia. Damasio's 'guidance system' would be compromised, leading to difficulties with choices and planning.

## Summary

This section has speculated upon possible influences that a compromised understanding of emotion might have upon the *experience* of emotion in schizophrenia. The interface between cognition and emotion is hotly debated, and the term 'cognition' has a much wider meaning than the script understanding that is the subject of this research. Despite this, emotional understanding has several hypothetical influences on the experience of emotion. Firstly, it may adversely affect the ability to make sense of emotional experience. Secondly, it could lead to problems in the schematic appraisal of events, and the triggering of inappropriate affects. Thirdly, it could compromise the 'gut-feeling' that helps people to plan and make choices in day-to-day life.

The description of the SPAARS model suggests that the understanding of emotion is only one part of one representational level in emotion appraisal. However, its importance may lie in its amenability to change, and therefore to clinical intervention. Increasing the understanding of emotion in people with schizophrenia may impact upon their experience of emotion through the mechanisms described above: narratives of intentionality, more accurate appraisals and stronger scripts to guide



planning. It is hoped that the current research offers the beginnings of a rationale and methodology in pursuit of this goal.

## **Conclusion**

This chapter has considered the theoretical and clinical context of the current research. The findings suggest that both the information processing and social cognition models of schizophrenia have contributions to make towards understanding social difficulties in the disorder. Overall, greater attention should be given to researching social understanding as a means of elucidating emotional distress.

Clinically, social understanding in schizophrenia is a useful target for assessment, intervention and evaluation. Interventions could include education on emotions, practicing the cognitive skills thought to underlie social understanding, and making communication clearer. In focusing on social scripts, such interventions would draw on paradigms from social psychology, and the project has suggested that there is great potential for the cross-fertilization of ideas between clinical and social psychology. Further research might usefully look at emotional understanding and perception in relation to specific symptoms, and at the relationship with social functioning at the level of social *skills* rather than social problems. Research on the developmental origins of problems of social understanding might provide a useful marker for people at risk of developing schizophrenia.

Finally, an attempt was made to integrate the findings of the study with normative theories of cognition and emotion. Difficulties in understanding emotions in relation

to events may lead to problems in making sense of the experience of emotion, in the generation of emotional reactions to events, and in the use of emotion to gauge preferences. It should be recognised that these suggestions are highly speculative, and draw freely on a number of theories. Although this study has begun to elucidate the understanding and perception of emotion in schizophrenia, an integrated model of cognition and emotion in the disorder remains a distant prospect.

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## **APPENDICES**

## Appendix One: Vignette validation questionnaire (Version A)

### Instructions

For each of the following scenarios, please tick **one** box for the emotion word that you think best describes how John or Jane would be feeling. Don't spend too long on any item. Please remember that there are no right or wrong answers. If you think that John or Jane would not experience any emotion at all in the situation, then tick the 'Neutral' box. Thank you for your help.

1) Jane was trying to say something important, but she kept on being interrupted.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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2) John is at a party with all his favourite people.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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3) Jane's friend took off his shoes and his feet smelled.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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4) John had worked hard, and was praised for the good job he had done.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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5) John was baking a cake and it got burned.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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6) John asked a shop assistant for help, but the shop assistant ignored him.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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7) Jane has made up with her friend after a bad argument.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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8) Jane hasn't been invited to her friend's party.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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9) Jane was trying to fix her bike, but she couldn't get it to work and she cut her hand.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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10) John went for a walk, and accidentally trod in some dog's mess.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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11) At Christmas, Jane didn't get any of the presents she had hoped for.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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12) Jane is thinking about someone she hasn't spoken to in a long time. The telephone rings and it is the person she was thinking about.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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13) John had a bad nightmare, and woke up sweating.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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14) John is out walking on his own, when suddenly a voice behind him shouts 'Hello!'

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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15) John is thinking about his holiday next month, and looking forward to relaxing in the sun.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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16) John saw an old lady being taken to an ambulance. Her face was covered in blood.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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17) At Christmas, Jane got a present she had wanted for a long time.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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18) Jane can smell smoke, and thinks the house is on fire.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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19) Someone was sick on John during lunch.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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20) Jane opens the newspaper, and sees a picture of herself.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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21) Someone had torn up John's favourite magazine.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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22) John was watching a horror film, when the lights suddenly went out.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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23) John finds a dead mouse under the stairs.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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24) Jane bit into an apple and found a dead worm inside.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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25) John has a pet dog. John has found out that the dog is sick and is going to die.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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26) Jane has just tasted something bad.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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27) While walking round a corner, John bumps into someone he hasn't seen in many years.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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28) John got into an argument, and the other person swore at him.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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29) When Jane opened the biscuit tin, a jack-in-the-box sprang out.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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30) John's favourite jumper has worn out, and he has to throw it away.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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31) Jane passed an empty house, and thought she saw a ghostly figure watching her from one of the windows.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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32) Jane was out walking when a fierce-looking dog started to run towards her.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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33) John thought he saw his sister in the shopping centre. When he said hello, she turned round and it was a complete stranger.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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34) Jane watched her favourite programme on TV.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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35) Jane was alone and lost in a strange city.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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36) Jane has discovered that her best friend must move far away.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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37) John hears on the news that a dangerous man is on the run in his area.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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38) Someone else had made a mistake, but Jane got blamed.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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39) John was riding in a friend's car. His friend was driving very fast on an icy road.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
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Please feel free to write down any comments you have on the above procedure

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Thank you for your help.

**Appendix Two**  
**Vignette validation: Percentage responses (N=118)**

	Happy	Sad	Fear	Anger	Disgust	Surprise	Neutral
<b><u>Happy</u></b>							
Jane has made up with her friend after a bad argument.	95	0	0	0	0	2	3
John is at a party with all his favourite people.	100	0	0	0	0	0	0
At Christmas, Jane got a present she had wanted for a long time.	85	0	0	0	0	15	0
John had worked hard, and was praised for the good job he had done.	92	0	1	0	0	7	1
Jane watched her favourite programme on T.V.	81	0	0	0	0	0	19
John is thinking about his holiday next month, and looking forward to relaxing in the sun.	98	0	0	0	0	0	2
<b><u>Sad</u></b>							
John was baking a cake, and it got burned.	0	44	2	40	2	4	8
Jane has discovered that her best friend must move far away.	0	98	0	1	0	0	1
John has a pet dog. John has found out that the dog is sick and is going to die.	0	97	3	0	0	0	0
At Christmas, Jane didn't get any of the presents she had hoped for.	0	84	0	7	0	7	3
Jane hasn't been invited to her friend's party.	3	59	2	11	2	23	0
John's favourite jumper has worn out, and he has to throw it away.	0	89	0	0	0	0	11
<b><u>Surprise</u></b>							
John thought he saw his sister in the shopping centre. When he said hello, she turned around, and it was a complete stranger.	0	6	2	0	0	76	16
Jane is thinking about someone she hasn't spoken to in a long time. The telephone rings and it is the person she was thinking about.	24	0	1	0	0	75	1
While walking round a corner, John bumps into someone he hasn't seen in many years.	13	0	0	0	0	87	0
When Jane opened the biscuit tin, a jack-in-the-box sprang out.	0	0	8	0	0	91	2
John is out walking on his own, when suddenly a voice behind him shouts "Hello!"	0	0	15	1	0	80	4
Jane opens the newspaper and sees a picture of herself.	2	1	6	0	0	90	2
<b><u>Disgust</u></b>							
John has just tasted something bad.	0	0	2	0	88	6	4
Jane finds a dead mouse under the stairs.	0	7	8	0	61	15	9
Someone was sick on John during lunch.	0	1	1	7	88	2	2



	Happy	Sad	Fear	Anger	Disgust	Surprise	Neutral
Jane bit into an apple, and found a dead worm inside.	0	0	2	0	94	3	2
John went for a walk, and accidentally trod in some dog's mess	0	0	0	21	74	1	4
Jane's friend took off his shoes, and his feet smelled.	0	0	1	0	75	12	13
John saw an old lady being taken to an ambulance. Her face was covered in blood.	0	55	17	3	9	8	9
<b><u>Fear</u></b>							
John hears on the news that a dangerous man is on the run in his area.	0	0	78	1	0	4	17
Jane was alone and lost in a strange city.	0	7	91	1	0	0	2
Jane passed an empty house, and thought she saw a ghostly figure watching her from one of the windows.	1	0	86	0	0	9	4
Jane had a bad nightmare, and woke up sweating.	0	1	96	0	0	2	2
John was watching a horror film, when the lights suddenly went out.	0	0	86	1	0	11	2
Jane was out walking when a fierce-looking dog started to run towards her.	0	0	99	0	0	1	0
John was riding in a friend's car. His friend was driving very fast on an icy road.	1	0	93	5	0	1	0
Jane can smell smoke, and thinks the house is on fire.	0	0	98	0	0	2	0
<b><u>Anger</u></b>							
Jane was trying to fix her bike, but she couldn't get it to work and she cut her hand.	0	8	5	73	1	3	9
Jane asked a shop assistant for help, but the shop assistant ignored her.	0	3	1	74	10	11	1
John got into an argument, and the other person swore at him.	0	3	8	70	4	7	8
Jane was trying to say something important, but she kept on being interrupted.	0	3	0	93	2	0	2
Someone had torn up John's favourite magazine.	0	4	1	89	1	3	3
Someone else had made a mistake, but Jane got blamed.	0	2	0	95	1	3	0

*Percentages are rounded to the nearest whole number, and therefore may not add up to 100% in all cases.*

## Appendix Three

### Emotion task instructions

#### **Task one: Perceptual matching task**

Place the female set of facial affect photographs in front of the participant in two rows, in random order, with four cards in one row, and three in the other.

Give the following instructions:

**These are some photographs of the same person, but in each photo they have a different facial expressions. You see, they are all different. Take a few moments to have a look at the cards, and see how the woman's face is different in each one.**

*Wait for twenty seconds*

**Now I'm going to show you a photograph that is the same as one of these.**

Show a photo, randomly drawn from a second set of female cards.

**Look carefully. Now, can you show me the photo that is exactly the same as this one.**

If the participant fails the first attempt on any trial, say:

**Look again at this one. Now, see if there is one that is just the same. Look carefully at all of them.**

If the second attempt is incorrect, the participant is deemed to have failed the trial.

Administer three trials. If any one trial is failed at the second attempt, administer a fourth trial. If any two trials are failed, discontinue testing.

#### **Task two : Emotion words task**

Place the affect word cards (*Disgust, Sad, Surprise, Anger, Happy, Fear*) in front of the participant in random order, in two rows.

Give the following instructions:

**On these cards are some words that describe emotions that people feel from time to time. Are the words large enough for you to read? Take a few moments to have a look at them. (*Allow 20 seconds*).**

**I'm going to read out some short situations involving a lady/man called Jane/ John, and when I've finished each one, I would like you to point to the word that best shows how you think they would be feeling.**

*(add the 'Nothing' word card to the array, to the right as the participant looks at it):*

**If you think that they wouldn't feel anything at all in the situation, then you can point to this card, that says "Nothing"  
Let's try a couple.**

### Sample items

#### **Sample 1:**

**John was alone and lost in a strange city.**

***Point to (or read out) the word which you think best describes how John would be feeling.***

**Good. Let's try another.**

#### **Sample 2:**

**John hasn't been invited to his friend's party.**

***Which word do you think best describes how John would be feeling?***

### Experimental items

**Good. You've got the hang of it. I'll read you some more situations now, and you pick the word that most closely fits what you think Jane/ John would be feeling. There's no need to rush. Take as long as you need to on each item.**

*If required, the following prompts may be used once only:*

**Point to the word that shows what you think they would be feeling.**

**Which word is nearest to how you think they would feel.**

**What do you think John/ Jane would feel?**

*Record responses on the question and response sheet.*

### **Task three: Emotion faces**

**Place one set of facial affect photographs in front of the participant in random order in two rows.**

**Give the following instructions:**

**Now let's try something different. *(Pointing to photos)* This is Jane/ John. You can see that John/ Jane has a different expression in each photo. Take a few moments, and have a good look at each one *(allow 20 seconds for participant to study the cards)*.**

**I'm going to read out some short situations involving Jane/ John, and when I've finished each one, I would like you to point to the picture that best shows how you think they would be feeling. Let's try a couple.**

*Sample items*

**Sample 1:**

**Jane is watching her favourite programme on TV.**

***Point to the photo which you think best shows how Jane would be feeling.***

***Good. Let's try another:***

**Sample 2:**

**Jane thought she saw her brother in the shopping centre. When she said hello, he turned around and it was a complete stranger.**

***Point to the photo which you think best shows how Jane would be feeling.***

*Experimental items*

**Good. You've got the hang of it. I'll read you some more situations now, and you pick the photo that most closely fits what you think Jane/ John would be feeling. There's no need to rush. Take as long as you need to on each item.**

***Proceed with items. There is no need to repeat the question once the participant has understood the procedure. It is important **not** to question participant choices during the testing stage: if required, the following prompts may be used once only:***

**Point to the photo that shows what you think they would be feeling.**

**Point to the expression which is nearest to how you think they would feel.**

**What do *you* think John/ Jane would feel?**

***Record responses on the question and response sheet.***

**Task four: Word and picture matching**

**Place one set of facial affect photographs in front of the participant, in random order in two rows. Place the affect word cards in random order to one side of the photos.**

**Give the following instructions:**

**Now, we have both the photos and the emotion words. What I'd like you to do is to match each word with the picture that you think shows that emotion: so, for the word 'Sad', for example, I would like you to pick the face that seems sad, for the word 'Fear' pick the face that looks to you to have an expression of fear, and so on. Do you understand what to do?**

***Record responses on the response sheet.***

***Thank the participant for taking part, debrief and answer any questions.***

**Appendix Three: Emotion task question and response sheet – version one**

**Date:** .....

**Participant Number:** .....

**Task one: Perceptual matching**

**Read instructions for task.**

**Record Responses:**

Surprise	Anger	Happiness	Neutral	Disgust	Fear	Sadness
----------	-------	-----------	---------	---------	------	---------

**Tasks two and three: Emotion word & emotion face**

**Read instructions for task three: emotion face task.**

**Sample items:**

- 1) Jane is watching her favourite programme on TV.  
*Point to the photo that you think best shows how Jane would be feeling.*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 2) Jane thought she saw her brother in the shopping centre. When she said 'Hello', he turned around and it was a complete stranger.  
*Point to the photo that you think best shows how Jane would be feeling.*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

**Experimental items:**

- 1) Jane's favourite jumper has worn out, and she has to throw it away.  
*Which photo best shows how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 2) Someone else had made a mistake, but Jane got blamed.  
*Which photo best shows how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 3) Jane is thinking about her holiday next month, and looking forward to relaxing in the sun.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 4) Jane is out walking on her own, when suddenly a voice behind her shouts 'Hello!'  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 5) When Jane opened the biscuit tin, a jack-in-the-box sprang out.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 6) Jane can smell smoke, and thinks the house is on fire.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 7) Jane's friend took off his shoes and his feet smelled.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 8) Jane has a pet dog. Jane has found out that the dog is sick and is going to die.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 9) Jane had a bad nightmare, and woke up sweating.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 10) Jane bit into an apple and found a dead worm inside.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 11) Jane has made up with her friend after a bad argument.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 12) Jane asked a shop assistant for help, but the shop assistant ignored her.  
Which photo best shows how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

**Replace photographs with word cards.**  
**Read instructions for task two: Emotion word task.**

**Sample items:**

- 1) Jane was alone and lost in a strange city.  
Point to (or read out) the word that you think best describes how John would be feeling.

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

- 2) Jane hasn't been invited to her friend's party.  
Which word do you think best describes how Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

**Experimental items:**

- 13) Jane was riding in a friend's car. Her friend was driving very fast on an icy road.  
Which word best describes how you think Jane would be feeling?

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

14) Jane has just tasted something bad.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

15) Jane has discovered that her best friend must move far away.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

16) Jane opens the newspaper, and sees a picture of her self.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

17) Jane had worked hard, and was praised for the good job she had done.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

18) At Christmas, Jane didn't get any of the presents she had hoped for.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

19) Someone had torn up Jane's favourite magazine.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

20) Someone was sick on Jane during lunch.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------



21) Jane is at a party with all her favourite people.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

22) Jane was out walking when a fierce-looking dog started to run towards her.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

23) While walking round a corner, Jane bumps into someone she hasn't seen in many years.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

24) Jane was trying to say something important, but she kept on being interrupted.

*Which word best describes how you think Jane would be feeling?*

Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

**Task four: Word and picture matching**

**Read instructions for task.**

Record word responses in spaces:

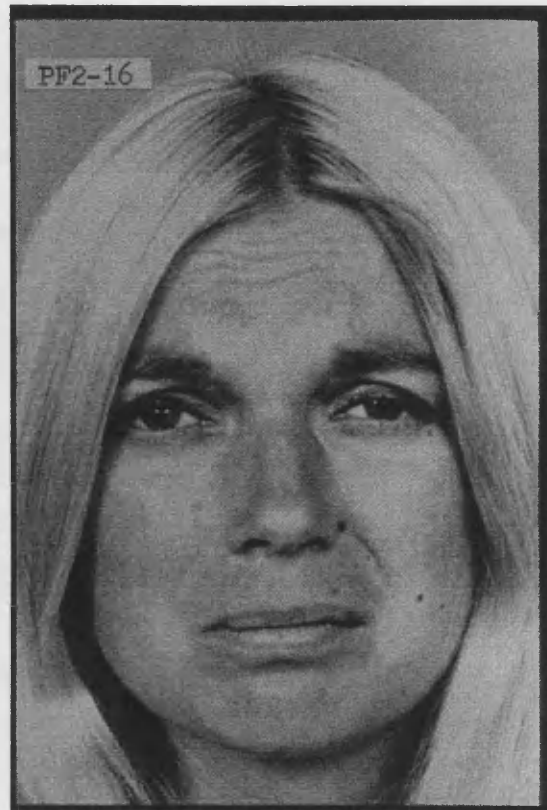
Disgust	Sadness	Surprise	Anger	Happiness	Fear	Neutral
---------	---------	----------	-------	-----------	------	---------

**General observations:**

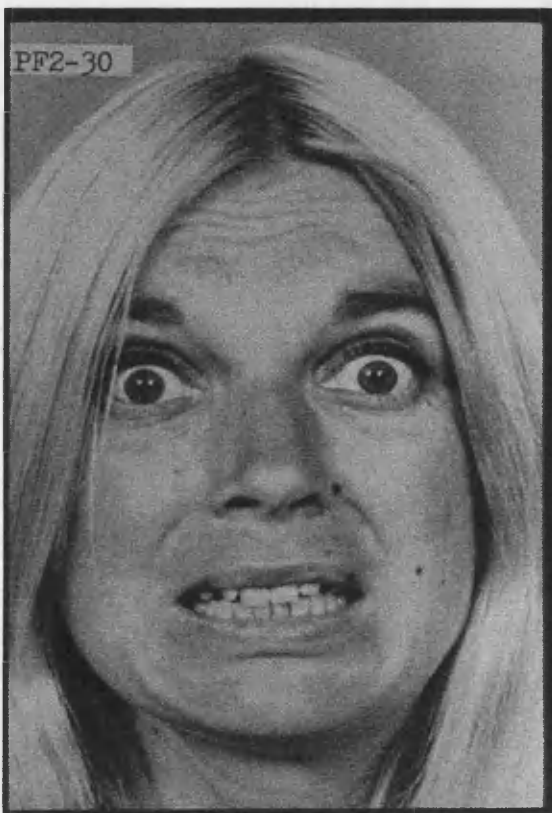
**Appendix Four:**  
**Pictures of facial affect**



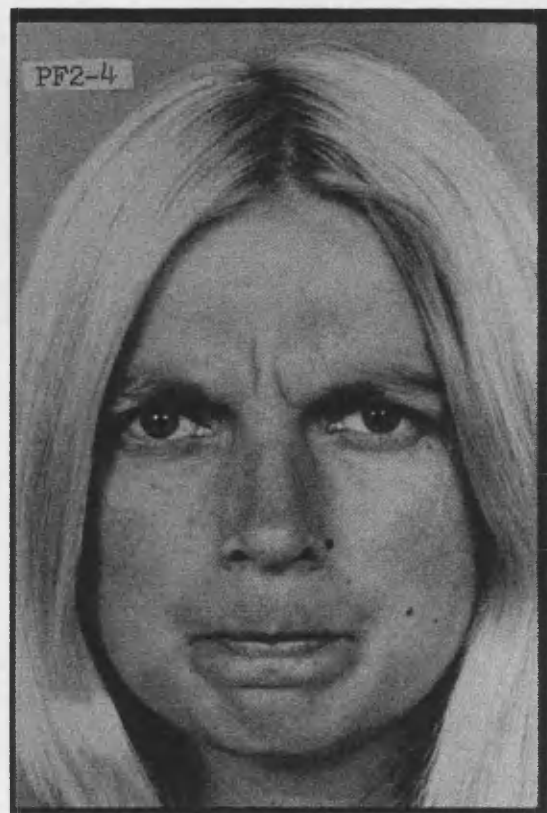
**Happy**



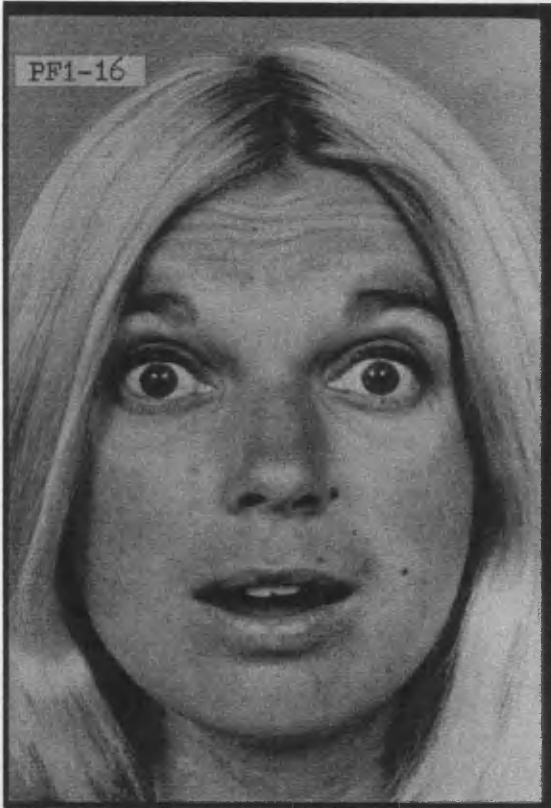
**Sad**



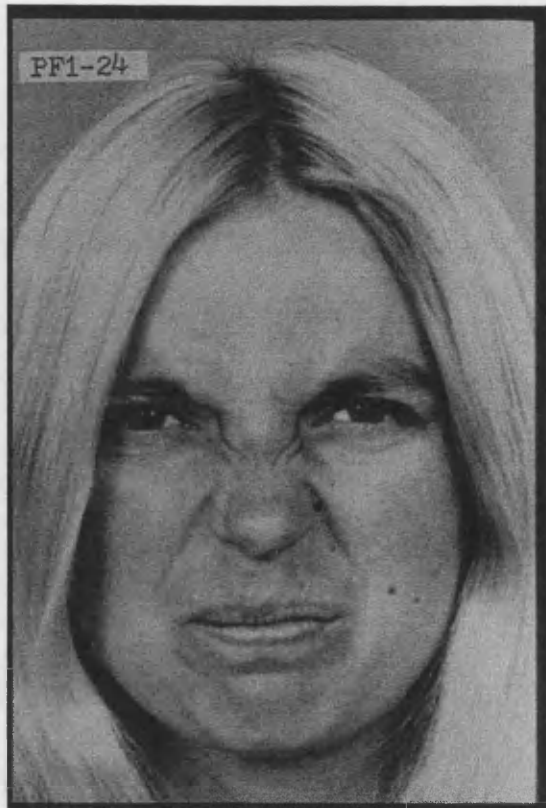
**Fear**



**Anger**



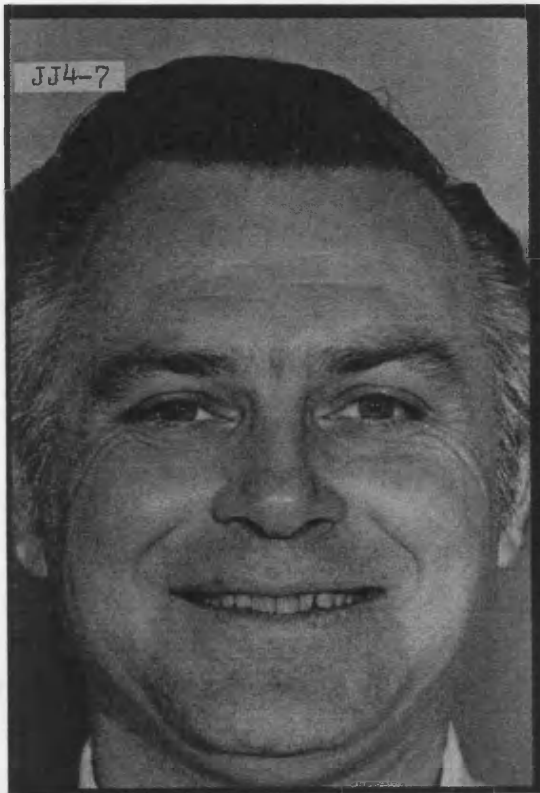
**Surprise**



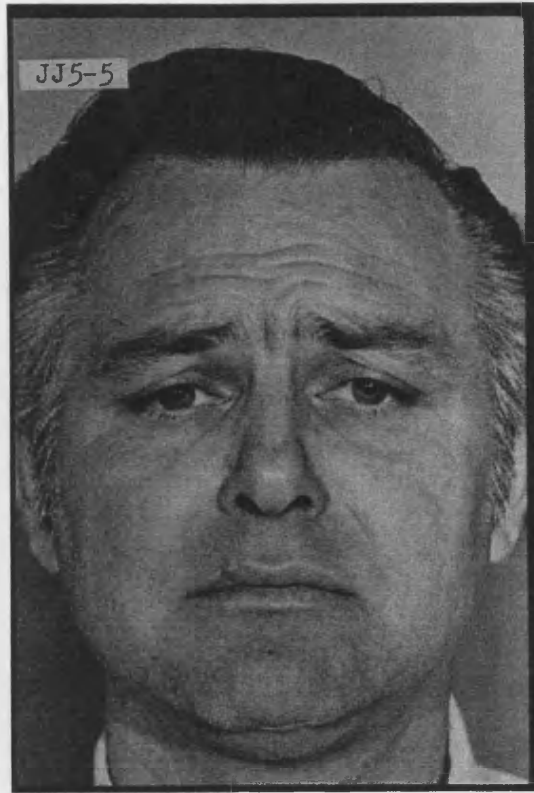
**Disgust**



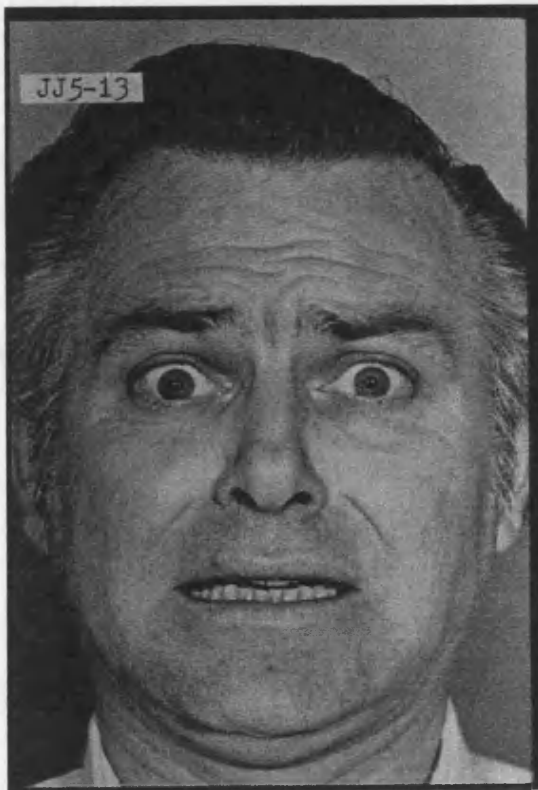
**Neutral**



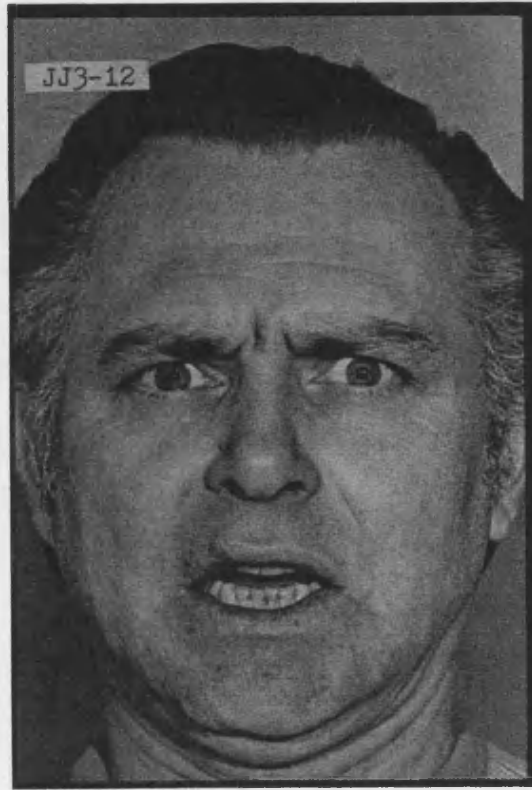
**Happy**



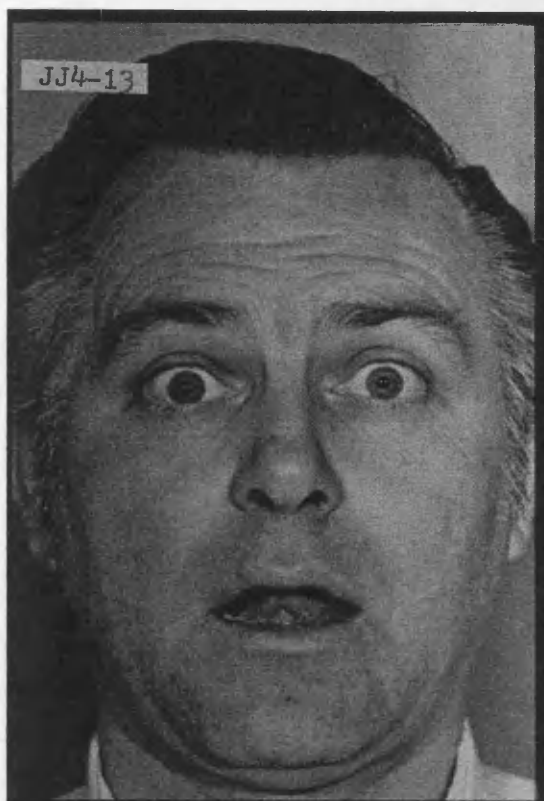
**Sad**



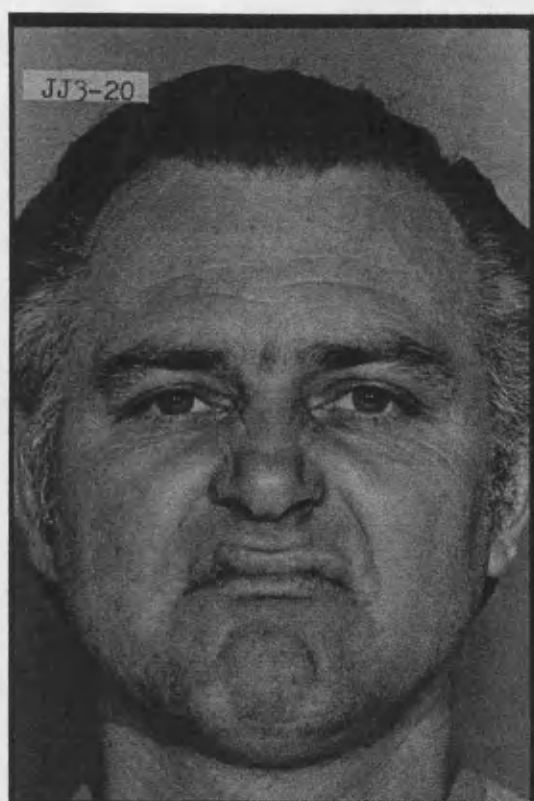
**Fear**



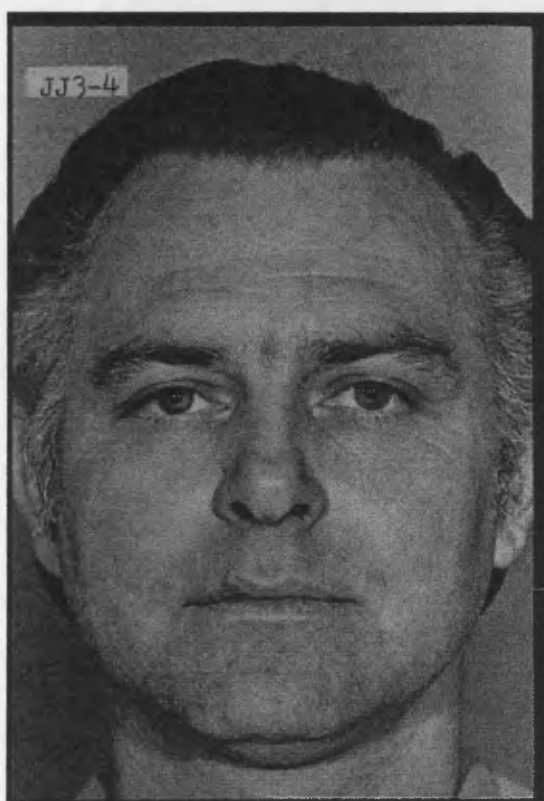
**Anger**



**Surprise**



**Disgust**



**Neutral**

## Appendix Five: Social Behaviour Schedule

This questionnaire describes the behavioural difficulties of people who use mental health services. The information it generates will be used only in the current research project, and not as the basis for any service decisions. All data will be coded and anonymous.

Please rate the person's typical behaviour over the past month.

The degree (severity) of the behaviour and the frequency of occurrence should both be taken into account when making the rating. When in doubt, frequency should always carry more weight than degree. In other words, how does the client *most usually* behave?

**Date of Completion** .....

**Name of Client** .....

**Setting** .....

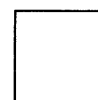
**Completed by** .....

### 1. Communication: taking the initiative

Does the client initiate conversations? Will he or she approach a member of staff either to ask a question or start a conversation?

If the client approaches, will he/she carry on the conversation after the initial comments?

- 0 = Good range of spontaneous contacts. Can initiate a conversation and keep it going by spontaneous contributions. If someone else initiates a conversation, client responds appropriately and quite often keeps the conversation going (i.e. active as well as passive response).
- 1 = Can sometimes initiate or maintain a conversation, but this is infrequent or the range of topics is very limited. If another person initiates contact client usually responds appropriately, but only for a short time and then ceases to respond.
- 2 = Occasionally speaks spontaneously, but this is unusual, and limited to greetings, brief factual exchanges etc. Quite often ignores another person's attempt at contact, or turns away.
- 3 = Usually responds negatively to attempts to initiate conversation.
- 4 = Client says virtually nothing. He/she does not respond when greeted or spoken to. He/she initiates extremely few verbal or non-verbal contacts.



## **2. Conversation: incoherence**

How far is the client handicapped in engaging in conversation with others through incoherence of speech?

(NB this rating is not concerned with how articulate the client is or how intelligently he/she can express him/herself. The incoherence of speech rated here is that associated with psychotic illness – e.g. flight of ideas, knight's move etc.)

0 = No incoherence of speech.

1 = Some occasional incoherence of speech (e.g. once or twice a month).

2 = Incoherence of speech occurs more frequently (e.g. once a week). Most speech is coherent.

3 = Frequent incoherence of speech (e.g. more than once a week).

4 = Client's conversation is always or almost always characterised by incoherence of speech. Very difficult to understand anything he/she says.

☐

## **3. Conversation: oddity/inappropriateness**

How far does the client's conversation show a preoccupation with bizarre or eccentric topics which most people (not only specialists) would regard as extremely odd.

0 = Above behaviour does not occur.

1 = Above behaviour occasionally present (e.g. once or twice a month).

2 = Above behaviour occurs more frequently (e.g. once a week) but most speech contains no such examples.

3 = Above behaviour occurs very frequently (e.g. daily).

4 = Virtually all client's conversation is as described above.

☐



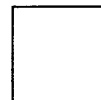
***Social mixing: note***

The following three ratings are concerned with three different aspects of the client's ability to mix with others. These ratings give some picture of the extent to which people have to make allowances for the client's handicaps or social difficulties in order to interact with the client. Thus the client's ratings on these three questions indicate how far he/she is restricted by his/her handicaps to relating only to immediate family or professional carers.

**4. Social mixing: ability to make social contacts in an appropriate way**

If the client was standing at a bus stop and someone asked him/her when the next bus was expected, would the client be able to respond appropriately? Would he/she appear odd in manner?

- 0 = Client behaves appropriately in the way he/she makes social contacts with others.  
Or client is not interested in making social contacts with others.
- 1 = Client makes social contacts with others appropriately to a degree, but is rather handicapped by lack of grasp of what is said and what is not socially acceptable (e.g. definitely behaved inappropriately on one or two occasions in the past month).
- 2 = Client can approach others in a socially appropriate manner some of the time but quite often lapses into inappropriate behaviour (e.g. once a week).
- 3 = Most of client's attempts to make contact with others are inappropriate in nature (e.g. more than once a week but behaviour is not as extreme as (4)).
- 4 = Client is quite unable to behave appropriately and creates frequent embarrassment because of the inappropriateness of his/her attempts to approach others. He/she never or virtually never approaches others in an appropriate fashion.



### **5. Social mixing: proportion of social contacts which are hostile in nature**

This rating is concerned with the sorts of contacts the client makes with other people. The emphasis in this rating is on verbal or physical hostility. Only rate hostility if it is inappropriate or more extreme than the situation demands. Verbal hostility includes swearing etc, but does not include apathy or failures to respond to social approach. Only rate physical hostility if the client has had physical contact with another person which was hostile in nature.

0 = Contacts are nearly all appropriately friendly.

1 = Mostly friendly contacts. Occasionally contacts are inappropriately hostile (e.g. one or two incidents in past month or more than this but of a relatively minor nature).

2 = More frequent incidents of inappropriately hostile contact or a serious incident involving threatening behaviour in past month, but most contacts have been friendly.

3 = Most contacts are verbally hostile (e.g. swears, accuses etc. more than once a week).

4 = Contacts are frequently verbally hostile, or client has at any time in past month been physically hostile.

☐

### **6. Social mixing: attention-seeking behaviour**

Does the client try to monopolise peoples' attention? Is he/she resentful if staff members, relatives etc. give attention to others?

0 = Client does not seek attention inappropriately.

1 = Client sometimes but does not get upset if attention is paid to others (e.g. an incident when client sought to monopolise attention occurred once in past month).

2 = Client sometimes seeks to monopolise attention of others, and also tends to get angry and resentful if attention is given to others.

3 = Client constantly makes demands on others attention (e.g. more than once a week).

4 = Client constantly makes demands on attention of others (either specific others such as a particular relative, or staff in Day Centre or Hostel setting, or other people in general). Client also frequently gets angry or resentful if any attention is given to others.

☐

## **7. Suicidal and self-harming ideas and behaviour**

Ratings on this item should be made conservatively. A rating of three or more should only be made if it is certain that injuries which were sustained were intended by the client to be of a suicidal nature.

0 = Client has not spoken of suicide or made any attempt.

1 = Client has alluded to suicide indirectly in past month.

2 = Client has spoken of suicide directly in past month.

3 = Client has made some kind of suicidal gesture in past month (e.g. scratching wrists). Or client has spoken of suicide several times in past month.

4 = Client has made a serious attempt at suicide or injured him/herself seriously in past month.

## **8. Panic attacks and phobias**

This rating is concerned with how far the client is troubled by anxiety, either attached to particular situations (e.g. being with people, travelling, leaving the house) or generalised feelings of anxiety and tension. Preoccupation with health worries are included if there are no objective grounds.

0 = Client is free enough from anxiety to be able to undertake any social or other activity he/she might choose.

1 = Client is troubled by occasional anxiety. Or client's anxiety is not excessively disabling because confined to small areas. Or level of anxiety is low enough that client can contain and live with it.

2 = Client is tense and anxious much of the time, and this prevents him/her from functioning in certain key areas of life. Nevertheless, client can cope with his/her anxiety in general.

3 = Client suffers anxiety most of the time. Or client has very frequent (e.g. twice weekly) anxiety attacks. There are few areas where client can function without being handicapped by anxiety.

4 = Client is extremely tense and anxious virtually all the time. His/her anxiety prevents him/her from doing almost anything at all and it troubles him/her constantly.

## **9. Overactivity and restlessness**

Overactivity should be rated if one or more of the following are present: purposeless pacing up and down or rushing from room to room, frequent unnecessary movements, general restlessness, fidgeting. If either purposeless frequent pacing is present or more than one of the other behaviours is present then rate as marked overactivity.

0 = No marked overactivity or restlessness.

1 = Occasional periods of restlessness or overactivity (e.g. once or twice in past month).

2 = Overactivity occurs quite often (e.g. weekly).

3 = Client shows marked overactivity frequently (e.g. daily or nightly).

4 = Client shows marked overactivity for long periods on a regular basis (e.g. most nights spends several hours pacing up and down).

## **10. Laughing and talking to self**

Only rate here if it is obvious that the client is not laughing socially i.e. evidence of laughing when alone or muttering so no-one else can catch what is said is enough to consider making a rating.

0 = No laughing or talking to self.

1 = Occasional episodes of laughing or muttering to self (e.g. once or twice in past month). Can control behaviour if reminded.

2 = More frequent episodes of laughing or muttering to self (e.g. three times in past month). Client has some difficulty in controlling behaviour if reminded.

3 = Laughing or talking to self occurs often (e.g. weekly).

4 = Very frequent laughing or talking to self (e.g. daily). Or less than daily but episodes last a long time.

### **11. Acting out of bizarre ideas**

This rating is concerned with whether the client decides on some action because of his/her delusions. For example: (a) going to the scene of some major catastrophe because the client feels his/her help is needed; (b) the client assumes that he/she has millions of pounds and so either spends it or tries to spend it on expensive items.

0 = No such behaviour.

1 = Such behaviour has occurred once in past month.

2 = Such behaviour has occurred more than once in past month.

☐

### **12. Posturing and mannerisms**

This rating is concerned with odd, stylised movements, or uncomfortable or inappropriate postures.

0 = No posturing or mannerisms.

1 = Some odd or uncomfortable postures or mannerisms occasionally (e.g. once or twice in past month).

2 = Behaviour apparent more frequently (e.g. once a week).

3 = Behaviour apparent very often (e.g. more than once weekly).

4 = Behaviour apparent frequently (e.g. client adopts odd postures or mannerisms much of the time or every day).

☐

### **13. Socially unacceptable habits or manners**

This rating concerns unacceptable habits e.g. scratching genitals, passing loud flatus, picking nose, etc. Ask particularly about problems at meal times such as poor table manners.

0 = Has good manners and behaviour is socially acceptable.

1 = Behaviour is not markedly unacceptable but client has positive qualities in manner.

2 = Occasional unacceptable behaviour (e.g. markedly unattractive habit, surliness, uncouthness). However, much of the time client is passively acceptable.

3 = Frequent episodes of unacceptable behaviour as in (2) (e.g. once a week).

4 = Behaviour is markedly unacceptable most of the time.

☐

### **14. Destructive behaviour**

Under this item only rate behaviour which results in destruction of property only. If an incident included some threatening behaviour to others as well as destruction of property, then rate under item 5 only.

0 = Client has reasonable tolerance for provocation, is in control of angry feelings and acts in a socially appropriate manner.

1 = Threatens to destroy property occasionally but has not actually done so.

2 = Frequently threatens to destroy property.

3 = Has damaged property in anger during past month e.g. broken windows, torn clothes.

☐

### 15. Depression

This rating concerns periods spent in the client sitting with his/her head in his/her hands looking miserable, remarks such as “I wish I had never been born” or “life is pointless” etc. Do not assume suicidal behaviour is an indication of depression. Other signs need to be present to make a rating here.

0 = No such behaviour.

1 = Such behaviour occurs occasionally (e.g. one or two brief incidents in past month).

2 = Such behaviour occurs fairly often or for fairly long periods (e.g. once a week).

3 = Such behaviour occurs frequently (e.g. daily).

☐

### 16. Inappropriate sexual behaviour

This rating concerns sexual activity which is directed towards another person. *Do not include* self-stimulation. Where the client is unaware of social constraints, e.g. masturbating in a public place but not directed towards any particular person. If unclear whether behaviour constitutes a sexual advance, then rate under item 13 (socially unacceptable habits). Include discussions of a sexual nature only when they are aimed at provoking the other discussants – if not provoking then rate under item 3 (odd or inappropriate conversations).

0 = No inappropriate sexual behaviour or talk.

1 = Client is somewhat preoccupied with sexual matters (e.g. once or twice talked about sex in an inappropriate context in the past month).

2 = Client more often exhibits inappropriate sexual behaviour (e.g. makes unwelcome sexual advances).

3 = Client exhibits markedly inappropriate sexual behaviour quite frequently (e.g. exposes self, makes unwelcome sexual advances in an embarrassing manner).

4 = Client exhibits behaviour as in (3) frequently (e.g. weekly). Client's behaviour is sufficiently marked and frequent to cause problems in his/her household and community.

☐

### **17. Personal appearance and hygiene**

In making this rating, consider cleanliness, hair, changing underwear, incontinence. Also consider bizarre appearance. Take into account the amount of supervision the client receives. If, for example, the client is in a hostel, consider how he/she would care for him/herself if not in a supervised situation. (Do not consider “fashionable” disorder in dress.

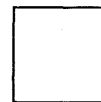
0 = Able to look after appearance and cleanliness adequately.

1 = Usually appearance is satisfactory but occasionally needs reminding. Or takes an interest in certain aspects of appearance but neglects others.

2 = Quite often needs reminding about appearance (e.g. three times in past month). Or attends to appearance but in an inappropriate manner so that appearance is bizarre.

3 = Considerable self-neglect most of the time. Needs frequent reminding (e.g. more than once a week) and some supervision.

4 = Gross self-neglect. No spontaneous care of clothes (e.g. clean underwear) washing hair, hygiene. Needs supervision in all aspects. Would smell if unsupervised. Would be incontinent if not reminded.



### **18. Slowness**

This item is concerned with abnormal slowness, e.g. the client sits abnormally still, walks abnormally slowly or is delayed when performing movements. Make allowances for age and physical condition.

0 = No abnormal slowness.

1 = Moderately slow on occasions, but most of the time is not slow.

2 = Moderately slow most of the time, even when stimulated.

3 = Moderately slow most of the time with periods of extreme slowness as in (4).

4 = Extremely slow. Will sit or lie doing nothing if not stimulated, and even then very slow to move.





## **19. Underactivity**

This rating concerns underactivity only. Bear in mind that the client may be slow (Question 18) and underactive, or underactive only. Underactivity here is defined as a lack of spontaneous activity. If the client is not stimulated will sit and do nothing (moderate underactivity). When it is not possible to stimulate the client into carrying out a task then rate as extreme underactivity.

0 = No abnormal underactivity.

1 = Moderately underactive on occasions, but most of the time keeps active.

2 = Moderately underactive most of the time even when stimulated.

3 = Moderately underactive most of the time, with periods of extreme underactivity as in (4).

4 = Extremely underactive. Will sit or lie doing nothing if not stimulated, and then very slow to move.

☐

## **20. Concentration**

Does the client find it difficult to concentrate on a task even when he/she really wants to do so? On watching a TV programme? On reading a book? Is the client distractible? Can the client set his/her mind to something and do it, or does he/she find it impossible to concentrate long enough to do this?

0 = Client does not have problems with his/her ability to concentrate.

1 = Client has periods when he/she is unable to concentrate.

2 = Client can only concentrate for a few minutes at a time.

☐

**21. Behaviours not otherwise specified that impede progress**

Specify any other behaviour or attitude not previously covered that seems to be holding back the client's progress (e.g. smoking, over-eating, anorexia, stealing, obsessions, sleep disturbances). Be conservative in rating. Do not rate behaviours here that should be rated elsewhere.

0 = No such behaviour present (other than those rated elsewhere).

1 = Behaviours have not occurred in past month, but informant worried that they might have done so.

2 = Behaviours have occurred a few times during past month.

3 = Behaviours have occurred quite frequently.

4 = Behaviours have been very frequent.

☐

**22. Type of weekday occupation (choose one only)**

0 = Unsheltered employment.

1 = Sheltered work.

2 = Undertakes some work in a day centre, standard of work and punctuality good.  
Earns pocket money.

3 = Undertakes work as in (2) but standard and punctuality poor.

4 = O.T.

5 = No daytime occupation.

☐

### **23. Leisure: activities**

Rate degree to which the client is able to occupy his/her leisure time, has active leisure interests, and goes out of the house (or hostel etc.) to pursue these.

- 0 = Client has an interest or interests which occupy his/her leisure time, and which he/she pursues without encouragement from others.
- 1 = Client shows a bit of active interest in something, but it fluctuates considerably, or his/her interests are bizarre in nature.
- 2 = Client has some rather "passive" leisure interest (e.g. watching TV) which occupies him/her to a limited extent.
- 3 = Client might respond fleetingly if somebody worked on engaging his/her interest in some leisure pursuit, but would not keep up interest if left to him/herself to pursue it on his/her own initiative.
- 4 = Client has no interest in anything. Even if a relative or professional carer tries to engage his/her interest in some leisure activity, he/she rejects this.



### **24. Restrictions on activity**

Any restrictions placed by carers or relatives on the activity of the client? (e.g. on money, going out, food, cigarettes, etc.) Specify.

## **25. Unrealistic aims**

This item concerns the client's expectations about his/her ability to affect changes in his/her own life. It focuses on his/her view of what he/she can realistically aim to achieve in the near future (e.g. the next 3 months). The areas in question could include work, housing, personal relationships, ability to overcome impairments, childcare etc. (whatever is relevant to the individual). e.g. In the past month how realistic would you say the client has been about what he/she can achieve in near future? Does he/she expect too much or too little? About employment? Housing? Overcoming his/her handicaps?

0 = The aims of the client are realistic.

1 = Client is indifferent to any aims.

2 = Client is not realistic in his/her aims and goals. He/she overestimates his/her ability.

3 = Client is not realistic in his/her aims and goals. He/she underestimates his/her ability.

☐

## **26. Most difficult problem**

Which out of all these problems do the staff find most difficult to deal with?  
Code 1 – 25 (number of the item in this questionnaire).

☐

**Appendix Six:**  
**Participant information sheet**  
**and consent form**

LEICESTERSHIRE + RUTLAND

# Healthcare



Community Hospitals   Mental Health   Community Health   Learning Disability

## **The Understanding and Perception of Emotion**

### **Research Participant Information Sheet**

We invite you to participate in a research project on how people understand emotions. In order to help you understand what the research is about, we are providing you with the following information. Be sure to ask any questions you have about the project, and we will do our best to explain and to provide any further information you require.

#### **What is the research about?**

The research is investigating how you understand emotion words (happy, sad etc.), and related situations and facial expressions. The aim is to learn how best to help people who use mental health services to understand what others are feeling in day-to-day life.

#### **What will be involved if I decide to take part?**

Participating in the study will involve one meeting with a researcher from Leicester University. We expect this to last about an hour. It will begin with a simple test of comprehension. You will then look at some photographs of faces, and sort out which faces go with different emotional situations which will be read out to you. We would also like to talk to a member of the home staff – someone who knows you well – about how they think you are feeling.

#### **Do I have to take part?**

It is up to you to decide whether or not to take part. If you decide to take part, you will be given this information sheet to keep, and be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time without giving a reason. This would not affect your future treatment in any way.

#### **What will it mean to me?**

There are no potential hazards involved in the research, and you will not be expected to give up any other activities to participate in the study. All the answers you give to the researcher will be strictly confidential, and any information will have your name removed, so that you cannot be recognized from it.

If you require any further information, we will do our best to provide it for you.

Thank you for your time and attention.

**Richard Longmore, Clinical Psychologist in Training, Leicester University / Psychology Dept.  
Rehabilitation Service HQ. Tel: 0116 225 6845**

**Dr Debbie Tombs, Clinical Psychologist, Community Rehabilitation Team (West), Sylvia  
Reid House**

LEICESTERSHIRE + RUTLAND

# Healthcare



Community Hospitals   Mental Health   Community Health   Learning Disability

## The Understanding and Perception of Emotion

### Participant Consent Form

Ethics Committee No. ....

Name of Participant.....

I have read / had read to me the attached information on the research in which I have been asked to participate, and have been given a copy to keep. I have had the opportunity to ask any questions I may have about this information.

The investigator has explained the nature and purpose of the study, and I believe I have understood what will be required if I take part in the study.

I understand that my particular data will be made anonymous, and remain strictly confidential. Only researchers involved in the project will have access to this data.

I understand that a copy of this consent form will be kept in my patient record.

I hereby fully and freely consent to participate in the study

Participant's Name: .....

Participant's Signature: .....

Witness' Name: .....

Witness' Signature: .....

Investigator's Name: .....

Investigator's Signature: .....

**Appendix Seven: Response dispersions for normal  
control and schizophrenia participant groups**

**Table A7.1: Response dispersion in percentages for the normal  
control group (n = 40)**

Emotion/Task	Response: Happy	Sad	Fear	Anger	Surprise	Disgust	Neutral
Happy Faces	98	0	0	0	3	0	0
Happy Words	99	0	0	0	0	0	1
Sad Faces	0	83	3	9	3	4	0
Sad Words	0	90	0	5	4	0	1
Fear Faces	0	13	54	9	11	14	0
Fear Words	0	0	100	0	0	0	0
Anger Faces	0	3	3	76	1	13	5
Anger Words	0	4	0	84	0	6	6
Surprise Faces	8	0	14	1	74	1	3
Surprise Words	8	0	3	0	90	0	0
Disgust Faces	0	3	15	8	6	68	1
Disgust Words	0	0	0	4	3	93	1

**Table A7.2: Response dispersion in percentages for the  
schizophrenic group (n = 60)**

Emotion/Task	Response: Happy	Sad	Fear	Anger	Surprise	Disgust	Neutral
Happy Faces	71	0	1	2	10	2	14
Happy Words	87	0	0	1	9	1	3
Sad Faces	1	49	7	17	7	11	9
Sad Words	3	74	1	3	6	10	3
Fear Faces	1	9	55	12	10	9	4
Fear Words	1	2	79	4	2	7	6
Anger Faces	2	18	11	44	5	13	8
Anger Words	1	6	3	60	6	20	5
Surprise Faces	15	3	17	9	53	1	3
Surprise Words	14	0	12	2	70	2	1
Disgust Faces	3	18	18	14	6	44	2
Disgust Words	0	3	4	13	14	58	8



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**Appendix Eight:**  
**Ethical Committee**  
**letter of approval**

Melanie Sursham  
Direct Dial 0116 258 8610

19 September 2000

Mr R Longmore  
Trainee Clinical Psychologist  
Centre for Applied Psychology (Clinical Section)  
New Building  
University of Leicester  
University Road  
Leicester  
LE1 7RH



Dear Mr Longmore

**The understanding and perception of emotion in relation to social functioning deficits in schizophrenia – our ref. no. 6041**

Further to your application dated 31 July 2000 the Leicestershire Research Ethics Committee at its meeting held on the 1 September 2000 approved your request to undertake the above-mentioned research conditional upon you using the standard consent form.

Your attention is drawn to the attached paper which reminds the researcher of information that needs to be observed when ethics committee approval is given.

Yours sincerely

R F Bing   
Vice-Chairman  
Leicestershire Research Ethics Committee

(NB All communications relating to Leicestershire Research Ethics Committee must be sent to the Committee Secretariat at Leicestershire Health)