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Metaphor comprehension in the treatment of people with schizophrenia

Alex Hains
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METAPHOR COMPREHENSION IN THE TREATMENT OF PEOPLE WITH SCHIZOPHRENIA

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Doctorate of Psychology (Clinical)

July 2014

This thesis is presented as part of the requirements for the award of the Doctorate of Psychology (Clinical) of the University of Wollongong. I declare that this thesis is my own work and has not been submitted for a degree to any other university or institution. Preliminary results were presented at the VI World Congress of Behavioural and Cognitive Therapies Conference in Boston (Hains & McLeod, 2010).

Alex Hains

People with schizophrenia demonstrate significant abstraction deficits, typically measured via metaphor interpretation tasks. Despite these deficits, people with schizophrenia have benefitted from psychological therapies laced with metaphorical language. This research examined one possible explanation for this contradiction by examining whether metaphors presented in the context of therapy have more salient meaning for the reader than metaphors that were developed for the purposes of a neuropsychological assessment. It was proposed that therapeutically oriented metaphors would facilitate better access to autobiographical memories and subsequently result in more accurate metaphor interpretation.

In Study I, a new abstraction measure was developed, called the Therapeutic-Metaphors Interpretation Test (T-MIT). The T-MIT differed from general abstraction measures in that it consisted entirely of metaphors that are actually used in the context of therapy. Eighty-seven participants (42 diagnosed with schizophrenia, and 45 healthy controls) completed the T-MIT and their scores were positively correlated with other well-established abstraction measures. Performance on the T-MIT was able to differentiate between those with schizophrenia and the healthy controls, even after controlling for depressed mood.

In Study II, responses from the 42 clinical participants were used to examine a model of abstraction that linked negative psychotic symptoms to abstraction performance. The proposed model predicted a negative relationship between negative symptoms and both working memory and autobiographical memory. The model also expected that deficits in these domains would have a direct relationship with abstraction. However, the data did not support the proposed model. Working memory was significantly positively correlated with

autobiographical memory and both therapeutic and non-therapeutic forms of abstraction. But the focus of this thesis was on the relationship between autobiographical memory and abstraction. And inconsistent with our hypothesis, this relationship was not significant when the non-therapeutic abstraction measures were replaced with the T-MIT as the endogenous variable.

While an explanation for how people with abstraction deficits can benefit from metaphor-laden treatments remains unresolved, it is recommended that future research focus on the frequency and way in which metaphorical language is used in psychological therapies to further our understanding of the role of abstraction in relation to the specific mechanisms of change.

I would firstly like to thank those who were willing to participate in this research. Through those conversations, I learnt an enormous amount about their struggles with schizophrenia. I hope that, through this research, they feel they have contributed to our collective understanding of the disorder and the role psychological treatments may play in their recovery.

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Lastly, I want to say a huge thank you to my family for their patience and support. In particular, I feel my wife, Amy, and her mother, Hazel, have contributed almost as many hours into this thesis as I have. I can't thank them enough for their support.

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AACAP	American Academy of Child and Adolescent Psychiatry
ACT	Acceptance and Commitment Therapy
ACTp	Acceptance and Commitment Therapy for psychosis
ADLs	Activities of Daily Living
AM	Autobiographical Memory
AMI	Autobiographical Memory Interview
ANCOVA	Analysis of Covariance
APA	American Psychiatric Association
BA	Brodmann's Area
BDI-II	Beck Depression Inventory, Second Edition
CBT	Cognitive Behavioural Therapy
CBTp	Cognitive Behavioural Therapy for psychosis
CDSS	Calgary Depression Scale for Schizophrenia
D-KEFS	Delis-Kaplan Executive Functioning Scale
DSM-V	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
EF	Executive Functioning
ES	Effect Size
ETAU	Enhanced Treatment As Usual
ERP	Event-Related Potential
fMRI	functional Magnetic Resonance Imaging
NICE	National Institute for Health and Clinical Excellence
PANSS-N	Positive And Negative Symptom Scale – Negative symptoms subscale
PIMIT	Plausible / Implausible Metaphor Interpretation Test
PSYRATS	Psychotics symptom Rating Scales
RANZCP	Royal Australian and New Zealand College of Psychiatrists
RFT	Relational Frame Theory
SCID-II	Structured Clinical Interview for DSM Disorders, Second Edition
TAU	Treatment As Usual
T-MIT	Therapeutic-Metaphors Interpretation Test
WM	Working Memory
WMS-III	Wechsler Memory Scale, Third Edition
WTAR	Wechsler Test of Adult Reading

This thesis begins with an outline of the psychological and neurocognitive features of schizophrenia. These two domains of schizophrenic psychopathology combine to cause significant psychosocial, economic and functional impacts. This thesis focuses on neurocognitive impairments in autobiographical memory, working memory and abstraction as it has been proposed that deficits in these areas limits one's capacity to benefit from psychological treatments.

The range of treatments for schizophrenia are briefly discussed, followed by a more detailed description of the psychological therapies of Cognitive-Behavioural Therapy for psychosis (CBTp) and Acceptance and Commitment Therapy for psychosis (ACTp). These two psychological approaches are contrasted in relation to their theoretical foundations and practical applications. The question is posed – how are psychological approaches that use metaphorical language effective for people with schizophrenia when schizophrenia has long been associated with neurocognitive impairments on metaphor comprehension?

In response to that question, the linguistic, psychological and neurobiological models of metaphor comprehension are discussed. And finally, a model of the relationship between metaphor comprehension and schizophrenia symptoms is proposed. This model argues that metaphors presented in the context of therapy (as opposed to generic metaphors developed as part of a neuropsychological task) have more directly relevant meaning for someone with schizophrenia, which enables more accurate interpretation. A unique measure of therapeutically oriented metaphors is developed and analysed for validity. Performance on this new measure is used to evaluate the proposed model.

1. SCHIZOPHRENIA

Schizophrenia comprises a combination of psychological and cognitive symptoms that are so debilitating that the syndrome is often characterised as “a loss of contact with reality” (Tarrier, 2004, p.1377) or a “loss of recognisable self” (Johannessen, Martindale & Cullberg, 2006, p.141; Pérez-Álvarez, García-Montes, Vallina-Fernández, Perona-Garcelán & Cuevas-Yust, 2010). For many people diagnosed with schizophrenia, there is a global and pervasive impact on both the individual and the way they interact with their world.

Despite the finding that schizophrenia has a relatively low prevalence of 0.4 to 0.7% in Australia (Henderson, Andrews & Hall, 2000) and 0.5 to 1.7% worldwide (American Psychiatric Association [APA], 2013; Saha, Chant & McGrath, 2008), schizophrenia and other psychotic disorders epitomise the public perception of mental illness (Jablensky et al., 2000) and represent a significant public health problem. The onset of symptoms is typically between the ages of 15 and 30 years, with women generally experiencing their first symptoms later than men (Abel, Drake & Goldstein, 2010; MacDonald & Schulz, 2009). While some people do not experience a recurrence of psychotic symptoms after their first episode (Morrison et al., 2012b), schizophrenia is often a life-long illness (Jablensky et al., 2000) and is rated in the top ten causes of disability (Schizophrenia Research Institute, 2012). This persistent disability is due to functional impairments, comorbid substance use, medication side effects, extreme social isolation, and dire socioeconomic circumstances that are commonly seen in people with chronic schizophrenia (Jablensky et al., 2000).

Not only is schizophrenia a leading cause of disability, but it has also been found to be associated with significantly higher mortality rates. In a review of 25 papers examining life expectancy and cardiovascular mortality in people with schizophrenia, Laursen, Munk-Olsen and Vestergaard (2012) concluded that people with schizophrenia have a life expectancy 10-25 years less than the general population, dying more often from causes associated with obesity (Daumit et al., 2005), cardiovascular diseases (Raedler, 2010), circulatory diseases (Fors, Isacson, Binglefors & Widerlöv, 2007), and suicide (Johnson, Gooding & Tarrier, 2010; Tarrier & Wykes, 2004). The gap between the life expectancy of someone with schizophrenia and the general population has been attributed to four factors: (1) people with schizophrenia may have lifestyles marked by unhealthy diet, excessive smoking and alcohol use, and a lack of exercise; (2) antipsychotic medications have negative effects on mortality (e.g. through adverse effects on cardiovascular risk factors); (3) physical illnesses are common amongst those with schizophrenia, but they are diagnosed late and only partially treated; and (4) the risk of suicide for those with schizophrenia is 13 times higher than that of the general population (Laursen et al., 2012). More alarmingly, the life expectancy gap is believed to be widening as people with schizophrenia fail to benefit from the vast improvements in health services increasingly available to the general population (Saha, Chant & McGrath, 2007).

1.1. Impact on functioning

There is considerable evidence that people with schizophrenia are significantly impaired in terms of social functioning (Häfner, Löffler, Maurer, Hambrecht & Heiden, 1999), vocational achievement (Kopelowicz, Liberman, Wallace, Aguirre & Mintz, 2006), physical health (Laursen et al., 2012), and general day-to-day functioning (i.e. activities of daily living

(ADLs); Evans et al., 2003). Educational disadvantage is also common, with less than one third (31.5%) having completed their final year of schooling (compared to 53% for the general population; Morgan et al., 2012). Furthermore, a high proportion of Australians with schizophrenia live in marginal accommodation, such as an institution or hospital (2%) or supported group home (11%). Furthermore, 12.8% report at least one period of homelessness in the past 12 months (Morgan et al., 2012). These barometers of general functioning provide an insight into what can be pervasively debilitating effects of having schizophrenia.

The social isolation experienced by Australians with schizophrenia was examined via the second *National Survey of Mental Health and Wellbeing*, which found that 15.7% of people with a psychotic disorder had never had a confiding relationship and 13.3% reported having no friends at all (Morgan et al., 2012). The social isolation and poor social skills of people with schizophrenia (MacDonald & Schulz, 2009) have been explained via two theories: (1) the *social drift hypothesis*, which proposes that the disorder causes a decline in occupational and social status thereby impairing the individual's social and cognitive confidence and competence, and (2) the *non-starter hypothesis* or *social stagnation hypothesis*, which suggests that the onset of the disorder at an early age of social development impedes the further development of social skills and reputation (Häfner et al., 1999). Additionally, poorer social functioning in people with schizophrenia may exacerbate the illness by making engagement with treatment services more difficult and subsequently worsening social isolation (Abel et al., 2010), which in turn promotes poorer functioning.

Another important component of recovery is a person's integration into paid employment (Davis, Townley & Kloos, 2013), as this provides a sense of competence and identity, opportunities to develop and maintain social relationships, the financial means to improve

ones situation, and a respected role in the community. However, studies in America exploring the job performance of people with schizophrenia (Mueser, Salyers & Mueser, 2001) estimate rates of competitive employment as low as 10-20%, and even when considering employers who provided additional support for people with disabilities, only 40% of people with schizophrenia were employed (Lehman et al., 2002). Furthermore, over half of those who are successful in gaining a job require significant time off work (14.7% of the year) due to incapacitation associated with the disorder (Jablensky et al., 2000) or are terminated within the first 6 months (Kopelowicz et al., 2006).

1.2. Psychological features

The symptoms of schizophrenia, as defined in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-V; APA, 2013), fall into two categories: *positive* symptoms and *negative* symptoms. In this context, *positive* refers to experiences that are additional to what is generally considered normal, whereas *negative* refers to an absence or a deterioration of normal functioning. More specifically, positive symptoms include delusions and hallucinations. *Delusions* are fixed beliefs not based in reality and not associated with cultural norms (e.g. believing the television is talking directly to you when it is not). *Hallucinations* are distortions of sensory perception (e.g. seeing things that are not really there, or hearing voices when there is no one talking). While positive psychotic symptoms are often quite obvious and episodic, negative symptoms are typically more subtle and persist even when positive symptoms have reduced (Reichenberg & Harvey, 2007). Some examples are flat affect (expressionless face, monotone voice), alogia (verbally slow, poverty of speech) and avolition (diminished goal-directed behaviour). Gender differences are evident in terms of symptom presentation, with women typically expressing

more paranoia or persecutory delusions, auditory hallucinations, and depressive symptoms than men (Abel et al., 2010). While the positive symptoms are far better recognised by health professionals, family members, and the suffering individual themselves, retrospective studies have shown that depressive and negative symptoms are often the first experienced (Häfner et al., 1999) and are well developed by the first onset of positive symptoms (Reichenberg & Harvey, 2007). For a diagnosis of schizophrenia to apply, a person will typically have experienced a combination of positive and negative symptoms for at least 6 months (APA, 2013).

While hallucinations and/or delusions can be experienced in the context of numerous other mental health problems, including Major Depressive Disorder and Bipolar I Affective Disorder, it is the negative symptoms of schizophrenia that cause the disorder to have such a profoundly disabling impact on the individual.

The success of those with schizophrenia in areas such as employment and social functioning is not related to the severity of positive psychotic symptoms, but rather is dependent on the severity of negative symptoms and cognitive deficits associated with the disorder (Kopelowicz et al., 2006; MacDonald & Schulz, 2009). As such, more cognitively demanding ADLs (e.g. grocery shopping or managing money) are more impaired than basic self-care tasks (e.g. grooming or eating), although performance on almost all ADLs is poor compared to healthy comparison subjects (Evans et al., 2003). In fact, the neurocognitive ability of people with schizophrenia has been shown to predict 40-50% of the variance in adaptive community functioning (Carlsson, Nyman, Ganse & Cullberg, 2006; Green, 1996; Velligan, Bow-Thomas, Mahurin, Miller & Halgunseth, 2000). Therefore, it appears that it is the 'unseen' symptoms of schizophrenia – the negative and neurocognitive deficits – rather than hallucinations and delusions that confer the greater functional impact of the disorder (Reichenberg & Harvey, 2007).

1.3. Neurocognitive features

The neurocognitive features of schizophrenia are now widely recognised as a central and reliably observed feature of the disorder (Dickinson, Ramsey & Gold, 2007; Lee & Park, 2005; Sanfilipo et al., 2002; Vadhan, Serper, Harvey, Chou & Cancro, 2001). Meta-analytic reviews of the neurocognitive deficits associated with schizophrenia have found the disorder to be characterised by broad cognitive impairment across memory, attention, intelligence, executive function, language, and motor performance (Heinrichs & Zakzanis, 1998; Fioravanti, Carlone, Vitale, Cinti & Clare, 2005; Frow, 2001). While this broad impact is now well documented, there is of course some variation in the degree of impairment across cognitive domains. In particular, people with schizophrenia have demonstrated impairments in sustained and selective attention (Fioravanti et al., 2005), theory of mind (Biedermann, Frajo-Apor & Hofer, 2012; Corcoran & Frith, 2003; Drury, Robinson & Birchwood, 1998), working memory (Lee & Park, 2005), language (Mitchell & Crow, 2005), and autobiographical memory (Riutort et al., 2003). Furthermore, the speed with which all cognitive tasks can be executed (i.e. processing speed) is also significantly slower for people with schizophrenia compared to healthy controls (Dickinson et al., 2007).

Negative symptoms, but not positive symptoms, are associated with neurocognitive impairment (Aleman, Hijman, de Haan & Kahn, 1999; Sanfilipo et al., 2002; Villalta-Gil et al., 2006) and the degree of impairment does not appear to worsen significantly over the long-term course of the illness. This was demonstrated in a meta-analysis by Mesholam-Gately, Giuliano, Goff, Faraone and Seidman, (2009), where neurocognitive deficits were evident during the first episode of symptoms and the severity of these first episode impairments were comparable to those who had experienced schizophrenia for many years. However,

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In Study II, responses from the 42 clinical participants were used to examine a model of abstraction that linked negative psychotic symptoms to abstraction performance. The proposed model predicted a negative relationship between negative symptoms and both working memory and autobiographical memory. The model also expected that deficits in these domains would have a direct relationship with abstraction. However, the data did not support the proposed model. Working memory was significantly positively correlated with

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AACAP	American Academy of Child and Adolescent Psychiatry
ACT	Acceptance and Commitment Therapy
ACTp	Acceptance and Commitment Therapy for psychosis
ADLs	Activities of Daily Living
AM	Autobiographical Memory
AMI	Autobiographical Memory Interview
ANCOVA	Analysis of Covariance
APA	American Psychiatric Association
BA	Brodmann's Area
BDI-II	Beck Depression Inventory, Second Edition
CBT	Cognitive Behavioural Therapy
CBTp	Cognitive Behavioural Therapy for psychosis
CDSS	Calgary Depression Scale for Schizophrenia
D-KEFS	Delis-Kaplan Executive Functioning Scale
DSM-V	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
EF	Executive Functioning
ES	Effect Size
ETAU	Enhanced Treatment As Usual
ERP	Event-Related Potential
fMRI	functional Magnetic Resonance Imaging
NICE	National Institute for Health and Clinical Excellence
PANSS-N	Positive And Negative Symptom Scale – Negative symptoms subscale
PIMIT	Plausible / Implausible Metaphor Interpretation Test
PSYRATS	Psychotics symptom Rating Scales
RANZCP	Royal Australian and New Zealand College of Psychiatrists
RFT	Relational Frame Theory
SCID-II	Structured Clinical Interview for DSM Disorders, Second Edition
TAU	Treatment As Usual
T-MIT	Therapeutic-Metaphors Interpretation Test
WM	Working Memory
WMS-III	Wechsler Memory Scale, Third Edition
WTAR	Wechsler Test of Adult Reading

This thesis begins with an outline of the psychological and neurocognitive features of schizophrenia. These two domains of schizophrenic psychopathology combine to cause significant psychosocial, economic and functional impacts. This thesis focuses on neurocognitive impairments in autobiographical memory, working memory and abstraction as it has been proposed that deficits in these areas limits one's capacity to benefit from psychological treatments.

The range of treatments for schizophrenia are briefly discussed, followed by a more detailed description of the psychological therapies of Cognitive-Behavioural Therapy for psychosis (CBTp) and Acceptance and Commitment Therapy for psychosis (ACTp). These two psychological approaches are contrasted in relation to their theoretical foundations and practical applications. The question is posed – how are psychological approaches that use metaphorical language effective for people with schizophrenia when schizophrenia has long been associated with neurocognitive impairments on metaphor comprehension?

In response to that question, the linguistic, psychological and neurobiological models of metaphor comprehension are discussed. And finally, a model of the relationship between metaphor comprehension and schizophrenia symptoms is proposed. This model argues that metaphors presented in the context of therapy (as opposed to generic metaphors developed as part of a neuropsychological task) have more directly relevant meaning for someone with schizophrenia, which enables more accurate interpretation. A unique measure of therapeutically oriented metaphors is developed and analysed for validity. Performance on this new measure is used to evaluate the proposed model.

1. SCHIZOPHRENIA

Schizophrenia comprises a combination of psychological and cognitive symptoms that are so debilitating that the syndrome is often characterised as “a loss of contact with reality” (Tarrier, 2004, p.1377) or a “loss of recognisable self” (Johannessen, Martindale & Cullberg, 2006, p.141; Pérez-Álvarez, García-Montes, Vallina-Fernández, Perona-Garcelán & Cuevas-Yust, 2010). For many people diagnosed with schizophrenia, there is a global and pervasive impact on both the individual and the way they interact with their world.

Despite the finding that schizophrenia has a relatively low prevalence of 0.4 to 0.7% in Australia (Henderson, Andrews & Hall, 2000) and 0.5 to 1.7% worldwide (American Psychiatric Association [APA], 2013; Saha, Chant & McGrath, 2008), schizophrenia and other psychotic disorders epitomise the public perception of mental illness (Jablensky et al., 2000) and represent a significant public health problem. The onset of symptoms is typically between the ages of 15 and 30 years, with women generally experiencing their first symptoms later than men (Abel, Drake & Goldstein, 2010; MacDonald & Schulz, 2009). While some people do not experience a recurrence of psychotic symptoms after their first episode (Morrison et al., 2012b), schizophrenia is often a life-long illness (Jablensky et al., 2000) and is rated in the top ten causes of disability (Schizophrenia Research Institute, 2012). This persistent disability is due to functional impairments, comorbid substance use, medication side effects, extreme social isolation, and dire socioeconomic circumstances that are commonly seen in people with chronic schizophrenia (Jablensky et al., 2000).

Not only is schizophrenia a leading cause of disability, but it has also been found to be associated with significantly higher mortality rates. In a review of 25 papers examining life expectancy and cardiovascular mortality in people with schizophrenia, Laursen, Munk-Olsen and Vestergaard (2012) concluded that people with schizophrenia have a life expectancy 10-25 years less than the general population, dying more often from causes associated with obesity (Daumit et al., 2005), cardiovascular diseases (Raedler, 2010), circulatory diseases (Fors, Isacson, Binglefors & Widerlöv, 2007), and suicide (Johnson, Gooding & Tarrier, 2010; Tarrier & Wykes, 2004). The gap between the life expectancy of someone with schizophrenia and the general population has been attributed to four factors: (1) people with schizophrenia may have lifestyles marked by unhealthy diet, excessive smoking and alcohol use, and a lack of exercise; (2) antipsychotic medications have negative effects on mortality (e.g. through adverse effects on cardiovascular risk factors); (3) physical illnesses are common amongst those with schizophrenia, but they are diagnosed late and only partially treated; and (4) the risk of suicide for those with schizophrenia is 13 times higher than that of the general population (Laursen et al., 2012). More alarmingly, the life expectancy gap is believed to be widening as people with schizophrenia fail to benefit from the vast improvements in health services increasingly available to the general population (Saha, Chant & McGrath, 2007).

1.1. Impact on functioning

There is considerable evidence that people with schizophrenia are significantly impaired in terms of social functioning (Häfner, Löffler, Maurer, Hambrecht & Heiden, 1999), vocational achievement (Kopelowicz, Liberman, Wallace, Aguirre & Mintz, 2006), physical health (Laursen et al., 2012), and general day-to-day functioning (i.e. activities of daily living

(ADLs); Evans et al., 2003). Educational disadvantage is also common, with less than one third (31.5%) having completed their final year of schooling (compared to 53% for the general population; Morgan et al., 2012). Furthermore, a high proportion of Australians with schizophrenia live in marginal accommodation, such as an institution or hospital (2%) or supported group home (11%). Furthermore, 12.8% report at least one period of homelessness in the past 12 months (Morgan et al., 2012). These barometers of general functioning provide an insight into what can be pervasively debilitating effects of having schizophrenia.

The social isolation experienced by Australians with schizophrenia was examined via the second *National Survey of Mental Health and Wellbeing*, which found that 15.7% of people with a psychotic disorder had never had a confiding relationship and 13.3% reported having no friends at all (Morgan et al., 2012). The social isolation and poor social skills of people with schizophrenia (MacDonald & Schulz, 2009) have been explained via two theories: (1) the *social drift hypothesis*, which proposes that the disorder causes a decline in occupational and social status thereby impairing the individual's social and cognitive confidence and competence, and (2) the *non-starter hypothesis* or *social stagnation hypothesis*, which suggests that the onset of the disorder at an early age of social development impedes the further development of social skills and reputation (Häfner et al., 1999). Additionally, poorer social functioning in people with schizophrenia may exacerbate the illness by making engagement with treatment services more difficult and subsequently worsening social isolation (Abel et al., 2010), which in turn promotes poorer functioning.

Another important component of recovery is a person's integration into paid employment (Davis, Townley & Kloos, 2013), as this provides a sense of competence and identity, opportunities to develop and maintain social relationships, the financial means to improve

ones situation, and a respected role in the community. However, studies in America exploring the job performance of people with schizophrenia (Mueser, Salyers & Mueser, 2001) estimate rates of competitive employment as low as 10-20%, and even when considering employers who provided additional support for people with disabilities, only 40% of people with schizophrenia were employed (Lehman et al., 2002). Furthermore, over half of those who are successful in gaining a job require significant time off work (14.7% of the year) due to incapacitation associated with the disorder (Jablensky et al., 2000) or are terminated within the first 6 months (Kopelowicz et al., 2006).

1.2. Psychological features

The symptoms of schizophrenia, as defined in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-V; APA, 2013), fall into two categories: *positive* symptoms and *negative* symptoms. In this context, *positive* refers to experiences that are additional to what is generally considered normal, whereas *negative* refers to an absence or a deterioration of normal functioning. More specifically, positive symptoms include delusions and hallucinations. *Delusions* are fixed beliefs not based in reality and not associated with cultural norms (e.g. believing the television is talking directly to you when it is not). *Hallucinations* are distortions of sensory perception (e.g. seeing things that are not really there, or hearing voices when there is no one talking). While positive psychotic symptoms are often quite obvious and episodic, negative symptoms are typically more subtle and persist even when positive symptoms have reduced (Reichenberg & Harvey, 2007). Some examples are flat affect (expressionless face, monotone voice), alogia (verbally slow, poverty of speech) and avolition (diminished goal-directed behaviour). Gender differences are evident in terms of symptom presentation, with women typically expressing

more paranoia or persecutory delusions, auditory hallucinations, and depressive symptoms than men (Abel et al., 2010). While the positive symptoms are far better recognised by health professionals, family members, and the suffering individual themselves, retrospective studies have shown that depressive and negative symptoms are often the first experienced (Häfner et al., 1999) and are well developed by the first onset of positive symptoms (Reichenberg & Harvey, 2007). For a diagnosis of schizophrenia to apply, a person will typically have experienced a combination of positive and negative symptoms for at least 6 months (APA, 2013).

While hallucinations and/or delusions can be experienced in the context of numerous other mental health problems, including Major Depressive Disorder and Bipolar I Affective Disorder, it is the negative symptoms of schizophrenia that cause the disorder to have such a profoundly disabling impact on the individual.

The success of those with schizophrenia in areas such as employment and social functioning is not related to the severity of positive psychotic symptoms, but rather is dependent on the severity of negative symptoms and cognitive deficits associated with the disorder (Kopelowicz et al., 2006; MacDonald & Schulz, 2009). As such, more cognitively demanding ADLs (e.g. grocery shopping or managing money) are more impaired than basic self-care tasks (e.g. grooming or eating), although performance on almost all ADLs is poor compared to healthy comparison subjects (Evans et al., 2003). In fact, the neurocognitive ability of people with schizophrenia has been shown to predict 40-50% of the variance in adaptive community functioning (Carlsson, Nyman, Ganse & Cullberg, 2006; Green, 1996; Velligan, Bow-Thomas, Mahurin, Miller & Halgunseth, 2000). Therefore, it appears that it is the 'unseen' symptoms of schizophrenia – the negative and neurocognitive deficits – rather than hallucinations and delusions that confer the greater functional impact of the disorder (Reichenberg & Harvey, 2007).

1.3. Neurocognitive features

The neurocognitive features of schizophrenia are now widely recognised as a central and reliably observed feature of the disorder (Dickinson, Ramsey & Gold, 2007; Lee & Park, 2005; Sanfilipo et al., 2002; Vadhan, Serper, Harvey, Chou & Cancro, 2001). Meta-analytic reviews of the neurocognitive deficits associated with schizophrenia have found the disorder to be characterised by broad cognitive impairment across memory, attention, intelligence, executive function, language, and motor performance (Heinrichs & Zakzanis, 1998; Fioravanti, Carlone, Vitale, Cinti & Clare, 2005; Frow, 2001). While this broad impact is now well documented, there is of course some variation in the degree of impairment across cognitive domains. In particular, people with schizophrenia have demonstrated impairments in sustained and selective attention (Fioravanti et al., 2005), theory of mind (Biedermann, Frajo-Apor & Hofer, 2012; Corcoran & Frith, 2003; Drury, Robinson & Birchwood, 1998), working memory (Lee & Park, 2005), language (Mitchell & Crow, 2005), and autobiographical memory (Riutort et al., 2003). Furthermore, the speed with which all cognitive tasks can be executed (i.e. processing speed) is also significantly slower for people with schizophrenia compared to healthy controls (Dickinson et al., 2007).

Negative symptoms, but not positive symptoms, are associated with neurocognitive impairment (Aleman, Hijman, de Haan & Kahn, 1999; Sanfilipo et al., 2002; Villalta-Gil et al., 2006) and the degree of impairment does not appear to worsen significantly over the long-term course of the illness. This was demonstrated in a meta-analysis by Mesholam-Gately, Giuliano, Goff, Faraone and Seidman, (2009), where neurocognitive deficits were evident during the first episode of symptoms and the severity of these first episode impairments were comparable to those who had experienced schizophrenia for many years. However,

the degree of neurocognitive impairment is related to the severity of symptoms (Bozikas, Kosmidis, Kioperlidou & Karavatos, 2004; Carlsson et al., 2006), with more severe negative symptoms predicting more severe cognitive impairment. While Frith (1992) argued that cognitive impairments, such as poor theory of mind, disappear once the acute psychotic episode has passed, there is mounting evidence that these impairments accompany schizophrenia regardless of acuity or chronicity (Brüne & Bodenstein, 2005). There is growing evidence against the argument that poor cognitive task performance amongst people with schizophrenia is due to a lack of motivation, institutionalisation, medication side effects, or interference from delusions or hallucinations (Fioravanti et al., 2005). Instead, the evidence appears to support the notion that the various neurocognitive impairments associated with schizophrenia are central features of the disorder. Given this, research further analysing the cognitive functioning of people with schizophrenia across various specific domains is critical to us gaining a more refined understanding of the disorder.

Two neurocognitive domains significantly affected in people with schizophrenia are memory and executive functioning, in particular the sub-domains of autobiographical memory, working memory, and abstraction.

1.3.1. Memory

One of the areas of major cognitive deficit for people with schizophrenia is memory. This memory deficit is significant compared to the overall level of intellectual impairment experienced by people with schizophrenia (Aleman et al., 1999) and compared to the memory deficit associated with other mental health problems, such as Major Depressive Disorder (Burt, Zembar & Niederehe, 1995). Verbal learning and recall tasks, in particular,

have consistently been identified as the most notable memory deficits when people with schizophrenia are compared to healthy controls ($d=1.4$; MacDonald & Schulz, 2009). Given that verbal memory has been implicated in social problem solving and social skills acquisition (Green, 1996), it is unsurprising that memory is a reliable predictor of all measures of community outcomes for people with schizophrenia (Velligan et al., 2000).

To understand where in the process of remembering people with schizophrenia particularly struggle, Aleman and colleagues (1999) conducted a meta-analysis of 70 studies. They found no significant difference between immediate and delayed recall, which suggested that there is at least some deficit in the encoding stage (Elvevåg, Kerbs, Malley, Seeley & Goldberg, 2003). They also found greater impairment for recall ($d=1.21$) compared to recognition ($d=0.64$; Aleman et al., 1999) even when tasks were matched for difficulty. They interpreted this as evidence that memory problems in schizophrenia are marked by less effective consolidation of material as well as a subsequent retrieval deficit; a conclusion supported by subsequent research (Feinstein, Goldberg, Nowlin & Weinberger, 1998; Fioravanti et al., 2005).

1.3.1.1. *Autobiographical memory*

Numerous studies have also shown impairments across personal episodic and semantic memories in people with schizophrenia (Aleman et al., 1999; Goldberg et al., 1998; Pelletier, Achim, Montoya, Lal & Lepage, 2005), particularly after the onset of illness (Riutort et al., 2003; Wood, Brewin & McLeod, 2006). Personal *episodic memory* refers to the recollection of specific events from your life, whereas personal *semantic memory* refers to facts about oneself (Riutort et al., 2003; Tulving, 1972). Deficits in personal semantic memory manifest as an inability to recall specific facts about the self (e.g. ones address).

Deficits in personal episodic memory are reflected in vague or general recollections of experience (e.g. recalling extended periods or categories of repeated events when actually asked to recall what happened at a specific time and place). This overgeneralised memory style is characteristic of people with schizophrenia and has been implicated in the maintenance of delusional beliefs. Specifically, delusional beliefs persist because the person is not able to accurately recall specific episodic memories that would contradict them (Wood et al., 2006). The combination of personal episodic and semantic memories in the context of one's own life is called *autobiographical memory* (Addis, McIntosh, Moscovitch, Crawley & McAndrews, 2004; Conway & Pleydell-Pearce, 2000).

Autobiographical memory (AM) plays an important role in the construction and maintenance of personal identity (Wilson & Ross, 2003; Riutort et al., 2003), the development and maintenance of social relationships (Nelson, 2003), and successful problem solving and adaptation (Pillemer, 2003). The AM deficit not only results in people with schizophrenia providing less specific autobiographical memories, but fewer memories about their life generally (Riutort et al., 2003). The onset of schizophrenia often coincides with adolescence and early adulthood, a time when personal identity is just being formed, and this AM deficit is thought to contribute to the "abnormal personal identity" seen in people with schizophrenia (Riutort et al., 2003, p.35; Johannessen et al., 2006; Neuman, Blairy, Lecompte & Philippot, 2007).

A full review of the vast literature on autobiographical memory and schizophrenia is not presented here. This review provides a brief summary of the relationship between autobiographical memory and emotional valence, with a focus on how this relates to retrieval of relevant memories in the context of therapy.

Conway and Pleydell-Pearce's (2000) *self-memory system* provides a model for investigating the relationship between AM and a person's sense of self. This model proposes a hierarchical organisation of autobiographical knowledge, where highly specific memories of single events are nested within larger thematic structures (e.g. work, family) or temporal periods in life (e.g. when I lived in England; Conway, 2005). Referring to this model, Morise, Berna and Danion (2011) confirmed that the AM organisational structures employed by people with schizophrenia differ to those of healthy controls. They found that people with schizophrenia grouped their memories according to the emotions experienced at the point of retrieval, whereas healthy controls prioritised the similarities or distinctiveness of the events recalled. The nature of the emotion associated with the memory also plays a role. In a study comparing 20 people with schizophrenia to 20 healthy controls matched for age, gender and education (Neuman et al., 2007), participants were asked to rate pictures in terms of pleasantness or unpleasantness before recalling a specific memory of their own that related to the picture. They returned 24 hours later, and were asked to recognise which pictures had been presented the day before and to again recall their associated autobiographical memories. Participants with schizophrenia recalled more positive than negative memories, whereas controls displayed the opposite pattern. This result was consistent with an earlier model (Conway & Pleydell-Pearce; 2000) that noted evidence of a bias for people with schizophrenia against retrieving memories associated with mildly negative emotions, but also intense (positive or negative) emotions. Emotional valence is clearly a factor in autobiographical memory performance for people with schizophrenia, just as it is with healthy controls (Conway & Pleydell-Pearce; 2000). For people with schizophrenia, the nature and intensity of the emotion appear to affect performance in different ways.

Given autobiographical memory has been shown to play a role in effective problem solving (Goddard, Dritschel & Burton, 1996) and the formation of one's sense of identity (Conway & Pleydell-Pearce; 2000), the relationship between autobiographical memory and emotional valence is particularly relevant in the context of treatment. That is, the treating clinician should be looking to utilise techniques that cue mild positive emotions to maximise the client with schizophrenia's capacity in this area. What may be more difficult for the treating clinician is to avoid cueing any negative or intensely positive emotions, as this could disrupt autobiographical memory performance.

1.3.1.2. Working memory

Another prominent neurocognitive deficit associated with schizophrenia is that of working memory (WM). WM was originally characterised by Baddeley (1986) as active short-term memory. More recently, WM has been described as the set of processes required for the temporary storage and manipulation of information (Glahn, Cannon, Gur, Ragland & Gur, 2000). Both definitions highlight the active and short-term nature of WM and how it enables an individual to manipulate information whilst maintaining a mental representation of the original material. WM is essential for any task requiring the goal-oriented active monitoring or manipulation of information despite potential distractions. As such, poor WM can make day-to-day tasks, such as mentally rehearsing a phone number, problem solving, organisational skills, and general social functioning very difficult (Takahashi et al., 2005).

WM also plays a pivotal role in the accurate interpretation of metaphorical language, independent of other cognitive deficits (Kiang, 2007; Silver et al., 2007). Numerous studies have found that individuals who perform well on WM tasks generated more apt

interpretations of metaphors (Chiappe & Chiappe, 2007; Pierce & Chiappe, 2008) and with greater speed (Chiappe & Chiappe, 2007; Pierce, MacLaren & Chiappe, 2010) than individuals with poor WM. Given that effective communication requires a person to hold in their mind the topic of discussion, what has already been said by each participant, relevant aspects of the relationship between the participants and so on (Ritchie, 2004), WM has a critical role in enabling effective interpersonal interactions.

People with schizophrenia demonstrate significant impairment in WM compared to healthy controls, regardless of the stimulus modality (i.e. verbal or visuospatial; Glahn et al., 2006; Lee & Park, 2005), and independent of general intellectual impairment (Riutort et al., 2003) and medication use (Aleman et al., 1999). There is also evidence that WM deficits are an expression of an underlying brain dysfunction related to the aetiology of schizophrenia (Michie et al., 2000), as WM deficits have been found in healthy biological relatives of those with schizophrenia (Glahn et al., 2006; Myles-Worsley & Park, 2002; Park, Holzman & Goldman-Rakic, 1995).

1.3.2. Executive functioning

Along with memory, executive functioning (EF) is significantly impaired in people with schizophrenia (Heinrichs & Zakzanis, 1998). EF is an 'umbrella' term used to encapsulate various cognitive processes, including planning, attention, working memory, problem solving, verbal reasoning, inhibition, mental flexibility, multi-tasking, and behaviour initiation (Chan et al., 2008). Some of these processes also belong to other functional groups (e.g. working memory can be considered a sub-type of short-term memory), but are included as part of EF because they require a 'higher level' cognitive process to enable a combination of cognitive operations to occur consecutively or simultaneously towards the

desired goal (Thoma & Daum, 2006). For example, to perform well on a working memory task, the individual has to encode the target, internally represent the target, maintain the mental representation of the target while inhibiting irrelevant information, and retrieve the mental representation at the right moment (Lee & Park, 2005). Baddeley's (1986) model of WM captures its multifaceted nature and is described as involving three components: the *central executive*, the *phonological loop*, and the *visuospatial sketchpad* (Baddeley & Della Sala, 1996). While short-term memory is certainly involved in this process, executive functions are required to synchronise these various elements. As is evident by the broad range of functions included under the banner of EF, any degree of executive dysfunction has a significant impact on a person's daily functioning (Semkovska, Bédard, Godbout, Limoge & Stip, 2004; Velligan et al., 2000). In addition to working memory, this thesis will focus on the executive function of abstraction (in the context of comprehending metaphorical language).

1.3.2.1. *Abstraction*

A number of executive functions have been associated with schizophrenia (Semkovska et al., 2004), but abstraction has a particularly long association with schizophrenia research (Finckh, 1906, as cited by Thoma & Daum, 2006). Deficits in abstraction have been established as such a stable feature of schizophrenia that abstraction measures have been used as diagnostic tools to help differentiate between those with schizophrenia and those without (Gorham, 1956, as cited in Reich, 1981; Faraone et al., 1995). Abstraction has been broadly defined as the process by which concepts are derived from literal or concrete stimuli, concepts that are then used to group stimuli in a meaningful way (Glahn et al., 2006). In the context of understanding the neurocognitive deficits associated with

schizophrenia, abstraction typically refers to the comprehension of non-literal language (primarily metaphorical language), whereby an individual makes an implicit comparison between ideas from different knowledge domains that are not usually associated with one another (Thoma & Daum, 2006). Using the expression “this job is a gaol” as an example, “job” and “gaol” are not typically associated with one another in the literal sense, but the interpreter can find some overlap in their meaning and attribute salient properties of “gaol” (e.g. restrictive, confining, lack of freedom) to “job” to help make sense of the expression. While abstract language comes in many forms, such as irony (e.g. “what lovely weather we are having” when it is raining; Gibbs, 1994), idioms (e.g. “it’s raining cats and dogs”; Glucksberg, 2001), and proverbs (e.g. “a stitch in time saves nine”; Gibbs & Beitel, 1995), this thesis will focus on metaphorical forms of abstraction (e.g. “you can’t judge a book by its cover”; Kiang et al., 2007).

Metaphorical language is part of everyday communication (Kircher, Leube, Erb, Grodd & Rapp, 2007; McCurry & Hayes, 1992; Bottini et al., 1994), occurring at an estimated rate of approximately 6 figurative expressions per minute of speech (Thoma & Daum, 2006) or one metaphor in every seven and a half lexical units (Steen, Dorst, Herrmann, Kaal & Krennmayr, 2010). Given this frequency, metaphorical expressions have become such a common part of our language that accurately understanding their meaning is central to effective communication. Their high incidence can make it difficult for people to recognise them as metaphorical at all. The distinctions between abstract language and literal language are: (1) non-literal language usually expresses a falsehood (e.g. “my heart is broken”), and (2) non-literal language tends to violate linguistic constraints (e.g. “choices are crossroads”, despite the two key words typically referring to unrelated contexts; Thoma & Daum, 2006). Given the ubiquity of abstract language, people need to be able to accurately interpret both familiar and unfamiliar non-literal language in order to interact

well socially (Mitchel & Crow, 2005) or perform well academically (Nippold & Martin, 1989). To understand the meaning of metaphorical language, the listener must first recognise that the speaker is conveying something that the words do not literally mean, which requires the ability to interpret subtle interpersonal cues (Brune & Bodenstein, 2005), something else people with schizophrenia do poorly (Lee, Farrow, Spence & Woodruff, 2004).

The development of functional magnetic resonance imaging renewed interest in neurocognitive and neurobiological research focusing on metaphor comprehension. Bottini and colleagues (1994) used positron emission topography (PET) imaging to investigate which areas of the brain were activated when healthy subjects were asked to interpret metaphors. Subsequently, Corcoran (1999) developed a neurocognitive model of metaphor comprehension and used four clinical case studies (including two people with schizophrenia) to demonstrate where the neurocognitive processes were likely to have broken down in those who show deficits in metaphor comprehension (see Section 3 for more detail). Her model provides a framework by which to understand the neurological and cognitive complexities involved in metaphor comprehension and appreciation. These studies demonstrate how close investigation of metaphor comprehension among people with schizophrenia provides useful insights into the neurobiological and cognitive elements of the disorder, insights that naturally inform our treatments.

1.4. Summary

The combination of positive psychotic symptoms and neurocognitive deficits clearly contributes to the poorer functioning of people with schizophrenia compared to healthy controls. In particular, neurocognitive functions such as verbal memory, episodic memory,

autobiographical memory, working memory, and abstraction are significantly negatively affected (MacDonald & Schulz, 2009). Deficits in these areas combine (Boeker et al., 2006) to affect a central part of everyday communication – metaphor comprehension. While the neurological and cognitive processes involved in metaphor comprehension provide a useful focus for research aiming to gain insights into schizophrenia (see Section 3 for more detailed review), more in-depth research is needed to improve our understanding of how autobiographical memory, working memory and schizophrenia psychopathology relate to one another to affect metaphor comprehension. Understanding these relationships better is important in the application of psychological treatments for people with schizophrenia, where metaphorical language is unavoidably prevalent.

2. TREATMENTS FOR SCHIZOPHRENIA

Historically, schizophrenia was considered relatively untreatable and, as a result, sufferers were often involuntarily held in institutions with little hope of discharge (Cancro, 1969; Jablensky et al., 2000). While the progress made in pharmacology and psychotherapy means schizophrenia is now considered more treatable than ever, complete recovery, defined as the absence of all symptoms, remains elusive (Andreasen et al., 2005). Instead, clinicians and services aim for a reduction in symptoms so as to enable the affected person to live a meaningful life (Davidson, Schmutte, Dinzeo & Andres-Hyman, 2008) and to reduce the collateral burden on family carers (American Academy of Child and Adolescent Psychiatry [ACAP], 2000).

In Australia, the majority of people with schizophrenia receive some form of treatment, with 92.8% attending an outpatient community mental health service, 37.6% being admitted to an inpatient psychiatric unit in the past year, and 43% seeking crisis support from emergency services (Morgan et al., 2012). Despite the obvious costs associated with providing such intensive services, long-term follow-up studies have demonstrated that the economic benefit of treatment, with the treated individual costing the community \$3445 per annum compared to \$9503 for the untreated individual (Mihalopoulos, Harris, Henry, Harrigan & McGorry, 2009).

Typically, Australians with schizophrenia are prescribed antipsychotics, mood stabilisers or antidepressants (94.9%; Morgan et al., 2012). The comparatively low rates of psychosocial treatments (39.1%) contradict the treatment guidelines promoted in Australia (Royal Australian and New Zealand College of Psychiatrists [RANZCP], 2009), Britain (National Institute for Health and Clinical Excellence [NICE], 2009) and the United States of America

(American Academy of Child and Adolescent Psychiatry [AACAP], 2000), where psychosocial interventions are recommended in conjunction with antipsychotic medications.

2.1. Pharmacological treatments

Antipsychotic medications have been (and continues to be) a primary component of treatment, with first-generation antipsychotics (e.g. chlorpromazine) enabling a reduction in positive psychotic symptoms. The development of the second-generation antipsychotics (e.g. risperidone, olanzapine, quetiapine) through the 1990s was hoped to reduce negative symptoms as well. However, meta-analyses have resulted in conflicting findings, with some reporting no effect on negative symptoms (Leucht et al., 2009; Salimi, Jarskog & Lieberman, 2009) and others reporting moderate effect sizes (Curtis, Katsafouros, Möller, Medori & Sacchetti, 2008; Leucht, Arbter, Engel, Kissling & Davis, 2008; Rainer, 2008). By way of explaining these inconsistent results, it has been suggested that medications are more effective in treating “*primary negative symptoms*” (Murphy, Chung, Park & McGorry, 2006, p.5, italics added) than symptoms that are “secondary manifestations of disease factors” (Salimi et al., 2009, p.844; Nuss & Tessier, 2010). For example, social withdrawal that develops in response to paranoid delusions may respond better to psychological intervention than medication alone.

Another reason medication needs to be augmented with psychological interventions is the potential for quite debilitating side effects. For example, clozapine (a second-generation antipsychotic) may cause severe reduction in white blood cells, seizures, hyper-salivation, drowsiness, tremors, headaches, low blood pressure, fever, blurred vision or constipation (Jablensky et al., 2000; Stahl, 1999). While those who do not respond to first-line antipsychotic medication are typically transitioned to clozapine (Mattai, Hill & Lenroot,

2010; Stahl, 1999) or some combination of medications (Zink, Englisch & Meyer-Lindenberg, 2010), approximately 75% are non-compliant (Rector & Beck, 2001; Stein et al., 2013) and 30-50% continue to experience symptoms even when compliant (de Pavia Barretto et al., 2009; Gould, Mueser, Bolton, Mays & Goff, 2001). It is sometimes only after a partial or incomplete response to pharmacotherapy that psychological treatments are considered. The evidence for combining medication and psychological intervention for people with schizophrenia is strong, and highlights the need to examine how psychological approaches might apply to the specific features of this disorder.

2.2. Psychological treatments

Despite the significant benefits associated with pharmacological treatments of schizophrenia (Chan, Lam & Chen, 2011; Leucht et al., 2009; Mattai et al., 2010), very few sufferers ever achieve symptom-free status (Warner, 2009; Lecomte & Lecomte, 2002). Any treatment that is dependent upon the unwell person complying with a strict medication regime relies upon that person agreeing at least to some extent with the proposition that they are indeed unwell. In the context of schizophrenia, a disorder often marked by a lack of insight, this barrier to effective pharmacological treatment is demonstrated by research showing insight to be the most significant predictor of recovery (David, Buchanana, Rees & Almeida, 1992). While complete remission may remain elusive, health services that augment medication with psychological treatments have been shown to increase insight (Brabban, Tai & Turkington, 2009), more effectively reduce psychotic symptoms (Steel, 2008) and improve general functioning, well-being and quality of life (Nuss & Tessier, 2010).

Furthermore, “schizophrenia exerts its effects in psychological realms” (Dickerson & Lehman, 2011, p.520), with numerous secondary psychological problems resulting from the effects of the psychotic symptoms. Perceptions, thinking and emotions are often disturbed as part of the psychosis, subsequently causing the person to feel frightened of, alienated from and shunned by others. As a result, people with schizophrenia have a high prevalence of comorbid psychiatric disorders, such as depression and PTSD associated with childhood trauma (Schäfer & Fisher, 2011; Birchwood, Iqbal, Chadwick & Trower, 2000). Psychological treatments serve multiple purposes in the treatment of psychosis – to increase insight (and therefore compliance with all aspects of treatment), to reduce psychotic symptoms directly, to treat secondary disorders developed as a result of the psychosis, and to help people “strive for a good quality of life, despite the illness” (RANZCP, 2009, p.27).

However, psychological treatments were for a long period considered unsuitable in the treatment of schizophrenia due to difficulties such as paranoia, which could be a major impediment to development of the therapeutic alliance between the clinician and client (Sivec & Montesano, 2012). Due to the significant and global memory impairment experienced by those with schizophrenia, it was also thought that “insight-related or other therapies that require advanced learning and memory functions are almost certain to be ineffective” (Aleman et al., 1999, p.1364).

It wasn’t until cognitive therapy was used with people suffering schizophrenia that perception of the usefulness of psychological therapies for schizophrenia began to change (Meichenbaum & Cameron, 1973). Chadwick and Lowe (1990; 1994) achieved significant reductions in delusional beliefs in the 1990s using cognitive restructuring techniques such as empirical testing. More recently, a number of psychological treatments, such as Acceptance and Commitment Therapy, supportive therapy, social skills training, family therapy, cognitive remediation, personal therapy, narrative therapy and compliance

therapy, have been applied to the treatment of schizophrenia with some success (Dickerson & Lehman, 2011; MacDonald & Schulz, 2009). While medication is almost always prescribed for persons with persistent psychosis, there is a growing body of evidence that treatment outcomes are improved when medication is combined with psychosocial interventions (Lewis et al., 2005). For the purposes of this thesis, two psychological therapies for schizophrenia are explained and contrasted. The first is the most empirically supported – Cognitive Behavioural Therapy for psychosis (CBTp; Tarrier et al., 1993), and the second represents a more recently developed form of psychotherapy – Acceptance and Commitment Therapy for psychosis (ACTp; Bach & Hayes, 2002).

Like many psychotherapies that have shown empirical promise in the treatment of other disorders, proponents of both CBT and ACT have acknowledged idiosyncrasies when these treatments are applied to psychosis. Hence, when clinicians and researchers discuss the application of ACT or CBT to the treatment of people with psychotic symptoms, a ‘p’ is typically added to the acronyms.

Cognitive Behavioural Therapy for psychosis (CBTp)

Of all the psychological treatments for schizophrenia, CBTp has the strongest evidence base (Dickerson & Lehman, 2011; Sivec & Montesano, 2012; Wykes, Steel, Everitt & Tarrier, 2008). It has been shown to be a moderately and reliably effective treatment of schizophrenia generally (Sivec & Montesano, 2012) and in relation to specific symptoms, formats, contexts and phases of illness. Table 1 provides examples of studies demonstrating the efficacy of CBTp across symptoms, chronicity, treatment setting, and format of treatment.

Table 1. *Studies supporting the evidence-base of CBTp with various applications*

<i>Symptoms of focus</i>	
hallucinations	Jenner, Nienhuis, van de Willige & Wiersma (2006)
delusions	Pfammatter, Junghan & Brenner. (2006)
<i>Chronicity of illness</i>	
chronic	Tarrier & Wykes (2004)
acute	Zimmerman, Favrod, Trieu & Pomini (2005)
first episode	Jackson et al. (2008)
<i>Treatment setting</i>	
community	Jakes, Rhodes & Turner (1999)
hospital	Drury, Birchwood, Cochrane & MacMillan (1996); Haddock et al. (1999)
<i>Format of treatment</i>	
individual	de Paiva Barretto et al. (2009)
group	Landa, Silverstein, Schwartz & Savitz (2006)
<i>Follow-up duration</i>	
short- and long-term	Zimmerman, Favrod, Trieu & Pomini (2005)

CBTp = Cognitive Behavioural Therapy for psychosis

The large body of research conducted on CBTp has enabled the analysis of its effectiveness with specific features associated with psychotic disorders (Wykes, Steel, Everitt & Tarrier, 2008). Wykes and colleagues conducted the largest meta-analysis of CBTp and found mean effect sizes (ES) for the reduction of positive symptoms (ES $d=0.37$), for negative symptoms ($d=0.44$), for social functioning ($d=0.38$), and for mood ($d=0.36$). CBTp has also been shown to be effective for treatment-resistant schizophrenia (i.e. those who do not respond to second- or third-line antipsychotics; de Paiva Barretto et al., 2009; Velligan, 2009) as well as for people not taking any antipsychotic medication at all (Hutton, Morrison & Taylor, 2012; Morrison et al., 2012a). While these results are impressive, when the meta-analysis excluded studies regarded as insufficiently methodologically rigorous, significant effect sizes were only found for positive symptoms ($d=0.35$; Wykes, Steel, Everitt & Tarrier, 2008).

More recent meta-analyses have found similar effect sizes for positive symptoms (ES $d=0.35-0.40$; Sivec & Montesano, 2012), but have shown less impressive results when CBTp

is compared to *active* control groups that provide participants with the same amount of direct contact with a clinician as those in the treatment group. The 'active' component of these control groups includes some element of acceptance, empathy, and positive social interaction, but no specific psychological treatment. When CBTp was evaluated in studies incorporating an active control group, the benefits of the treatment appeared somewhat limited (ES $d=0.20$). This result may indicate that the common elements of treatment (e.g., factors contributing to therapeutic alliance; Wittorf et al., 2010) play a more significant role in CBTp than previously thought.

When exploring the ways in which CBTp is effective in treating psychosis, it is important to understand how its proponents conceptualise the symptoms. While auditory hallucinations (e.g. hearing voices) are typically considered misattributions of internal thought processes to an external source (Mechelli et al., 2007; Tai & Turkington, 2009), delusional beliefs are explained via a combination of arguments (Moore et al., 2006):

1. People with schizophrenia make errors when trying to understand the intentions of others (Frith, 2004);
2. People with schizophrenia have a data-gathering bias that means they jump to conclusions despite insufficient evidence (Dudley, John, Young & Over, 1997; Freeman et al., 2004); and
3. People with schizophrenia attribute the cause of negative events to other people (Candido & Romney, 1990).

The negative symptoms of schizophrenia (e.g. disengaging / withdrawing behaviours) are thought to be a way of coping with the distress caused by positive psychotic symptoms. Low expectations may also exacerbate negative symptoms. It has been argued that people with schizophrenia have low expectations of pleasure (and high expectations of *displeasure*), low expectations of success (i.e. goal-attainment), low expectations of being

accepted by others (e.g. as worthwhile), and underestimation of their personal resources (e.g. energy, ability) to achieve their goals (Rector, Beck & Stolar, 2005). Further, it is suggested that there is a bidirectional relationship between these four elements and negative symptoms, whereby low expectations make the negative symptoms worse, subsequently reinforcing and cultivating even lower expectations (Rector et al., 2005).

These explanations of psychotic symptoms demonstrate CBTp's broad treatment goal, that is, to facilitate the client's realisation that they have misunderstood reality (Tai & Turkington, 2009), and that their responses to those misunderstandings (i.e. coping strategies) have been misguided and unhelpful. In consideration of the unique nature of psychotic disorders, the goals of CBTp differ importantly from those of CBT more generally. It is the psychotic client who judges which irrational thoughts and feelings are the focus of therapy, as opposed to the therapist identifying which thoughts are problematic and therefore will be the primary focus of treatment (as is the case in CBT for other disorders; McLeod, 2009). In CBTp, there is increased emphasis on the thoughts and feelings that interfere with daily functioning rather than simply those thoughts that are deemed irrational or behaviours that are considered maladaptive by the clinician or family.

There is some variation in treatment components applied even within CBTp (Lecomte & Lecomte, 2002). For example, the timing of application may vary depending on the phase of illness (Johannessen et al., 2006). Despite such variations, there is also significant overlap in the treatment manuals (Rector & Beck, 2001). Table 2 provides a description of the common elements amongst CBTp manuals.

Table 2. *Common elements of CBTp*

	Definition	Possible therapeutic example
Establishing a strong therapeutic relationship	Support, collaboration and acceptance are the hallmarks of a strong therapeutic alliance. With psychosis (specifically paranoia), developing trust may take time but is pivotal to engagement. Check understanding regularly during sessions, ask the client for clarification if needed.	"I understand that you feel that it is difficult to trust. Please tell me how our work together can be the most helpful to you." Or, if the clinician believes that the client is suspicious of him or her: "It seems like you may not trust me. Can we talk about it?"
Education about the illness	Education would include information based on the biopsychosocial model with a goal of normalising the experience and reducing stress. It is also important to discuss the roles of vulnerability and stress.	"Many times, when people are under stress, symptoms get worse and coping strategies just don't seem to work. For example, they may feel like other people are talking about them or watching them."
Cognitive and behavioural strategies for reducing stress directly related to hallucinations and delusions	Identify thoughts and behaviours that maintain distress and offer alternatives. Teach specific distraction strategies.	"You have talked about how when you start thinking about the evil spirits, you get upset. Have you had the chance to practise the other thoughts that we have discussed? If not, let's think of ways you can start using them."
Suggesting reality testing experiments	Have the client practise an experiment to evaluate the accuracy of their psychotic symptoms, and ask the client to report their findings at the next session. (Note: it is important to have a good understanding of the client's beliefs before proposing a reality check.)	For a client who believes everyone looks at him when he enters a store, ask the client to briefly enter a store, look directly at the others in the store, and leave. Record the experience and review in session.
Reducing relapse	Develop a relapse prevention plan that builds on client strengths. The goal of the plan is to create a written document that the client can refer to when feeling vulnerable or when symptoms begin to feel unmanageable.	"You have made so much progress. Maybe we could write down some of the things that really helped you, like the best coping strategies and people who supported you. Maybe we could also identify the ways to tell if you are beginning to have problems again."

CBTp = Cognitive Behavioural Therapy for psychosis. Sources: Rector & Beck (2001); Sivec & Montesano (2012); Lecomte & Lecomte (2002); Morrison & Barratt (2010)

While CBTp administered on its own has shown significant promise as a treatment for people with schizophrenia (Wykes et al., 2008), it is often applied in combination with

other treatments, such as motivational interviewing techniques, family treatment, crisis services, and medication. This combination approach facilitates more sustained improvements for people experiencing hallucinations than CBTp alone (Jenner et al., 2006), but it is clear that the inclusion of CBTp adds significant benefit to the non-psychological treatments usually available.

There is now considerable research to support the notion that CBTp offers potential benefit to people with schizophrenia (Wykes et al., 2008; Gould et al., 2001). However, it is also clear that no one treatment is universally effective for all sufferers (Lecomte & Lecomte, 2002; Davidson et al., 2008). A large-scale and methodologically rigorous study has demonstrated that CBTp (even when combined with family intervention) fails to prevent future relapse (Garety et al., 2008). While medication and CBTp appear to offer some people some relief (Dunn et al., 2012), it is important that we continue to examine additional options that might add to the effectiveness of these existing treatments.

2.2.1. *Acceptance and Commitment Therapy for psychosis (ACTp)*

There are common features across CBTp and ACTp – both encourage emotion regulation strategies, both try to reduce avoidable distress, and both aim to improve quality of life. However, they differ in terms of which stage of the process they focus on. As Pull (2009) stated, “CBT promotes adaptive *antecedent*-focused emotion regulation strategies, whereas acceptance strategies of ACT counteract maladaptive *response*-focused emotion regulation strategies, such as suppression” (p.56). ACT has been suggested as an alternative approach for dealing with distress caused by phenomena that appear impossible to extinguish entirely, as it encourages people to “make room” for unavoidable negative private experiences (Strosahl, Hayes, Bergan & Romano, 1998, p.44). In fact, ACT

proponents suggest that attempts to extinguish or reduce distressing symptoms are likely to paradoxically increase their frequency and salience (Hayes, Luoma, Bond, Masuda & Lillis, 2006; Pankey & Hayes, 2003).

ACT has been described as one of the psychotherapies belonging to the ‘third wave’ of cognitive-behavioural therapies (Hayes, 2004; Hayes et al., 2006), after the initial *behavioural* ‘wave’ in the 1960s and the subsequent integration of *cognitive* techniques in the 1980s (Pull, 2009). The theoretical background behind ACT is Relational Frame Theory (RFT), which asserts that people’s behaviour is affected by how they develop language and cognition (Hayes, Strosahl & Wilson, 1999). As we learn about our environments and ourselves, we also apply meaning to the associated language used to describe those experiences. These learnt meanings associated with language and cognition form what RFT calls *relational frames*. When we interact with our environment, other people, or our own internal experiences, we do so by deriving meaning from previously established relational frames, at the same time as contributing further to them (Montgomery, Kim & Franklin, 2011). RFT cites language as a key distinguishing feature of being human and suggests that our practice of linking language and cognition with such meaning results in humans being unable to avoid distressing situations simply by leaving the situation physically as a non-human might do (Hayes, 2004). The meaning we place on our cognitions can bring painful emotions from our past into our present or can create anticipatory anxiety about our future.

RFT argues that the human tendency to be dominated by language and cognition also reduces contact with the here-and-now experience (Hayes et al., 2006). This loss of contact with the present moment has the potential to prevent alternative learning experiences and/or corrective action, thereby further reinforcing unhelpful relational frames. Consequently, ACT incorporates the practice of mindfulness (Tai & Turkington, 2009),

defined as “paying attention in a particular way: on purpose, in the present moment, and non-judgementally” (Kabat-Zinn, 1994, p.4). Accepting the negative experiences we cannot control and mindfully disengaging from them forms one significant part of ACT. But to facilitate actual behaviour change, ACT also encourages people to willingly choose behaviour that moves them towards their fundamental values. Together, these elements are said to increase “psychological flexibility” (Hayes et al., 2006, p.7), which is the central goal of ACT. The relationship between the six core processes of ACT and psychological flexibility is illustrated in Figure 1, and a detailed description of the core processes is provided in Appendix A (Hayes et al., 2006).

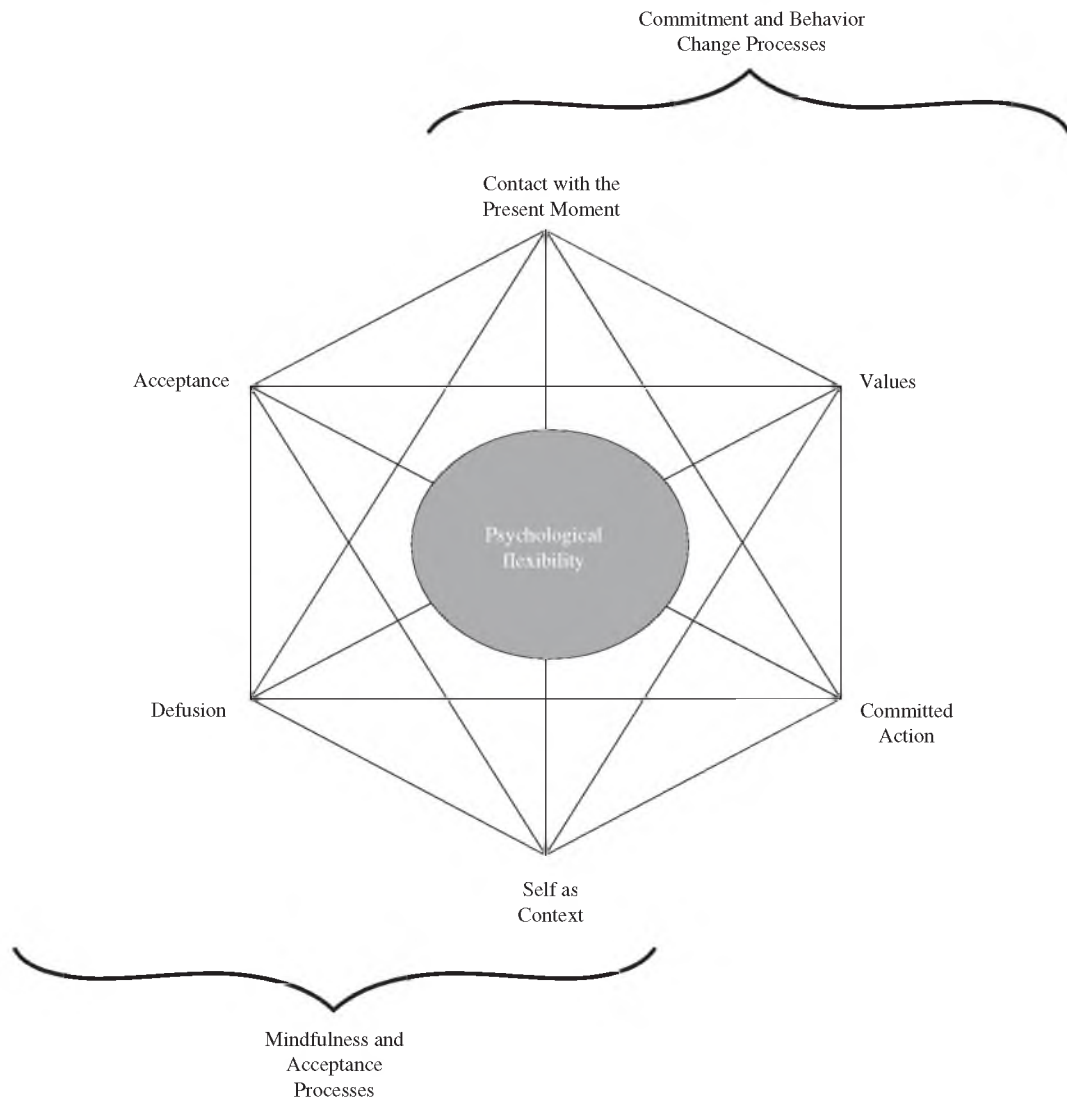


Figure 1. ACT hexaflex – a model of the core processes promoted in Acceptance and Commitment Therapy

(Note: Reproduced from Hayes, Luoma, Bond, Masuda & Lillis (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44(1), 1-25. doi:10.1016/j.brat.2005.06.006)

Because ACT emphasises the way a person *relates* to their internal experiences, as a treatment approach, it is theoretically applicable irrespective of the nature of that internal experience (McLeod, 2009). As a result, the processes of ACT (e.g. defusion, committed action) are also considered to be applicable across diagnostic groups. However, just as CBT

clinicians found the need to make adjustments to their model when working with people with schizophrenia, ACT has some potential challenges with this population as well. For example, while ACT views the separation or *defusion* of one's self from one's mind as a positive part of disentangling from problematic language and cognition, people with schizophrenia are renowned for having already 'lost' their mind (McLeod, 2009) and this has clearly not offered them any relief. While ACTp views hallucinations in a similar way to CBTp (i.e. as an internal thought misattributed to an outside source), ACTp conceptualises delusions somewhat differently. ACTp considers delusions to be a form of experiential avoidance (Bach & Hayes, 2002), whereby the affected person tries to suppress distressing thoughts and feelings associated with the hallucinations or other stressful life events.

A recent study found some support for this proposition with experiential avoidance mediating the relationship between stressful life events and delusional symptoms in a sample of 100 people diagnosed with a psychotic disorder (Goldstone, Farhall & Ong; 2011). This supports the formulation that attempting to suppress or avoid unwanted thoughts and feelings may trigger delusional ideation amongst those with a pre-existing predisposition (Goldstone et al., 2011).

While ACTp is still in its infancy compared to CBTp, there is some consistency across the initial trials in the way this treatment approach is applied to people with schizophrenia. Table 3 summarises common elements found in ACTp interventions.

Table 3. *Common elements of ACTp*

	Definition	Possible therapeutic example
Dropping the control agenda	Help the client recognise the unworkability (ineffectiveness) of the control agenda. Discuss problems associated with avoidance. Normalise experience of voices or delusions, emphasising the importance of how we <i>respond</i> to these experiences.	Chinese handcuffs metaphor. Polygraph metaphor. Down in the cellar exercise. Tug of war metaphor.
Willingness / Acceptance	Willingness presented as an alternative to control. Client is encouraged to “just notice” the symptom. The target is not the <i>reduction</i> of the symptom, but the aim to change the client’s <i>relationship</i> to that symptom.	Mindfulness exercises. Invitation to the room exercise. Walk up a mountain metaphor.
Defusion	Clients taught to separate themselves from the literal meaning of their thoughts, and instead become aware of where these thoughts exist contextually. Distinguish the person from the thoughts. See that they cannot control the thoughts, but they can control their behaviour in response.	Bad cup metaphor. River of thoughts metaphor. Mindfulness exercises.
Values and goals	Client to engage in behaviours that work best in allowing them to reach their stated goals, or move in the direction of their values. Again, reflect on how control has interfered with this.	“In a world where you could choose to have your life be about something, what would you choose?”

ACTp = Acceptance and Commitment Therapy for psychosis. Sources: Bach & Hayes (2002); Gaudiano & Herbert (2006); Pankey & Hayes (2003)

While there have been some promising case studies of ACTp (Bloy, Oliver & Morris, 2011; Pankey & Hayes, 2003), there are only two studies to have systematically evaluated the efficacy of ACTp at this time. The first was conducted by Bach and Hayes (2002), who randomly assigned 80 inpatients to either a treatment as usual (TAU) control group or an ACTp + TAU treatment group. After 4 sessions, they found that half the number of

participants receiving ACTp were rehospitalised over the following 4 months compared to those in the control group. While this result appears impressive, there has been considerable criticism of the authors' interpretation given people who dropped out of the study were not included in the analyses and the difference between the rehospitalisation rates of the two groups was not statistically significant using a chi-squared test (Coyne, 2011). Furthermore, the use of rehospitalisation as the primary outcome measure appears controversial. While it is of course desirable for people to not require hospitalisation, staying out of hospital does not necessarily indicate recovery from schizophrenia. In fact, two of the participants in the Bach and Hayes (2002) trial went to gaol and two suicided. These four participants were not included in the "survival analysis" (p.1132) and so did not affect the apparent efficacy of ACTp.

Interestingly, those in the ACTp group reported more psychotic symptoms, but lower believability of symptoms (the degree to which positive psychotic symptoms actually represented reality) and less subsequent distress caused by symptoms (Bach & Hayes, 2002). The authors deemed this finding to be consistent with ACTp theory in that decreasing experiential avoidance of distressing internal experiences (e.g. delusions) through guided exposure also decreases the distress these internal experiences cause (Hayes et al., 2006). The lack of reporting of pre- and post-treatment symptom frequency and the absence of a measure of symptom severity make it difficult to fully analyse the efficacy of the ACTp intervention used by Bach and Hayes (2002). While some have also criticised the short follow-up period used in this study (4 months; Öst, 2008), the authors have subsequently published the results of a 1-year follow-up on 64 (80%) of the participants from the 2002 ACTp trial (Bach, Hayes & Gallop, 2012). Results indicated that those who received ACTp continued to show significantly reduced rehospitalisation rates compared to those in the TAU control group 1 year after intervention.

The second major study compared ACTp to enhanced treatment as usual (ETAU; Gaudiano & Herbert, 2006). The ETAU condition included regular meetings between the control participants and the ACTp therapist to provide non-specific support and to answer general questions. This was incorporated in the design to ensure that the primary difference between the groups was the nature of the treatment, and results were not confounded by the ACTp group receiving extra individual attention (Gaudiano & Herbert, 2006). The results replicated some of those reported by Bach and Hayes (2002), with the ACTp group showing less affective disturbance, and higher social functioning (Gaudiano & Herbert, 2006). Again, reduced distress associated with hallucinations was found despite no significant difference in frequency or severity of psychotic symptoms compared to the ETAU group. In a more recent paper exploring these outcomes further, it was found that the believability of hallucinations was the mechanism by which ACTp reduced participants' subjective distress (Gaudiano, Herbert & Hayes, 2010). Gaudiano and Herbert (2006) overcame some of the flaws associated with the earlier ACTp trial (Bach & Hayes, 2002), but did not find a significant difference between the groups in terms of rehospitalisation rates. A weakness of Gaudiano and Herbert's (2006) study was the small sample size (n=40), which may have resulted in insufficient power to detect such differences.

While more robust research is needed to endorse ACTp as empirically supported, early studies show promise for people with schizophrenia, and elements of acceptance and mindfulness appear to be increasingly incorporated into a more familiar CBTp approach (Chadwick, Taylor & Abba, 2005; Langer, Cangas, Salcedo & Fuentes, 2012; Shawyer et al., 2012). Some of the studies using ACT elements have shown positive results (Tai & Turkington, 2009). For example, participants with schizophrenia have responded well to mindfulness training and reported experiencing associated reductions in comorbid depression (White et al., 2011). However, ACTp is also being used increasingly on its own

with individuals (White et al., 2011) and groups (Oliver, Morris, Johns & Byrne, 2011), and with longer treatment durations (e.g. 27 sessions; Bloy et al., 2011). Critics of ACTp have pointed to the research lacking rigour (e.g. no systematic participant diagnosis confirmation, no follow-up) and the lack of research directly comparing ACTp to an alternative treatment (e.g. CBTp; Öst, 2008). While the American Psychological Association now classifies ACTp as having *moderate* research support, further exploration of its effectiveness and mechanisms of change in the treatment of people with schizophrenia is required. This thesis aims to further our understanding of how metaphorical language, a central tool of psychological therapies and particularly ACTp, might affect change in people with schizophrenia.

2.3. Summary

Pharmacotherapy and case management remain the first-line treatments for schizophrenia, but empirical evaluations of psychological treatments, such as CBTp and ACTp, have shown encouraging results. There are some fundamental differences between these two psychological approaches. CBTp is based on the premise that changing maladaptive thinking and behaviours leads to changes in affect (Garety et al., 1997) and so the goal is to *change* a person's irrational cognitions (Dickerson & Lehman, 2011). On the other hand, the broad goal of ACTp is to change the way a person *relates* to their cognitions and feelings without any focus on altering the initial experience at all (Hayes et al., 2006). Where CBTp emphasises the gathering of evidence to change how the client views their hallucinations and delusions, ACTp conceptualises such evidence-gathering as only promoting further entanglement with the problematic relational frame. Where CBTp uses behavioural strategies to distract from and disprove negative cognitions (Sivec & Montesano, 2012),

ACTp promotes the clarification of fundamental values to inspire behavioural change (Bach & Hayes, 2002).

Despite these differences, research indicates that both CBTp and ACTp achieve reductions in distress and improved functioning (Sivec & Montesano, 2012; Tai & Turkington, 2009) after relatively small doses of therapy (i.e. short treatment duration; Bach & Hayes, 2002; Gaudiano & Herbert, 2006; Malik, Kingdom, Pelton, Mehta & Turkington, 2009). Also, meta-analyses of psychological treatments for schizophrenia have identified similar predictors of a positive treatment response with two of the main factors being insight (Sivec & Montesano, 2012) and symptom believability (Gaudiano & Herbert, 2006).

While there is not yet a treatment comparison trial evaluating these two treatments alongside each other, it is important that we continue to try to understand the mechanisms of change in how 'talking therapies' are helpful in the treatment of schizophrenia (McLeod, 2009). Of particular interest is how these talking therapies are effective given that people with schizophrenia suffer significant cognitive deficits relating to language comprehension (Thoma & Daum, 2006). Given that ACTp in particular relies on the use of metaphorical language (Varra, Drossel & Hayes, 2010; Hayes, 2004), it is perhaps surprising that such a treatment approach would be effective with this population. More specifically, there appears to be a contradiction between the research showing that people with schizophrenia are poor at abstraction (Faraone et al., 1995) and yet a therapeutic approach laced with metaphorical language is efficacious for people with schizophrenia (Bach & Hayes, 2002; Gaudiano & Herbert, 2006). This contradiction emphasises the need to further examine the mechanisms of change in psychological treatments for schizophrenia as well as the need to explore the relationship between psychotic psychopathology and the neurocognitive processes involved in metaphor comprehension.

3. METAPHOR PROCESSING

The frequency of figurative language means accurate metaphor comprehension is integral to effective communication. Metaphors, being the most commonly used form of non-literal language, occur at a rate of approximately 6 per minute of speech (Thoma & Daum, 2006) or 5 per every 100 words of written text (Bambini, Gentili, Ricciardi, Bertinetto & Pietrini, 2011). While there is some variation in the use of metaphorical language across contexts, with academic texts having 18.5% metaphor-related words, news 16.4%, fiction 11.7%, and general conversation 7.7% (Steen et al., 2010), metaphors are clearly pervasive throughout our language.

The ubiquity of metaphorical language is also demonstrated in the broad span of abstraction-related research across disciplines, typically focusing on metaphors specifically. Linguistic, neurocognitive, psychological, philosophical, and neurobiological lines of investigation all contribute to our understanding of metaphor comprehension (Ritchie, 2006). Given metaphorical language is often used within psychological therapies (Blenkiron, 1999), it is important that we unpack the mechanisms of metaphor comprehension to further examine whether they will be an effective vehicle for communication with people with schizophrenia. This chapter will outline some of the key findings from the neurocognitive and neurobiological research into metaphor comprehension.

3.1. Neurocognitive models of metaphor comprehension

The *comparison model* was one of the earliest neurocognitive models used to explain metaphor comprehension. In this model, a person essentially maps out the features of the target and base to identify pre-existing but perhaps obscure similarities between the two.

To demonstrate this model, I will use the simplest form of metaphorical language: A is a B, where A is the *target* and B is the *base*. In the example “the mind is a computer”, the interpreter scans the features of both the target (mind) and base (computer) looking for some overlap. The meaning of the metaphor is chosen from these overlapping features (see Figure 2). There is some empirical support for this model, with the degree of similarity between the target and the base being positively correlated with the aptness and interpretability of metaphors (Marschark, Katz & Paivio, 1983) and the speed with which metaphors are processed (Gentner & Wolff, 1997; Pierce & Chiappe, 2008).

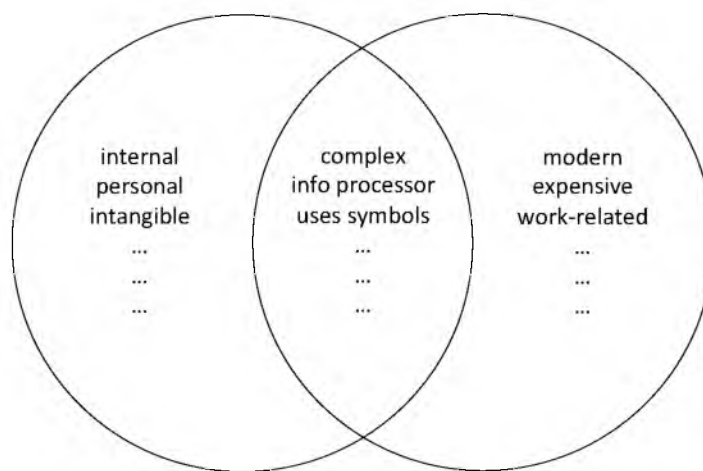


Figure 2. A feature-mapping (comparison model) interpretation of
the metaphor “the mind is a computer”

There have been some persistent criticisms of the comparison model however (Bowdle & Gentner, 2005). For instance, there are often numerous overlapping features between the target and base of a metaphor, but the model does not explain how the interpreter accurately chooses the meaning intended. Also, a simple mapping of similar features doesn’t account for the importance of the syntactic order of words within a metaphor. For example, “a computer is the mind” no longer makes sense.

In response to the criticisms of the comparison model, the *categorisation model* was suggested as an alternative. In this model, metaphors are seen to establish “taxonomic relations between semantically distant concepts” (Bowdle & Gentner, 2005, p.195). More specifically, upon hearing or reading the base term (computer), the interpreter simultaneously refers to the literal concept and an abstract metaphorical category (e.g. complex information processing system). The target of the metaphor (mind) is then assigned to that metaphorical category to denote the meaning of the metaphor. In support of the categorisation model, Jones & Estes (2006) found *aptness*, the extent to which a metaphor expresses an important feature of the target, to predict the speed and ease of accurate metaphor comprehension. Glucksberg, McGlone and Manfredi (1997) refined the categorisation model further to try to account for the irreversibility of the words within a metaphor and to explain how the interpreter elicits the appropriate metaphorical category from the base. Their *interactive property attribution model* has the base suggesting possible metaphorical categories while the target *simultaneously* highlights the appropriate categories. This model assumes a clear ‘base’ and ‘target’, however, which may not always be the case, particularly when more complicated metaphorical language might be used (e.g. in psychological therapy).

Corcoran (1999) proposed a more sophisticated model for metaphor comprehension that outlines the process for understanding both literal and non-literal utterances and attempts to explain specifically where the process might be breaking down for those with abstraction deficits (see Figure 3). This model suggests that hearing another person’s utterance triggers an intuitive *relevance seeker* that involves the listener making some effort to understand the intention of the speaker. This subsequently triggers simultaneous searches through semantic and episodic memory to retrieve an understanding of the speaker’s utterance. While the meaning formed from semantic memory is preferred as the accepted meaning in

response to literal speech, unfamiliar metaphorical language requires the listener to search their episodic memory for a personal recollection that helps to make sense of the literally implausible utterance. Bottini et al. (1994) argued that it was this literal implausibility of metaphorical language (or *denotative gap* as they called it) that triggered the engagement of episodic memory. Bottini et al. (1994) demonstrated the link between episodic memory and interpretation of unfamiliar metaphors by using positron emission topography (PET) to reveal activity in the right prefrontal cortex and precuneus when healthy adults interpreted unfamiliar metaphors, which is the same region of the brain activated when healthy volunteers were asked to retrieve information from their episodic memory in another study by Shallice et al. (1994). Corcoran (1999) included the concepts of an *as if processor* that she suggested allows a listener to translate metaphorical language into similes (e.g. “you’re crazy” effectively translated to “it’s *as if* you’re crazy”), as well as a final *shared relevance monitor* that involves the listener checking that their interpretation is from an episodic memory the speaker is also likely to have experienced.

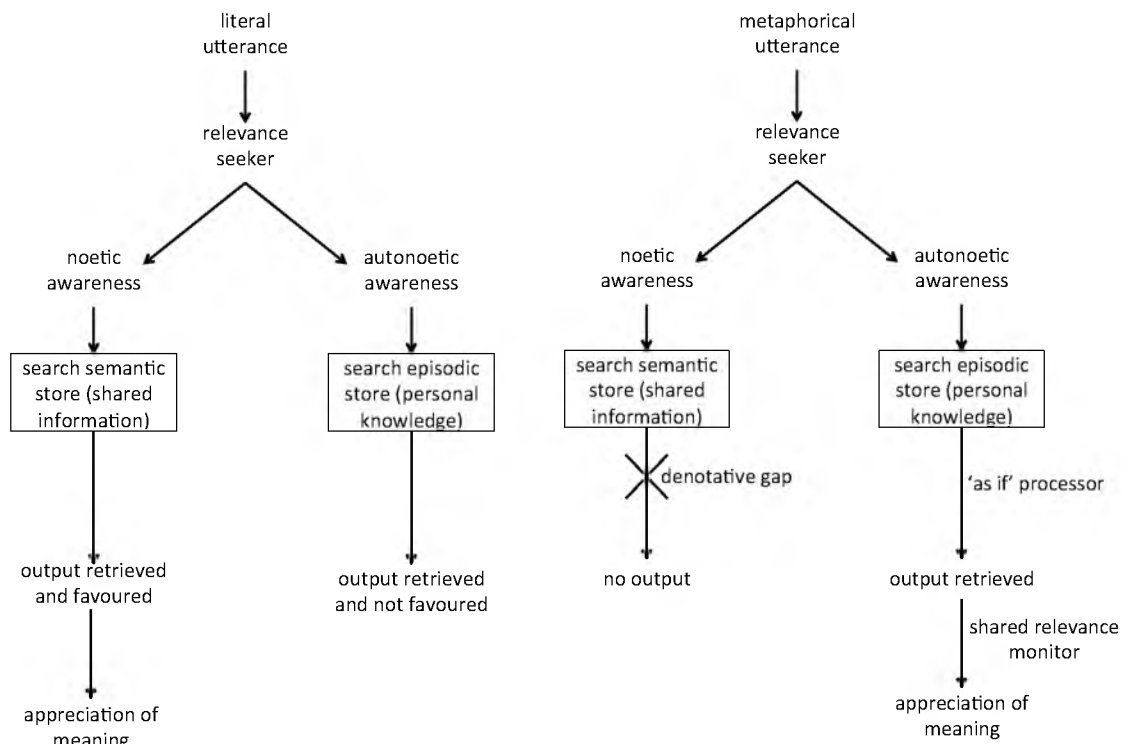


Figure 3. Corcoran's (1999) model of literal sentence and metaphor comprehension

(Note: Reproduced from Corcoran, R. (1999). *Autonoetic Awareness, Executive Social Skills, and the Appreciation of Intention:*

Figurative Reasoning in Amnesia, Confabulation, and Schizophrenia. Cognitive Neuropsychiatry, 4(1), 55–80.

doi:10.1080/135468099396061)

Corcoran (1999) used two case studies of people with schizophrenia (one with predominately negative psychotic symptoms, and the other with formal thought disorder and paranoid delusions) to illustrate where metaphor processing might break down in this disorder. While there was considerable heterogeneity between these two cases, she found evidence for a faulty *relevance seeker*, incapacitated *'as if' processor*, and episodic memory deficits in the person with predominately negative psychotic symptoms. This would be consistent with research that has found people with the negative features of schizophrenia typically provide vague personal recollections rather than details of specific events (Warren

& Haslam, 2007; Wood et al., 2006). The person with predominately positive psychotic symptoms, on the other hand, was able to interpret metaphors, but only by reflecting on fanciful or bizarre experiences characteristic of their florid mental state. As a result, their interpretations of metaphors were generally incorrect, which Corcoran (1999) attributed to a faulty *shared relevance monitor*. Despite the very small sample in Corcoran's (1999) study, her interpretation of the results is consistent with the notion that metaphor comprehension is particularly disrupted for people experiencing negative symptoms of schizophrenia.

Like Corcoran (1999), others have highlighted the importance of establishing a shared understanding of the context of a conversation in order to determine the most appropriate meaning of a metaphor. Clark's (1996) concept of *common ground* has some similarities with Corcoran's (1999) concept of the *shared relevance seeker*. While it is literally impossible for one person to know for certain what another person perceives, thinks or believes (Ritchie, 2004), Clark (1996) argued that we infer common ground on the basis of shared membership in cultural groups, both being in a particular physical environment, and shared past experiences. The conversation that led up to the metaphorical expression may itself contribute to the development of this assumed common ground (Ritchie, 2004).

Despite the apparent logic of Corcoran's (1999) model, there is some evidence to contradict its assumptions. For instance, numerous researchers have found no difference in the comprehension speeds of metaphorical speech and literal speech (Kintsch & Bowles, 2002; Gibbs, 2001), which they suggest questions the view that a person first attempts to determine an appropriate literal meaning before favouring the metaphorical meaning. Other contradictory findings come from a computational prediction model that generates context-appropriate meanings of the words within a metaphor to determine the most appropriate meaning (Chiappe & Chiappe, 2007; Terai & Nakagawa, 2012; Utsumi, 2011).

Using this prediction modelling technique, Kintsch and Bowles (2002) concluded that some metaphors are understood much like literal sentences, without any convoluted process of interpretation, particularly for metaphors that are commonly used and so more familiar. Therefore, further investigation of Corcoran's (1999) model appears warranted, with particular focus on the effect of the familiarity of the metaphorical utterance. Also, the processes of metaphor comprehension within the context of psychological treatments, where metaphors are often used to communicate new and complex concepts, is not well understood at this time.

3.2. Neurobiology of metaphor comprehension

While the neurocognitive features of schizophrenia have been considered central to the disorder for many years (Kraepelin, 1971), the underlying neurobiological mechanisms and locations have proven difficult to define. Efforts to clarify these gaps in our knowledge have required a combination of approaches. One approach has been to compare the cognitive performance of people with known localised brain injuries (e.g. a lesion to the left temporal lobe) with healthy controls. Conclusions made from this type of research have then been used to make inferences about which neurological areas are affected by disorders such as autism (Norbury, 2005), stroke (Winner & Gardner, 1977), and schizophrenia (Kircher et al., 2007). More recently, modern medical investigatory techniques have enabled unparalleled insights into the neurobiological processes of metaphor comprehension.

3.2.1. *Brain lesion studies*

While it is well established that the left hemisphere is particularly active in the comprehension and production of general (literal) speech and text (Mitchell & Crow, 2005), early research found that people with brain injury to the right hemisphere were more impaired on abstraction tasks than those with brain injury to the left hemisphere (Eisenson, 1962; Winner & Gardner, 1977). A later study by MacKenzie, Begg, Brady and Lees (1997) compared people who had suffered a right hemisphere stroke to healthy controls on various verbal language and abstraction tasks. Using a sentence-to-picture matching task that requires the person to match an orally presented or written figurative expression (e.g. “his heart felt heavy”) with the appropriate pictorial illustration, people with right hemisphere impairment chose the literal picture (i.e. a picture of a man carrying a giant heart) more often than the figurative picture (i.e. a picture of a man looking sad). These results led many to conclude that metaphor processing occurred neurologically in the right hemisphere.

Other tasks used to measure metaphor processing include a word-triad relatedness paradigm, in which participants are presented with sets of three words (e.g. cold, unfriendly, chilly) and asked to identify the two that are closest in meaning. On this task, those with damage to their right hemisphere more often choose the literal pairing (i.e. cold and chilly) over the figurative pairing (i.e. cold and unfriendly) compared to both those with left hemisphere lesions and healthy controls (Brownell, 1998, as cited in Thoma & Daum, 2006). However, other studies using the same or similar tasks found no significant difference between right- and left-brain damaged groups at all (Gagnon, Goulet, Giroux & Joannette, 2003; Zaidel, Kasher, Soroker & Batori, 2002), which suggested that it was not the location of the brain damage, but the presence of brain damage at all (i.e. right or left hemisphere) that resulted in poorer metaphor processing. In fact, Zaidel et al. (2002) noted

that the size of the lesion correlated negatively with abstraction performance, but only for left hemisphere lesions. And others have found damage to left hemisphere is associated with impaired metaphor processing compared to healthy controls (Papagno, Tabossi, Colombo & Zampetti, 2004; Giora, 2003, as cited in Thoma & Daum, 2006). These results contradict the conclusion that abstraction occurs in the right-hemisphere. Given that brain lesion research has found poor metaphor processing to be associated with right hemisphere damage (MacKenzie et al., 1997), left hemisphere damage (Papagno et al., 2004), and any brain damage at all (Zaidel et al., 2002), this line of investigation has failed to conclusively determine the neurobiological location of metaphor processing.

3.2.2. *Neuroimaging studies*

As neuroimaging technology has become more sophisticated, researchers have been able to examine the specific areas of the brain involved in understanding metaphorical language. In the first study to use functional imaging techniques to focus on metaphor processing, Bottini et al. (1994) identified numerous areas of the left hemisphere that are activated when reading literal sentences – the left prefrontal region, temporal pole, middle and inferior temporal gyrus, angular gyrus, precuneus and subcallosal gyrus regions. When participants were asked to judge the plausibility of metaphorical sentences, the same areas in the left hemisphere were activated with the addition of the Broca's and Wernicke's areas of the right hemisphere. It has been suggested that these results demonstrate that the left hemisphere is primarily responsible for language processing (including figurative language; Mitchell & Crow, 2005) but the right hemisphere is recruited for more complex semantic expressions (Bottini et al., 1994; Lee & Dapretto, 2006). Others have argued that these results show that both hemispheres are involved in the processing of language, and the

authors were not able to definitively conclude that metaphor interpretation was specific to the right hemisphere. In contrast to the right hemisphere hypothesis, Rapp, Leube, Erb, Grodd and Kircher (2004) found that when metaphorical and literal sentences are matched for syntactic and semantic complexity, metaphorical expressions triggered the strongest activation in the *left* inferior frontal and *left* temporal gyri, and these results have been replicated even when metaphor processing was compared to other forms of non-literal language, such as irony (Eviatar & Just, 2006).

Event-related potential (ERP) research, which measures the brain's response to a stimulus, has demonstrated that the context in which a metaphor is presented may also affect the neurological effort required to successfully interpret non-literal language, with higher N400 amplitude (a measure of stimulus novelty) in response to unfamiliar compared to familiar metaphors (Tartter, Gomes, Dubrovsky, Molholm & Stewart, 2002). Additionally, functional magnetic resonance imaging (fMRI) studies have found the right homolog of the Wernicke's area, the right and left premotor areas, the right and left insula and Broca's area are recruited for processing unfamiliar but not familiar metaphors (Mashal, Faust & Hendler, 2005; Mashal, Faust, Hendler & Jung-Beeman, 2007). This suggests that metaphor comprehension is not processed exclusively in either hemisphere, and that the degree to which neurological areas are activated is dependent on many factors (Schmidt & Seger, 2009), including the familiarity and general complexity of the metaphor (Schmidt, DeBuse & Seger, 2007).

Bambini et al. (2011) mapped the neurobiological areas activated when processing metaphors against the functions associated with those neural regions. They identified (1) the bilateral inferior frontal gyrus and left angular gyrus as supporting the integration of linguistic material and contextual world knowledge, (2) the anterior cingulate and prefrontal areas as monitoring and filtering the relevant aspects of the context to identify

appropriate meanings, and (3) the right superior temporal sulcus as dealing with the recognition of the speaker's intentions. This demonstrates the neurocognitive complexity of metaphor comprehension and illustrates how any deficits, whether resulting from brain injury or associated with a disorder, would impact on a person's ability to effectively communicate.

3.2.3. Understanding these contradictory findings

There are some possible explanations for the inconsistent findings from brain lesion studies and neuroimaging studies. For example, early studies did not differentiate lesion sites within the right or left hemispheres, or the time since their injury, or control for age-related cognitive decline independent of the brain injury (Schmidt, Kranjec, Cardillo & Chatterjee, 2010). Studies that did control for these factors found people with right hemisphere brain damage scored higher on a metaphor comprehension test than those with left hemisphere brain damage, and no difference compared to healthy controls (Giora, Zaidel, Soroker, Batori & Kasher, 2000). Furthermore, many studies did not control for differences in tasks used to test metaphor processing. Winner and Gardner's (1977) study demonstrated the variability in performance across verbally presented metaphors versus visually-depicted metaphors, and others have failed to find any significant difference between right and left brain damaged groups on metaphor processing performance when controlling for general language deficits (Zaidel et al., 2002). This raises the possibility that findings in favour of a lateralisation of metaphor processing may be more attributable to the nature of the task material used (Jordan & Hillis, 2005).

The grammatical nature of the metaphors used in this research has also been raised as a possible explanation for contradictory results (Schmidt et al., 2010), with studies neglecting

to ensure uniformity across conditions. Researchers have used a combination of nominal (noun-based) metaphors (e.g. “that baby is an *angel*”), predicate (verb-based) metaphors (e.g. “he *ran* for President”), preposition metaphors (e.g. “*chandelier earrings* are out of fashion”), or adjective-based metaphors (e.g. “she has a *warm* heart”). Some research has focused on the differences between nominal and predicate metaphors, proposing that the processing of predicate metaphors would have a unique neurobiological profile because they would activate areas of the brain associated with the corresponding literally intended motion verbs (Aziz-Zadeh & Damasio, 2008). However, findings have again been inconsistent with some supporting this hypothesis (Chen, Widick & Chatterjee, 2008; Saygin, McCullough, Alac & Emmorey, 2010) and others not (Cardillo, Watson, Schmidt, Kranjec & Chatterjee, 2012). Despite these contradictory results, the grammatical nature of the metaphor may still play a role in process of metaphor comprehension.

3.2.3.1. *Career of metaphor model*

While there is evidence to suggest that metaphors require a ‘higher’ level of cognitive processing than literal sentences (Mitchell & Crow, 2005), there is also evidence that the more familiar metaphors are processed much the same as literal sentences (Kintsch & Bowles, 2002). This concept of a *dead metaphor* was coined to describe a metaphor that had become so common that it’s meaning was essentially no longer figurative (Bottini et al., 1994). A metaphor is completely novel the first time it is presented, but becomes *conventionalised* over repeated presentations (Aziz-Zadeh & Damasio, 2008). A recent neurological study used fMRI to investigate the neural activity of healthy participants as they processed novel metaphors repeatedly, and found neural activity decreased within bilateral inferior frontal gyri, left posterior middle temporal cortex, and right postero-

lateral occipital cortex as metaphors became more familiar (Cardillo et al., 2012). As metaphors conventionalised, the right hemisphere became gradually less engaged and neural activity became increasingly dominated by the left hemisphere, similar to that of general (literal) communication.

This process of conventionalisation forms the heart of the *career of metaphor model* (Bowdle & Gentner, 2005). This model incorporates both the comparison and categorisation models, and explains how the processes by which we comprehend metaphors changes as we become increasingly familiar with the metaphorical interpretations of the base words. The comprehension of a novel metaphor subsequently strengthens the base word's association with two (or more) meanings. For example, understanding the metaphor "an obsession is a tumour" creates two representations of "tumour" – a cancerous growth (literal) and a problem that will become bigger over time if not attended to (figurative). The base (tumour) now becomes polysemous and can be applied within new metaphors with different target words, e.g. "doubt is a tumour", "a grudge is a tumour". The career of metaphor model argues that novel metaphors are understood via feature mapping (i.e. comparison model), whereas more familiar metaphors are understood via their associated metaphoric categories (i.e. categorisation model).

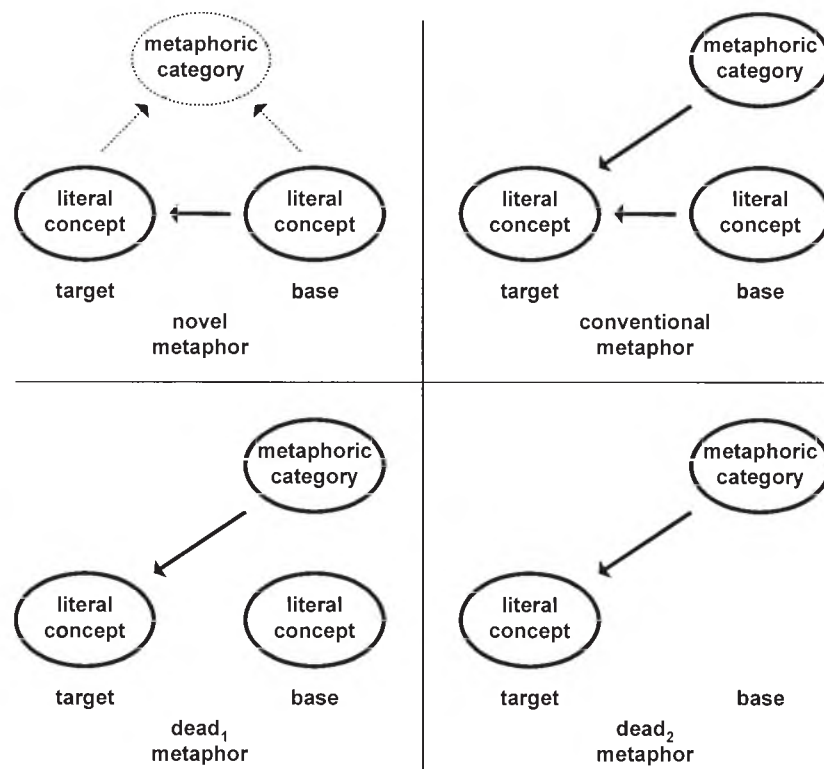


Figure 4. *Career of metaphor model*

(Note: Reproduced from Bowdle, B. F., & Gentner, D. (2005). *The Career of Metaphor*. *Psychological Review*, 112(1), 193–216.

doi:10.1037/0033-295X.112.1.193)

It is also worth noting that there are two forms of *dead* metaphors (as indicated in Figure 4 by the numerical suffixes: *dead₁* and *dead₂*). Some metaphors become *dead₁* over repeated exposures despite people still being aware of the literal definition of the word (e.g. “love is a rose”, people still realise a rose is a flower). Other metaphors become *dead₂*, where the base word is no longer linked to its literal meaning at all (e.g. people are probably not aware that the term “blockbuster” originally referred to a bomb that could destroy an entire block of buildings). The career of metaphor model has both behavioural (Bowdle & Gentner, 2005) and neurological support (Tartter et al., 2002; Mashal et al., 2005; Mashal

et al., 2007; Schmidt et al., 2007), and may help to explain some of the inconsistent findings within research that does not control for familiarity of metaphors.

3.3. Metaphors in psychological treatment

Given the complicated neurocognitive processes involved in metaphor comprehension and the known abstraction deficits for people with schizophrenia, it is perhaps worth asking why we use metaphorical language with such frequency in psychological treatments. Initially, the answer may seem simple - the use of metaphorical language in psychological therapies is inevitable because 'talking therapies' are inherently reliant of language and metaphors are unavoidably frequent within language. However, there are some important reasons for therapists to incorporate metaphors into psychological treatments and to encourage people with schizophrenia to use metaphorical language in return.

Regardless of the theoretical orientation of the psychological treatment, the fundamental aim is to help the client learn new ways of interacting with their internal and external experiences. Metaphors provide a useful vehicle for teaching and understanding new concepts by comparing them to more familiar contexts (Leary, 1990), e.g. learning ways to "empty your stress bucket".

For this learning to be effective over the course of therapy, and certainly for it to be effective beyond the final session, the new information and strategies discussed during treatment must be mentally retained by the client. It is, therefore, imperative that therapeutic information is communicated in a highly memorable way. Research on verbal memory suggests that recall is enhanced when material is organised and interesting, is mildly emotionally evocative, and utilises a number of sensory realms (Otto, 2012). Using

metaphors does just that, with studies showing greater recall of metaphors compared to literal sentences (Marschark & Hunt, 1985; McCabe, 1988). This has been attributed at least in part to the mental images generated during the process of metaphor interpretation. In this way, metaphors communicate important information in a salient and memorable way (Blenkiron, 1999; Otto, 2012).

In addition to facilitating the understanding of new concepts with improved memorability, Blenkiron (1999) outlined numerous other reasons for incorporating metaphorical language into cognitive behavioural treatments. He stated that using metaphors:

- makes therapy more understandable by communicating complex concepts in an efficient, easily accessible and portable way (e.g. “a man is not an island”),
- helps clients reflect on their problems from a new perspective (potentially facilitating increased insight),
- makes abstract concepts more concrete (and therefore manageable for clients to grapple with),
- allows initial externalisation of sensitive topics, which may help a reluctant client to discuss their issues,
- potentially increases rapport between the therapist and client (particularly through the use of humorous metaphors),
- increases the impact of a message (as some metaphors invite the client to relate to the characters within a metaphorical story),
- accesses both thoughts and emotions simultaneously (thereby increasing the potency of the intervention),
- effectively teaches particular skills (e.g. cognitive disputation), and
- encourages specific outcomes via tangible behavioural goals (e.g. focus on not continuing to do things that “dig this hole I’m in even deeper”).

The emotional and private nature of the content discussed during psychological treatment also means metaphorical language is well suited to therapy. When people need to express emotions, abstract concepts, or internal mental experiences, it is not possible to speak literally as a person cannot physically point to these phenomena (Crawford, 2009). Instead, metaphors are often used to represent concepts that are not directly sensorial in nature (Lakoff & Johnson, 1980; McGlone, 2007; Bowdle & Gentner, 2005). Furthermore, the stigma and shame often associated with psychological distress can make people reluctant to speak of their struggles directly. Metaphorical language offers an alternative, but still effective, means of communicating, e.g. “I just feel like I’m juggling so many things, and I’m scared I’m going to drop one”.

In fact, *not* using metaphorical language or *not* being attentive to a client’s metaphorical meaning increases the risk of therapy becoming stuck on a literal interpretation or becoming stuck with a single perspective (Blenkiron, 1999). Otto (2012) recommends using metaphorical language to alleviate this ‘stuckness’ in therapy – “when no one wants to listen to a list of social principles, many will listen to an Aesop’s fable” (p.167) – suggesting that metaphors tend not to evoke defensiveness to the same extent that direct (literal) instruction can (Hayes et al., 1999).

Within the context of CBT interventions generally, metaphors are considered an excellent way to demonstrate the relationship between thoughts and specific behaviours and more easily comprehend the impact of problematic beliefs (Abbatiello, 2006). Friedberg and Wilt (2010) suggest that metaphors are a particularly useful therapeutic tool when working with children as they can accommodate differences in developmental stage, improve recall of important information, encourage objectivity, and provide a simple way of understanding complex reasoning techniques such as evidence-gathering, reattribution, or decatastrophising.

While the benefits of metaphor use outlined by Blenkiron (1999) in reference to CBT are probably applicable to any form of psychotherapy, there are some reasons for using metaphors that are unique to the ACT model. Varra and colleagues (2010) stated that using metaphors in ACT avoids some of the potential negative effects of language. For example, using metaphors enables the therapist to avoid giving clients specific directions that they might comply with simply to try to please the therapist, and also provides a common sense model of communicating the paradoxical processes central to the ACT model (e.g. control is the problem).

There are also some distinctions between CBT and ACT in terms of the way metaphorical language is incorporated within treatment. CBT practitioners recommend explicitly explaining the meaning of metaphors and overtly linking this meaning to the client's dilemmas (Friedberg & Wilt, 2010; Blenkiron, 1999). In contrast, ACT practitioners would argue that this direct explanation detracts from the benefit of using metaphorical language in therapy (Hayes et al., 1999), much like explaining the punch line to a joke makes it less funny. One of the main reasons metaphors are used so frequently in ACT is that figurative language challenges the functions of literal verbal processes (Varra et al., 2010). Based on the belief that literal language is a primary contributor to rigid and ineffective coping strategies (Hayes, 2004), ACT uses metaphors to reframe thinking, evaluating, judging, remembering, and feeling, and to decouple the culturally established link between these experiences and current behaviours. Therefore, ACT would contend that explicit explanations for metaphors would simply return the client to non-figurative rationalisations that keep the client 'stuck'.

Of course, the thoughtless insertion of metaphors into a psychological intervention will not automatically result in improved outcomes. As with any component of treatment, clinicians need to consider the characteristics of the client, their cognitive style, their developmental

level, and their readiness for change to maximise the impact (Otto, 2012). Studies have demonstrated that the clinical effectiveness of metaphors is increased when metaphors are produced in collaboration with the client, are frequently repeated, and are apt to the situation the client is struggling with (Martin, Cummings & Hallberg, 1992; Abbatiello, 2006).

Similarly, metaphors are not automatically memorable. In a review of the clinical and experimental literature regarding metaphors (McCurry & Hayes, 1992), factors such as the number of interpretations that could be derived from a metaphor, its association with a visual image, and the availability of subsequent environmental cues can affect a metaphor's memorability. The literature review also suggested specific factors to consider when treating people with schizophrenia such as, metaphors high in affect tend to be less comprehensible to people with schizophrenia (McCurry & Hayes, 1992).

3.4. Summary

Metaphors are the most common form of non-literal speech and so are integral to effective communication. As such, the accurate comprehension of metaphorical language is central to the effectiveness of psychological treatments.

In our efforts to better understand the processes of metaphor comprehension, the *comparison model* and *categorisation model* have together provided a useful framework and given rise to more sophisticated and integrated models of metaphor comprehension. Corcoran's (1999) model, in particular, highlights the importance of episodic memory and *shared relevance* between the speaker and the listener given the context of the conversation. Furthermore, she has applied her model to people with schizophrenia, and

suggested how their errors in metaphor interpretation may indicate where the process has broken down.

Despite these neurocognitive models providing logical frameworks of metaphor processing, empirical results are inconsistent in supporting them. In particular, studies showing no significant difference in processing time between metaphorical and literal sentences have been used to argue that metaphorical phrases are interpreted much like literal sentences (Chiappe & Chiappe, 2007; Terai & Nakagawa, 2012; Utsumi, 2011; Kintsch & Bowles, 2002).

In a parallel line of enquiry, neurobiological investigations initially appeared to offer some clarity; with early studies finding that general language was processed in the left hemisphere while metaphorical language was processed in the right hemisphere (Eisenson, 1962; Winner & Gardner, 1977). While some brain lesion studies (Mackenzie et al., 1997; Thomas & Daum, 2006) and neuroimaging studies (Bottini et al., 1994; Lee & Dapretto, 2006) were consistent with this hypothesis, others found no difference in hemisphere activation at all (Gagnon et al., 2003; Zaidel et al., 2002; Rapp et al., 2004; Eviatar & Just, 2006).

A number of methodological and theoretical explanations for these contradictory results have been proposed (Schmidt et al., 2010), including the *career of metaphor theory* (Bowdle & Gentner, 2005). This model argues that a metaphor presented for the first time requires episodic memory and working memory, and is processed by engaging the right hemisphere of the brain to, among other things, recognise the speaker's intention (Bambini et al., 2011). However, over repeated exposures, a metaphor becomes *conventionalised* (Aziz-Zadeh & Damasio, 2008) to the extent that it may be comprehended much like a

literal sentence (Bowdle & Gentner, 2005), with decreased dependence on the right hemisphere for processing (Cardillo et al., 2012).

Research on metaphor comprehension benefits our appreciation of the neurocognitive processes involved, and subsequently our understanding of why people with schizophrenia experience deficits in interpreting this form of figurative language (Corcoran, 1999). Despite these deficits, there remains strong rationale for incorporating metaphors in psychological treatments for people with schizophrenia (Otto, 2012; Blenkiron, 1999; Varra et al., 2010), or as Ortony (1975) expressed it – “metaphors are necessary and not just nice” (p.45). While those providing psychological therapies to people with schizophrenia espouse the use of metaphorical language because of its capacity to communicate emotionally meaningful content in a memorable way, there is currently no research in the literature systematically evaluating a model of *clinically oriented* metaphor comprehension.

4. PROPOSED MODEL OF METAPHOR COMPREHENSION

As previously mentioned, accurate metaphor comprehension is important to the effectiveness of treatments that are reliant on verbal communication. Neurocognitive and neurobiological models of metaphor interpretation have shed considerable light on the cognitive processes and neural activity involved in a person's interpretation of a metaphor, but no model has been universally empirically supported. Rather than discourage further efforts, the inconsistencies in research evaluating these models have in fact stimulated more sophisticated and integrated models that increasingly accommodate the variability of metaphorical language (e.g. career of metaphor theory). However, there has been a lack of explanation for how the cognitive processes involved in metaphor comprehension relate to specific clinical pathology, such as negative psychotic symptoms. The model presented in this thesis attempts to resolve this omission by presenting and evaluating a model of metaphor comprehension that straddles neurocognitive processes and schizophrenia psychopathology. In addition, the model proposed below acknowledges the importance of the context in which a metaphor is presented and the potential impact of meaningfulness for the listener, suggesting that these factors may also have an effect on the accuracy of metaphor interpretation.

4.1. The role of negative symptoms

Negative symptoms include alogia (poverty of speech), anhedonia (decreased experience of pleasure), prosody (diminished intonation in speech), flat affect, asociality (lack of motivation for social interaction) and avolition (lack of motivation generally). For people with schizophrenia, negative psychotic symptoms often appear first (Häfner et al., 1999;

Reichenberg & Harvey, 2007) and have the biggest impact on general functioning (Kopelowicz et al., 2006; MacDonald & Schulz, 2009; Reichenberg & Harvey, 2007; Carlsson et al., 2006). It is also the negative psychotic symptoms that are most strongly linked with the neurocognitive deficits associated with schizophrenia, in particular deficits in working memory (Lee & Park, 2005), language (Mitchell & Crow, 2005), and autobiographical memory (Riutort et al., 2003).

The proposed model hypothesised a relationship between negative symptoms and autobiographical memory, which was based on the rationale that negative symptoms are associated with a combination of various cognitive deficits (see Section 1.3) and a prolonged history of social isolation (see Section 1.1). Corcoran and Frith (2003) argued that these factors combine to result in “impoverished autobiographical memory stores” (p.898). That is, people with schizophrenia don’t have the same number of experiences to recall as healthy controls (Riutort et al., 2003) and have trouble recalling the experiences they have had accurately (Corcoran & Frith, 2003). Hence, a significant negative relationship was predicted between negative symptoms and autobiographical memory performance. While between group comparisons have found people with schizophrenia to perform poorly on autobiographical measures compared to healthy controls (Wood et al., 2006), the relationship between negative symptoms and autobiographical memory has not been tested directly in previous research.

One of the other negative symptoms long considered core to the profile of schizophrenia is anhedonia (Kraepelin, 1971). In the context of depressive disorders, anhedonia typically refers to a decreased capacity to experience pleasure. However, it has been argued that this term is more complex in relation to schizophrenia. Strauss and Gold (2012) argue that people with schizophrenia do have the capacity to experience pleasure, as demonstrated by their self-reported levels of pleasure being the same as healthy controls when they are

asked how they feel in the current moment (Cohen & Minor, 2010; Kring & Moran, 2008). However, when people with schizophrenia are asked about their experiences of pleasure using hypothetical questions (e.g. “True or false: Although there are things that I enjoy doing by myself, I usually seem to have more fun when I do things with other people”), retrospective questions (e.g. “Over the past two weeks, how good did you feel?”), prospective questions (e.g. “What activities or events are you looking forward to? And how much fun do you think you will have?”), or trait-based questions (e.g. “In general, how happy do you feel?”), their responses are partly dependent on other cognitive processes. Strauss and Gold (2012) believe deficits in episodic, semantic and working memory contribute to the reduced levels of self-reported “non-current” pleasure (p.364). The model proposed here tested this theory, hypothesising a relationship between negative symptoms and working memory, where more severe negative symptoms are associated with poorer working memory performance.

4.2. Role of autobiographical memory

People with schizophrenia exhibit significant autobiographical memory deficits from early adulthood (Wood et al., 2006; Wilson & Ross, 2003), which aligns with the typical onset of negative symptoms (15 and 30 years of age; MacDonald & Schulz, 2009). Some neurocognitive models of metaphor comprehension (e.g. Corcoran, 1999) highlight the importance of autobiographical memory as central to a person’s capacity to reflect on their past experiences to determine potential abstract meanings of figurative speech. It was predicted that those with more severe negative symptoms would exhibit greater deficits in autobiographical memory, and for autobiographical memory to subsequently predict performance on a metaphor comprehension task.

4.3. The role of working memory

Accurately interpreting metaphorical speech requires a person to simultaneously recognise that an utterance is in fact metaphorical, search their autobiographical memory for clues as to the abstract meaning of the metaphor, and check for a shared relevance of meaning given the context of the conversation. For all these processes to occur at the same time, considerable working memory must be employed. This reliance on working memory for accurate metaphor processing has been demonstrated by numerous studies (Chiappe & Chiappe, 2007; Kiang et al., 2007; Pierce & Chiappe, 2008; Pierce et al., 2010; Ritchie, 2004; Lee & Park, 2005). People with schizophrenia are known to demonstrate working memory deficits (Barch & Caeser, 2012; Haenschel & Linden, 2011), and it has been argued that these deficits in working memory mediate the relationship between negative symptoms and abstraction (Glahn et al., 2000). As part of this thesis, it was hypothesised that working memory would predict abstraction performance, both directly and by mediating the relationship between negative symptoms and autobiographical memory.

4.4. The role of abstraction

While the term abstraction has been applied to the interpretation of non-literal language in a more general sense (Thoma & Daum, 2006), in the context of the proposed studies it is used to refer to the interpretation of metaphors only. The metaphor comprehension tasks that contribute to the general abstraction variable within this thesis include metaphors that are not therapeutically oriented. They are either artificially generated (i.e. novel) metaphors (e.g. “the investors were squirrels collecting nuts”) or highly familiar metaphors

(e.g. “you can’t judge a book by its cover”). Consistent with past research, the model of metaphor comprehension proposed in this thesis anticipated abstraction to be predicted indirectly by negative symptoms via both working memory and autobiographical memory performance.

4.5. The role of context

While the effects of psychopathology and neurocognitive deficits are considered important to the abstraction deficits associated with schizophrenia, there are contextual subtleties that may also play an important role (Kövecses, 2010). For example, metaphors that are presented in the context of therapy, chosen specifically because their message applies to the client’s struggles at that particular time, may be comprehended differently to those invented for the artificial purpose of a standardised abstraction measure (e.g. “*the close friends were a bag of toffees*” from the Plausible/Implausible Metaphor Interpretation Test). While even artificially generated metaphors are more memorable than literal speech (Marschark & Hunt, 1985; McCabe, 1988), the memorability of metaphors presented in the context of therapy are expected to be even greater than artificially generated metaphors that have no pertinent meaning to the listener (McCurry & Hayes, 1992). However, there has been no research to date to examine this. Given that emotions play a role in how people with schizophrenia recall autobiographical memories (Morise et al., 2011; Bennouna-Greene et al., 2012), metaphors that evoke a pertinent meaning and therefore evoke the individual’s emotions may be particularly relevant to the treatment of people with schizophrenia. Assuming that therapy evokes core emotions more than a standardised abstraction test, therapeutically oriented metaphors would facilitate improved access to core emotions and in turn improve retrieval of autobiographical memories. Therefore, the

model proposed in this thesis distinguished between general abstraction tasks (consisting of non-therapeutic metaphors) from metaphors that are more likely to be therapeutically meaningful.

4.6. The proposed model

In summary, an indirect relationship between negative psychotic symptoms and metaphor comprehension is hypothesised. It is predicted that this relationship will be mediated by autobiographical memory and working memory. It is also expected that autobiographical memory functioning will be predicted by both negative symptoms and performance on working memory tasks (see Figure 5).

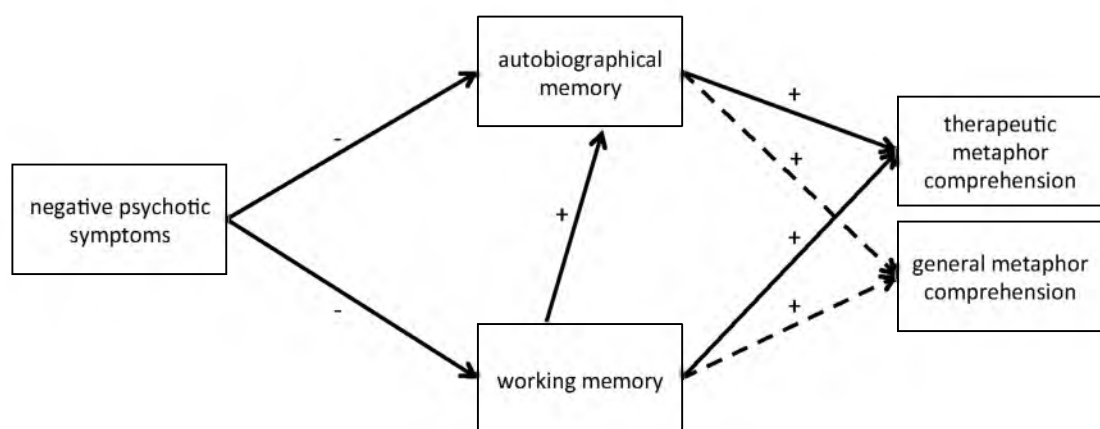


Figure 5. *Hypothesised model of factors influencing metaphor comprehension in people with schizophrenia (positive and negative symbols indicate the direction of the relationships between factors and dotted lines indicate weaker relationship strength).*

Furthermore, non-therapeutic and therapeutic metaphor interpretation were included in this model interchangeably to investigate whether expected greater meaningfulness of the

therapeutic metaphor would make any difference to the relationship between these variables. This step was included to examine the contradictory findings that people with schizophrenia are able to benefit from metaphor-laden treatments (Bach & Hayes, 2002; Gaudio & Herbert, 2006) despite well-known abstraction deficits (Thoma & Daum, 2006). Therefore, a key question posed by this thesis is whether people with schizophrenia are able to comprehend metaphors that are therapeutically oriented, even when they show deficits on general abstraction measures.

It was also hypothesised that metaphors presented to a person with schizophrenia in the context of therapy – metaphors that have an intended meaning that is relevant to that person's recovery from mental illness – would be better able to 'tap in' to that person's autobiographical (episodic) memory and subsequently more easily trigger a relevant meaning for that person. Therefore, it was expected that the predictive power of autobiographical memory would be greater for therapeutically oriented metaphors than for experimental or common metaphors.

These hypotheses were tested via two studies. Study I developed and validated a unique metaphor interpretation test. This test was unique in that it asked participants to interpret six metaphors that are regularly used in psychological treatment for people with schizophrenia (i.e. ACTp). This new therapeutic metaphors interpretation test was then incorporated into Study II, where the proposed models of metaphor comprehension were evaluated to determine if results for non-therapeutic metaphor comprehension were different from therapeutic metaphor comprehension.

5. STUDY I: THERAPEUTIC METAPHORS INTERPRETATION TEST

5.1. Purpose of this study

Traditional abstraction measures used by researchers involve artificially generated metaphors often in the form of A is a B (e.g. “love is a rose”). The relationship between schizophrenia and abstraction deficits has been established on their poor performance on standardised tests using these uncommon or experimental metaphors (Thoma & Daum, 2006). However, this finding does not take into account the importance of the context in which metaphors are presented (Kövecses, 2010) or the relevance of the meaning to the listener (McCurry & Hayes, 1992). A *Therapeutic Metaphors Interpretation Test* (T-MIT) was designed to provide a measure of abstraction using metaphors that are actually used within the context of therapy (i.e. ACTp).

5.2. Method

5.2.1. *Participants*

The healthy control group consisted of 45 university students (9 male, 36 female; M age=21.58, SD=11.51), who volunteered to participate by responding to an online noticeboard advertisement outlining the purposes of the research (see Appendix B). They received course credit for participation. Participants in the control group were excluded if they reported any history of psychotic symptoms.

The clinical group consisted of 42 people (18 male, 24 female; M age=40.33, SD =11.51) with a primary diagnosis of Schizophrenia or Schizoaffective Disorder. These participants were referred by their treating psychiatrist or mental health case manager. They were not paid for their participation. Seven additional patients declined or did not complete the testing; one due to being discharged from the inpatient service to another geographical area prior to completing the assessment, and six others declined to participate. These additional 7 patients did not agree to participate and so there was no data provided by them to include in the analyses. There was no missing data from the 42 who were included.

General exclusion criteria that applied to both groups included those who were unable to participate meaningfully due to poor English or a diagnosed intellectual disability.

A priori analysis indicated a need for 36 participants in each group to have 0.8 power for detecting a medium effect when employing the typical .05 criterion for statistical significance.

5.2.2. *Materials*

In addition to providing general demographic information, participants completed a combination of psychopathology and abstraction measures (see Appendix C and Appendix D for complete test batteries used for control participants and clinical participants respectively).

5.2.2.1. Psychopathology

The Psychotic Disorders Screen of the *Structured Clinical Interview for DSM Disorders* (SCID-II) was used to determine whether participants had ever experienced psychotic symptoms; control group participants were excluded if they had, and clinical group participants were excluded if they had not.

To account for the possible confounding effects of depressed mood on abstraction ability (Iakimova, Passerieux & Hardy-Bayle, 2006), the *Beck Depression Inventory – second version* (BDI-II) was administered to the control group, and the *Calgary Depression Scale for Schizophrenia* (CDSS) was used for the clinical group. A meta-analysis of 25-years of results on the BDI-II found very high internal consistency: 0.86 for psychiatric patients and 0.81 for nonpsychiatric subjects (Beck, Steer & Garbin, 2002). The CDSS was developed to discriminate between people with schizophrenia who were or were not depressed. It showed a Cronbach alpha of 0.84 with 50 consecutive voluntary admissions with schizophrenia to psychiatric hospitals and was deemed to avoid the confounding influence of negative psychotic symptoms on depression ratings scales (Addington, Addington & Schissel, 1990).

5.2.2.2. Abstraction

The *Therapeutic Metaphors Interpretation Test* (T-MIT) was developed by the author to test whether participants' abstraction performance would be improved when the metaphors included were therapeutically oriented rather than artificially generated. The six metaphors included in the T-MIT were drawn from the seminal ACT treatment manual written by Hayes et al. (1999) and focused on a range of the principles fundamental to ACT (see Table

4). ACT metaphors were chosen because, while CBT practitioners are also known to use metaphors in therapy (Blenkiron, 1999; Otto, 2012), the foundational ACT text (Hayes et al., 1999) provides explicit scripts for metaphors and links each with a specific therapeutic message.

Table 4. *T-MIT metaphor descriptives*

Metaphor	ACT principle	Words	Average word length
1. Tug of war with a monster	Defusion	97	3.88
2. Polygraph	Acceptance	193	4.15
3. Chessboard	The observing self	407	4.29
4. Gardening	Values	216	4.44
5. Bubble in the road	Willingness	118	4.22
6. Joe the bum	Committed Action	304	4.33
Average		222.50	4.22
Standard Deviation		116.85	0.19

Participants were asked to choose the most appropriate meaning of each metaphor from four options – a correct concrete interpretation, an incorrect concrete interpretation, an incorrect abstract interpretation, and a correct abstract interpretation (see Appendix C). These response options were generated by the primary researcher and supervisors. Consistent with the scoring used in the *Delis-Kaplan Executive Functioning Scale* (D-KEFS) Proverbs Test, correct abstract responses on the T-MIT received the maximum score (4), correct concrete responses received a lesser score (2), and incorrect interpretations (whether abstract or concrete) received no score at all (0). Thus, total scores on the T-MIT could range from 0 to 24.

To explore the psychometric properties of the T-MIT, two well-established abstraction measures were used as a comparison – the *Plausible / Implausible Metaphor Interpretation Test* (PIMIT) and the *Proverbs Test* of the D-KEFS. The PIMIT (Bottini et al., 1994) consists of

40 short sentences (e.g. “this city is a chimney”) to which the respondent circles ‘yes’ or ‘no’ to indicate whether they believe the sentence has a plausible metaphorical interpretation. Half of the sentences are nonsensical, and those that are metaphorical are unfamiliar as they were artificially developed and not in common use. This makes the PIMIT less vulnerable to conventionalisation effects (Bottini et al., 1994).

The D-KEFS Proverbs Test (Delis, Kramer, Kaplan & Holdnack, 2004) consists of two subscales: one answered via free inquiry (*achievement 1*), and the other answered via multiple choice (*achievement 2*). The items of the D-KEFS Proverbs Test include 5 metaphors commonly used in everyday language (e.g. “you can’t judge a book by its cover”) and 3 more uncommon metaphors (e.g. “an old ox plows (sic) a straight row”). The D-KEFS Proverbs Test has shown good reliability (.68 to .80; Homack, Lee & Riccio, 2005).

5.2.3. Procedure

Ethics approval was sought from the University of Wollongong Human Research Ethics Committee (see Appendix E) and approved subject to use of information sheets and consent forms (see first two pages of Appendix C and Appendix D for control and clinical participants respectively).

After agreeing to participate, participants met with the principal researcher individually at the university psychology clinic (control group) or the facility where they were receiving mental health care at the time (clinical group). Each test was administered in accordance with the directions outlined in its original manual. All clients were offered the opportunity to ask questions and/or receive supportive debriefing as needed after the assessment interview.

5.2.4. Data analysis

Responses were entered into an automated scoring template before being transferred into SPSS for statistical analyses. Responses from a random selection of 5 participants were checked for accuracy. Correlational analyses were planned to assess whether the T-MIT scores varied consistently with well-established abstraction measures, and independent group t-tests were planned to explore whether the performance on the T-MIT differentiated between the clinical group and healthy controls. Non-parametric equivalent analyses were employed due to the skewed distribution of the PIMIT, D-KEFS and T-MIT scores across the control group.

5.3. Results

While the distribution of gender in the clinical group was relatively equivalent ($\chi^2(1, N=42)=.86, p>.05$), the control group had significantly more females (36) than males (9; $\chi^2(1, N=45)=16.20, p<.001$). The gender difference *between* groups was also significant ($\chi^2(1, N=87)=5.31, p<.05$), with the female:male ratio higher in the control group (36:9) compared to the clinical group (24:18; see Table 5). There was also a significant difference in the age of the clinical ($M=40.33, SD=11.51$) and the control groups ($M=21.58, SD=8.99$), with the control group (university sample) significantly younger ($z=-6.91, p<.001$).

Table 5. *Demographic information by group*

	Control	Clinical
Number	45	42
Age (M and SD)	21.58 (8.99)	40.33 (11.51)
Female:Male	36:9	24:18
Australian	84.44%	88.10%
Primary diagnosis of schizophrenia	0.00%	78.57%
Age of onset of psychosis	n/a	26.02 (11.33)
Prescribed antipsychotic medication	0.00%	80.95%
Medication Compliance (as %)	n/a	89.81 (17.82)
Emergency Department presentations (last 6 months)	0.00 (0.00)	1.21 (1.32)
Hospital admissions (last 5 months)	0.00 (0.00)	3.50 (4.10)

Using the SCID psychotic disorders screen, no participants from the healthy control group were excluded due to a history of psychotic symptoms, and no participants from the clinical group were excluded due to an absence of psychotic symptoms.

The majority (89%) of healthy control participants reported *normal* levels of depressed mood, with 9% having *mild* levels and 2% having *moderate* levels. A higher proportion of the clinical group showed depressive symptoms, with 43% indicating a high likelihood of Major Depressive Disorder on the CDSS (see Table 6; Addington, Addington & Maticka-Tyndale, 1994). The control group performed well on the PIMIT ($M=13.67$, $SD=2.78$), D-KEFS achievement 1 ($M=24.60$, $SD=4.92$), and D-KEFS achievement 2 ($M=31.56$, $SD=1.12$), but the clinical group performed noticeably worse on all measures of abstraction. These results were presented as preliminary data at an international conference (Hains & McLeod, 2010).

Table 6. *Mood and metaphor task performance by group (Study I)*

	Control		Clinical		Total	
	M	SD	M	SD	M	SD
Depression *	5.58	4.81	7.93	5.80		
PIMIT total	13.67	2.78	9.50	5.39	11.66	4.71
D-KEFS achievement 1	24.60	4.92	18.90	7.50	21.85	6.88
D-KEFS achievement 2	31.56	1.12	26.90	6.47	29.31	5.10
T-MIT total	21.20	3.03	13.71	5.58	17.59	5.80

* Depression was measured using two different tests: (1) the BDI-II for the control group, and (2) the CDSS for the clinical group

A more detailed summary of the T-MIT scores highlighted that the clinical group performed poorer on all items, but most notably on items 2 and 6 (see Table 7). Given that interpreting every item literally (i.e. the correct concrete option) would result in a total T-MIT score of 12, the average total T-MIT score for the clinical group (13.71) might suggest very little abstraction was evident at all. However, the item breakdown suggests that the clinical participants demonstrated some abstraction in their interpretations (e.g. item 4).

Table 7. *Means (and Standard Deviations) for the T-MIT items by group (Study I)*

	Control	Clinical	Both Groups
1. Tug of war	2.76 (1.67)	2.48 (1.31)	2.62 (1.50)
2. Polygraph	3.11 (1.57)	1.95 (1.79)	2.55 (1.77)
3. Chessboard	3.78 (.77)	2.48 (1.52)	3.15 (1.35)
4. Garden	3.91 (.60)	3.00 (1.67)	3.47 (1.31)
5. Soap bubble	3.82 (.83)	2.29 (1.85)	3.08 (1.61)
6. Joe the tramp	3.82 (.83)	1.52 (1.86)	2.71 (1.83)
Total	21.20 (3.03)	13.71 (5.58)	17.59 (5.80)

Further item analysis on the T-MIT found the items were of appropriate difficulty, with the control group responding correctly to 85.56% of the time and the clinical group responding

correctly 45.24% of the time (see Table 8). No items were answered correctly by all participants, and no items were answered incorrectly by all participants. The most discriminating items appeared to be items 3 and 6, which consisted of the Chessboard and Joe the Tramp metaphors respectively.

Table 8. *Percentage of correct abstract responses for the T-MIT items by group (Study I)*

	Control	Clinical	Both Groups
1. Tug of war	60.00%	35.71%	48.28%
2. Polygraph	73.33%	38.10%	56.32%
3. Chessboard	91.11%	42.86%	67.82%
4. Garden	97.78%	71.43%	85.06%
5. Soap bubble	95.56%	50.00%	73.56%
6. Joe the tramp	95.56%	33.33%	65.52%
Total	85.56%	45.24%	66.09%

The convergent validity of the T-MIT was evaluated by comparing those scores to other well-established measures of abstraction. As predicted, the T-MIT total score for both groups combined was positively correlated with both the PIMIT and the D-KEFS Proverbs Test (achievement 1 and achievement 2; see Table 9). The lack of significant correlations between the T-MIT and the well-established abstraction measures for the control group may be due to the ceiling effect evident in the control participants' abstraction performance.

Table 9. *Spearman's correlations between T-MIT, PIMIT and D-KEFS proverb task scores by group and combined (Study I)*

		Depressed mood ^a	PIMIT total	D-KEFS achievement 1	D-KEFS achievement 2
Both groups	PIMIT total	-.15			
	D-KEFS achievement 1	-.05	.13		
	D-KEFS achievement 2	-.09	.25*	.14	
	T-MIT total	-.12	.48**	.24*	.53**
Control group	PIMIT total	-.30*			
	D-KEFS achievement 1	.04	.07		
	D-KEFS achievement 2	.09	-.11	-.16	
	T-MIT total	.01	.09	.09	.13
Clinical group	PIMIT total	.14			
	D-KEFS achievement 1	-.03	.01		
	D-KEFS achievement 2	.00	.07	.20	
	T-MIT total	.04	.38*	.13	.34*

^a using the BDI-II for the control group and the CDSS for the clinical group; * $p \leq .05$; ** $p \leq .001$

Between group differences were then examined to assess whether the clinical group and control group differed in their performance on the T-MIT task. Using a Mann-Whitney U test, a significant difference was found between the T-MIT scores of the control group ($M=21.20$, $SD=3.03$) and the clinical group ($M=13.71$, $SD=5.58$; $z=-5.96$, $p<.001$), with the healthy control group scoring higher than those with schizophrenia.

An analysis of covariance (ANCOVA) was then performed to determine whether this difference remained significant when statistically controlling for the effects of depressed mood, a factor known to affect abstraction performance (Iakimova et al., 2006). Given different depression measures were used for each group, the ANCOVA required BDI-II and CDSS scores to be converted into z-scores (normed within each group). After statistically controlling for depression, the significant between group effect for T-MIT performance ($F(1,84)=60.88$, $p<.001$) remained, with the control group scoring significantly higher than the clinical group.

Non-parametric Spearman's rho correlations of the individual T-MIT items and the T-MIT total score found significant inter-item relationships (see Table 10), and also between all individual items and the T-MIT total score (except for item 1 in the clinical group).

Table 10. *Spearman's correlations between T-MIT individual items and total score by group and combined (Study I)*

		item 1	item 2	item 3	item 4	item 5	item 6
Both groups	item 1	-					
	item 2	.12	-				
	item 3	.25*	.43***	-			
	item 4	.15	.32**	.35***	-		
	item 5	-.00	.31**	.60***	.20	-	
	item 6	.01	.27*	.41***	.40***	.50***	-
	total score	.46***	.66***	.72***	.54***	.65***	.71***
Control group	item 1	-					
	item 2	.04	-				
	item 3	.18	.14	-			
	item 4	.23	.28	-.05	-		
	item 5	-.17	.13	.30*	-.03	-	
	item 6	.08	.13	-.07	-.03	-.05	-
	total score	.66***	.59***	.44**	.27	.20	.34*
Clinical group	item 1	-					
	item 2	.11	-				
	item 3	.22	.42**	-			
	item 4	.07	.20	.26	-		
	item 5	-.08	.35*	.51***	-.03	-	
	item 6	-.09	.01	.12	.23	.26	-
	total score	.28	.62***	.75***	.52***	.65***	.49***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

5.3.1. Post hoc analyses

Given we were interested in whether people's abstraction abilities are affected by the nature of the metaphors included in abstraction measures, post hoc analyses looked at participants' results on familiar versus unfamiliar metaphors on the D-KEFS Proverbs Test. As was expected, participants interpreted familiar metaphors ($M=6.69$, $SD=1.36$) significantly more accurately than unfamiliar metaphors ($M=5.89$, $SD=1.72$), both for the

control group ($z=-2.95$, $p<.005$) and the clinical group ($z=-4.23$, $p<.001$), as well as across the entire sample ($z=-5.13$, $p<.001$). This result was consistent with the career of metaphor theory (Bowdle & Gentner, 2005) and other studies showing conventionalisation effects (Cardillo et al., 2012; Tartter et al., 2002; Mashal et al., 2005; Mashal et al., 2007; Schmidt et al., 2007). The T-MIT scores significantly correlated with both familiar ($r(87)=.41$, $p<.001$) and unfamiliar ($r(87)=.52$, $p<.001$) metaphors on the D-KEFS. The strength of these relationships suggests the T-MIT was more closely aligned with unfamiliar metaphors, but the difference between these correlations was not statistically significant.

As noted in Table 4, the metaphors included in the T-MIT varied in terms of number of words and average word length. Therefore, post hoc analyses tested whether performance on the T-MIT items was affected by these factors. The relationship between performance on the T-MIT and number of words was not statistically significant for the control group ($r(5)=.41$, $p>.05$) or clinical group ($r(5)=-.06$, $p>.05$; see Figure 6). However, it is worth noting that the small number of T-MIT items to include in this analysis (i.e. 6) still found a relationship of .41 magnitude. This suggests a significant relationship may in fact be evident if more items were included in the analysis.

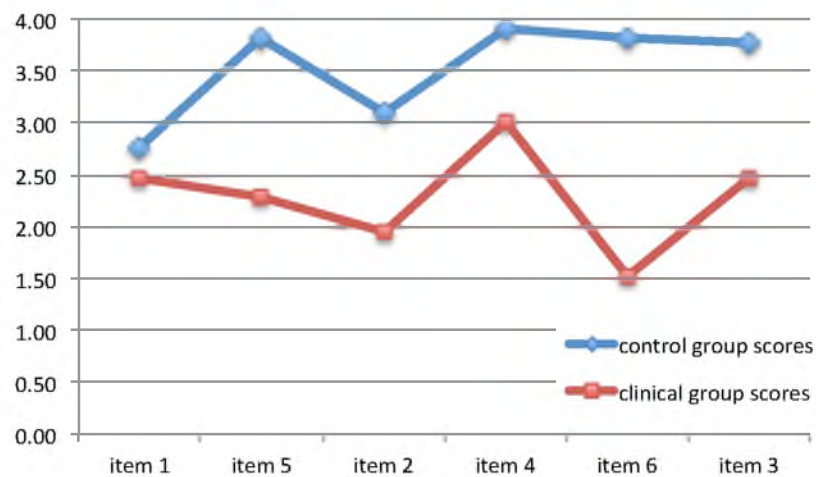


Figure 6. Mean T-MIT scores by group, with the items listed according to the metaphor length (shortest on the left, longest on the right) – no significant relationship.

Similarly, there was no significant relationship between performance on the T-MIT items and average word length for the clinical group ($r(5)=.17$, $p>.05$). But participants in the control group scored higher on T-MIT items with longer words ($r(5)=.90$, $p<.05$; see Figure 7).

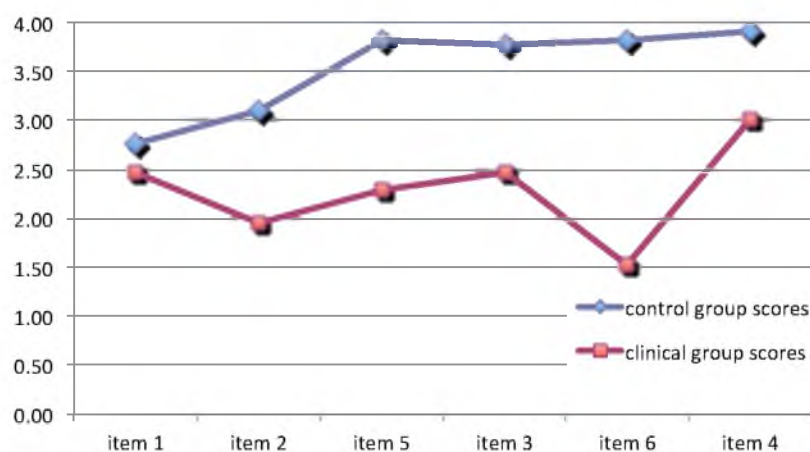


Figure 7. Mean T-MIT scores by group, with the items listed according to the mean word length (shortest on the left, longest on the right) – significant relationship for the control group only.

5.4. Summary

The purpose of this study was to validate a new measure of abstraction, one that incorporated metaphors that are used in psychological treatments for people with schizophrenia. The T-MIT demonstrated both construct and discriminant validity, with significant positive correlations with well-established abstraction measures and significant between group differences for clinical and health control participants. Furthermore, between group effects were not affected by depressed mood. Post hoc analyses demonstrated that the metaphors used in the T-MIT were not conventionalised and their reading difficulty did not disadvantage any group of participants. These results support the use of the T-MIT in investigations focusing on therapeutically oriented metaphor comprehension.

To explore whether the T-MIT is a valid measure of abstraction, scores were compared with two well-established abstraction measures – the *Plausible Implausible Metaphor Test* (PIMIT) and the *Delis-Kaplan Executive Functioning Scale* (D-KEFS) *Proverbs Test*. The T-MIT significantly correlated with traditional measures of abstraction, and differentiated between people with schizophrenia and healthy controls. These results support the use of this new abstraction measure in exploring whether the relationship between schizophrenia symptoms and metaphor interpretation is affected by whether the metaphors are therapeutically oriented or developed for experimental purposes.

6. STUDY II: TESTING A MODEL OF THERAPEUTIC METAPHOR COMPREHENSION

6.1. Purpose of this study

Despite the association between abstraction deficits and schizophrenia (Thoma & Daum, 2006; Lee & Park, 2005; Carlsson et al., 2006), psychological therapies laced with metaphorical language have shown promising results in treating people with schizophrenia (Bach & Hayes, 2002; Gaudiano & Herbert, 2006). Working memory (Pierce et al., 2010; Ritchie, 2004) and autobiographical memory (Corcoran & Frith, 2003) have been implicated as playing a role in abstraction, but the impact of negative symptoms on these factors has not yet been clarified. Furthermore, the possible influence of the therapeutic relevance of metaphors has not been explored in the literature.

This study proposed that people with schizophrenia benefit from psychological treatments that use metaphors to communicate core messages because the metaphors that are presented are therapeutically meaningful. To explore this, a proposed model of how working memory and autobiographical memory affect abstraction was fitted to the data (see Figure 5). It was predicted that increased negative symptom burden would negatively affect working memory and autobiographical memory performance, which would subsequently impact on metaphor comprehension. This model was then re-analysed with therapeutically oriented metaphor comprehension replacing the well-established metaphor tasks as the abstraction measure in the model.

It was expected that the second version of the model would explain more of the variance in abstraction performance, providing an indication that abstraction performance would improve for people with schizophrenia when using therapeutically oriented metaphors

compared to less meaningful metaphors. More specifically, it was predicted that therapeutically oriented metaphors would engage autobiographical memory more than generic metaphors, thereby enabling participants with schizophrenia to better access past experiences that might help determine potential abstract meanings of figurative speech. This would be evident in a stronger relationship between autobiographical memory and the therapeutically oriented abstraction measure compared to artificially generated abstraction measures.

6.2. Method

6.2.1. *Participants*

The same participants from the clinical group of Study I participated in Study II.

With the relatively small number of 4 variables included in the structural equation model proposed in this study, *a priori* analysis indicated a minimum sample size of 10 per variable to detect an effect with 0.8 power using the traditional .05 criterion for statistical significance.

6.2.2. *Materials*

In addition to the measures administered as part of Study I, this Study included measures of psychotic symptoms and a range of cognitive tests focusing on intelligence, working memory, autobiographical memory and learning.

6.2.2.1. *Psychopathology*

Once the Psychotic Disorders Screen from the SCID-II (see Section 5.2.2.1) had found that participants had in fact experienced psychotic symptoms, the nature and severity of these symptoms (over the past week) was measured using the *Psychotic Symptom Rating Scales* (PSYRATS) for hallucinations and delusions, and the Negative Scale of the *Positive and Negative Syndrome Scale* (PANSS-N) for negative symptoms. All participants were assessed by the researcher or the principal supervisor, with calibration between assessors on the PSYRATS occurring prior to testing commencing (by scoring a video assessment of a person with schizophrenia and comparing scores). The PSYRATS has “almost perfect” inter-rater reliability (coefficient $>.884$) and sound validity (Haddock et al., 1999, p.883). The PANSS-N subscale has a Chronbach’s alpha coefficient of .83, excellent test-retest reliability, as well as construct and criterion-related validity (Kay, Fiszbein & Opler, 1987).

6.2.2.2. *Cognitive functioning*

The *Wechsler Test of Adult Reading* (WTAR) was used as a brief measure of estimated pre-morbid intelligence. Participants were asked to read aloud a page of 50 words and score a point for each word they pronounce correctly. While the WTAR is vulnerable to practise effects due to not having an alternate form, all participants were completing the WTAR for the first time. The WTAR has been found to be a reliable and valid tool for estimating pre-morbid intelligence (Green et al., 2008).

Working memory was tested using two subtests of the *Wechsler Memory Scale – Third Edition* (WMS-III) – Letter-Number Sequencing and Spatial Span. These two subtests focus on verbal and non-verbal working memory respectively, and allowed for analysis of each

mode of working memory independent from the other, as well as analysis of them together as a combined working memory index. The Word Lists subtest of the WMS-III provided a measure of participants' capacity to learn. The WMS-III has excellent psychometric properties (Tulsky & Price, 2003), with the Index reliability coefficients ranging from .82 to .95 (Tulsky et al., 2003).

Autobiographical memory was measured using the *Autobiographical Memory Interview* (AMI). The AMI is a semi-structured interview consisting of both open and closed questions that focus on the various phases of life. Two example items from the AMI are “Ask the subject for the address where he or she was living while obtaining the qualification(s) or starting the first job”, and “Ask the subject to recall an incident from their wedding, or failing this, any wedding that the subject attended while in his/her twenties”. The first of these examples was scored 2 points for the full address, 1 point for the street and town only, and ½ point for the town or street only. The test manual provides a guide on how to score episodic memories such as the second example. An episodic memory that is specific in time and place receives 3 points. If the memory is personal but not specific or, if the memory is specific but the time and place are not recalled, it scores 2 points. If it is only a vague personal memory, it scores just 1 point. Scores are then divided into two subscales: *autobiographical incidents* (i.e. evaluating memory for past personal events or experiences), and *personal semantic memories* (i.e. evaluation knowledge of facts about their past personal life). Both components discriminate between people with amnesia and healthy controls and have demonstrated reliability coefficients of .83 to .86 (Kopelman, Wilson & Baddeley, 1989).

6.2.3. Procedure

The one process of recruitment and testing was used for both Study I and Study II. For Study II, the data gathered for Study I was incorporated into the analyses of Study II alongside the additional variables (i.e. PSYRATS, PANSS-N, WTAR, WM, and AMI scores). When scoring participants' responses on the AMI, the investigators confirmed personal details (e.g. address, age) from the participants' clinical records, where possible.

The two components of working memory – auditory and visual – contributed equally to a working memory total score. Each component was divided by the maximum score for that component, and then added together. This ensured the working memory total score was not weighted to favour either auditory or visual working memory.

Similarly, the PIMIT, D-KEFS achievement 1 and D-KEFS achievement 2 were combined in the same way to produce a composite variable for general abstraction. Post hoc analyses separated these measures again to further explore the proposed model of metaphor comprehension.

6.2.4. Data analysis

Data for Study II included clinical group data from Study I. There was no missing data, and none of the participants withdrew prematurely or were excluded for any other reason. Data was checked and cleaned while in Excel format to ensure no erroneous entries affected the analyses. All measures met normality assumptions. Structural equation modelling was used to test the goodness-of-fit of our proposed model, using the default fit indices of the AMOS package of the SPSS software.

6.3. Results

All participants reported experiencing psychotic symptoms – either positive symptoms only (2.38%), negative symptoms only (14.29%), or both (83.33%). As mentioned in Study I, 43% of the clinical group indicated a high likelihood of Major Depressive Disorder on the CDSS (Addington et al., 1994). As a group, their pre-morbid intelligence appeared to fall within the lower end of the *average* range, and they demonstrated learning and autobiographical memory deficits that are characteristic for people with schizophrenia (see Table 11).

Table 11. *Psychopathology, cognitive functioning, and metaphor task performance for clinical participants (Study II)*

	M	SD
PSYRATS	29.86	19.39
auditory hallucinations	18.24	15.89
delusions	11.62	8.85
PANSS-N	8.60	5.83
CDSS total	7.93	5.80
WTAR full scale IQ	93.40	13.58
learning	4.07	1.91
working memory total	0.81	0.24
auditory working memory	7.74	3.37
visual working memory	14.26	3.42
AMI total	61.49	11.58
personal semantic	48.25	8.18
autobiographical incidents	13.24	4.73
abstraction		
total	2.18	0.47
PIMT	9.50	5.39
D-KEFS achievement 1	18.90	7.50
D-KEFS achievement 2	26.9	6.47
T-MIT total	13.71	5.58

PSYRATS = Psychotic Symptoms Rating Scale; PANSS-N = Positive and Negative Symptom Scale - Negative sub-scale; CDSS = Calgary Depression Scale for Schizophrenia; WTAR = Wechsler Test of Adult Reading; AMI = Autobiographical Memory Interview; PIMT = Plausible Implausible Metaphor Test; D-KEFS = Delis-Kaplan Executive Functioning Scale; T-MIT = Therapeutic Metaphor Interpretation Scale; n=42

Table 12 provides the Pearson correlations between these psychopathology and cognitive indices. Positive ($r=.48$) and negative ($r=.31$) psychotic symptoms were significantly correlated with depression scores. Working memory significantly correlated with autobiographical memory ($r=.47$), general abstraction measures ($r=.67$) and the T-MIT ($r=.50$), but not with psychotic symptoms ($r=-.18$) or depressive symptoms ($r=.19$). The lack of a significant correlation between the depression measure (i.e. the CDSS) and working memory may be further endorsement of that measure's ability to measure depression in people with schizophrenia independent of negative psychotic symptoms. But the lack of a significant correlation between psychotic symptoms and working memory was inconsistent with past research (Barch & Caesar, 2012), which typically shows working memory deficits to be a robust characteristic of people with schizophrenia.

Autobiographical memory significantly correlated with scores on the PIMIT ($r=.38$), but not with the D-KEFS tasks (achievement 1: $r=.23$; achievement 2: $r=.26$). Autobiographical memory was also expected to correlate significantly with the T-MIT given the former is thought to be involved in metaphor processing (Corcoran, 1999). While there was some support for a relationship between these two variables (i.e. the *autobiographical incidents* subscale of the AMI significantly correlated with T-MIT scores ($r=.45$), the total score was not significantly correlated with the AMI total score (see Table 12).

Table 12. *Pearson's correlations between dependent variables (Study II)*

	psychotic symptoms total	positive psychotic symptoms	negative psychotic symptoms	CDSS total	working memory total	auditory working memory	visual working memory	AMI total	personal semantic	autobio- graphical incidents	abstraction total	PIMT	D-KEFS achieve- ment 1	D-KEFS achieve- ment 2
psychotic symptoms total	-													
positive psychotic symptoms	.94**	-												
negative psychotic symptoms	.68**	.43*	-											
CDSS total	.49**	.48**	.31*	-										
working memory total	-.18	-.01	-.16	.19	-									
auditory working memory	.21	-.09	-.26	.11	.93**	-								
visual working memory	.04	.10	.06	.24	.82**	.58**	-							
AMI total	-.13	-.05	-.24	-.22	.47*	.44*	.35*	-						
personal semantic	-.09	-.02	-.23	-.16	.37*	.34*	.28	.94**	-					
autobiographical incidents	-.21	-.11	-.28	-.27	.54**	.56**	.36*	.71**	.49**	-				
abstraction total	-.07	.08	-.27	.15	.67**	.68**	.52**	.41*	.43*	.36*	-			
PIMT	.08	.18	-.12	.14	.52**	.56**	.30	.38*	.38*	.33*	.67**	-		
D-KEFS achievement 1	-.10	.01	-.21	.06	.45*	.41*	.44*	.23	.28	.17	.79**	.14	-	
D-KEFS achievement 2	.00	.10	-.13	-.02	.43*	.36*	.50**	.26	.26	.24	.70**	.12	.73**	-
T-MIT total	-.12	-.05	-.11	-.27	.50**	.49**	.41*	.29	.22	.45*	.55**	.38*	.48**	.39*

* $p \leq .05$; ** $p \leq .001$; listwise $n=42$

CDSS = Calgary Depression Scale for Schizophrenia; AMI = Autobiographical Memory Interview; PIMT = Plausible Implausible Metaphor Test; D-KEFS = Delis-Kaplin Executive Functioning Scale; T-MIT = Therapeutic Metaphor Interpretation Test

The sample size was deemed statistically sufficient to run the structural equation modelling analyses (see Section 6.2.1 for *a priori* power calculations), and the measures to be included showed normal distribution for the clinical sample.

Results from the structural equation modelling found that the proposed model explained 54% of the variance in performance on general abstraction measures (see Figure 8). Negative symptoms were not related to autobiographical memory or working memory. However, significant relationships were found between working memory and general abstraction, both directly and via autobiographical memory (see Figure 8).

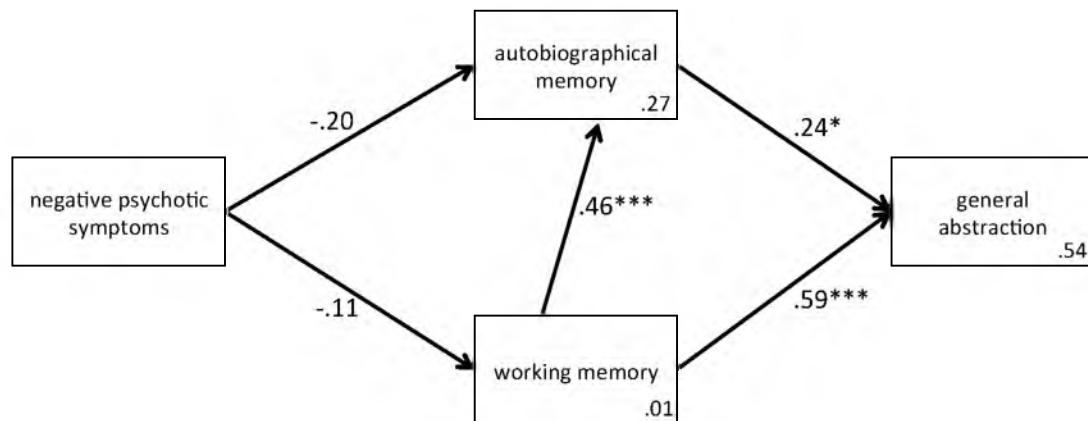


Figure 8. Structural equation modelling of proposed model for general abstraction

(*= $p < .05$, ***= $p < .001$. Note the numbers on the lines are unstandardised coefficients representing the strength of the relationship between the factors at each end of that arrow, and the numbers within the boxes represent the amount of variance in that factor that is explained by the preceding parts of the model)

When general abstraction was replaced with performance on the T-MIT as the endogenous variable, the relationship between working memory and abstraction remained significant, but autobiographical memory was no longer significantly influencing performance on the therapeutically-oriented abstraction measure (see Figure 9). Subsequently, only 28% of the

variance in abstraction was explained when using the T-MIT as the endogenous variable. Note that the strength of the relationships between negative symptoms and both autobiographical memory and working memory did not change in this revised model, as the only part of the model that changed was ‘downstream’ from those relationships.

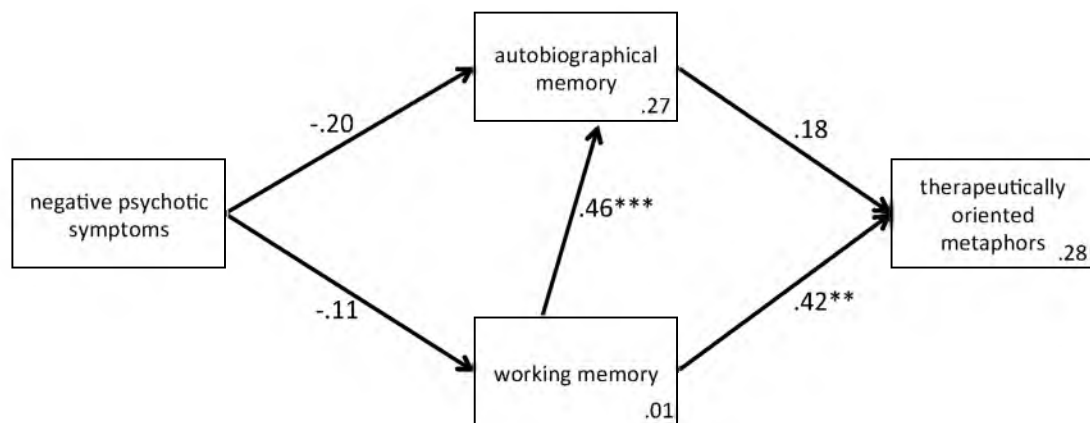


Figure 9. Structural equation modelling of proposed model for therapeutically oriented metaphors

(**= $p < .005$, ***= $p < .0001$. Note the numbers on the lines are unstandardised coefficients representing the strength of the relationship between the factors at each end of that arrow, and the numbers within the boxes represent the amount of variance in that factor that is explained by the preceding parts of the model)

In addition to comparing the degree to which the two proposed models explained the variance of the endogenous variables, the goodness of fit of these models was also compared. The general abstraction model had a non-significant chi-square ($\chi^2(df=1, n=42)=1.40, p>.05$) with a CFI of 1, while the therapeutically oriented abstraction model also had a non-significant chi-square ($\chi^2(df=1, n=42)=.01, p>.05$) with a CFI of 1. The low chi-square result for the second model suggests it is statistically unsatisfactory, and certainly the first model is a better fit of the data.

6.4. Summary

This study investigated one possible explanation for the contradictory finding that metaphor laden psychological treatments are effective for people with schizophrenia despite schizophrenia being associated with metaphor comprehension deficits. The proposed model predicted that improved access to autobiographical memory would help people with schizophrenia interpret unfamiliar metaphorical language, and that this relationship would be stronger when the metaphors were therapeutically relevant.

Two models of metaphor comprehension were investigated, both linking negative psychotic symptoms, working memory, and autobiographical memory to abstraction performance. The only difference between the two models was the nature of the abstraction measure used – a combination of traditional abstraction measures using artificially generated metaphors in one model, and a new measure incorporating metaphors that are actually used in ACTp.

The results were the opposite of what was predicted. Replacing the traditional abstraction measures in the first model with the T-MIT produced a weaker relationship between autobiographical memory and abstraction. Autobiographical memory significantly predicted abstraction performance on traditional measures, but this relationship was no longer significant when the T-MIT was used as the abstraction measure.

Again contrary to predictions, having the T-MIT as the abstraction performance variable reduced the amount of variance explained by the model. While 54% of abstraction performance was accounted for with the well-established metaphor interpretation tasks as the endogenous variable, substituting in the T-MIT resulted in only 28% of the variance being explained.

DISCUSSION

Consistent with previous neurocognitive models of abstraction (e.g. Corcoran, 1999), it was proposed that autobiographical memory and working memory were central to abstraction, and that the severity of negative symptoms would predict deficits in these areas. Despite the abstraction deficits associated with schizophrenia, metaphor-laden psychological treatments have demonstrated moderate efficacy with this disorder. This research explored one possible explanation for this contradiction in the literature by examining whether the relationships between negative symptoms, autobiographical memory, working memory and abstraction differ when the metaphors being interpreted are therapeutically meaningful. Better understanding the role of metaphorical language in psychological treatments will help us to learn how these people are benefitting from these treatments, which will inform and improve future treatments for people with schizophrenia.

7. MAIN FINDINGS

7.1. Development of a therapeutically-relevant abstraction test

In order to examine whether a person with schizophrenia can understand metaphors that are actually used in the context of therapy, a new abstraction measure was developed consisting of metaphors taken directly from the seminal ACT text (Hayes et al., 1999). Results suggest that this new therapeutically oriented abstraction measure – the T-MIT, has both construct and discriminant validity. Performance on the T-MIT positively correlated with other well-established abstraction measures, and was also able to differentiate

between participants with schizophrenia and healthy controls, even when statistically controlling for depressed mood.

Construct validity for the T-MIT was supported via correlational analyses between it and two well-established abstraction measures: the PIMIT and the D-KEFS Proverbs Test. While both these measures are widely used to assess abstraction performance, they do differ in terms of the novelty of the metaphors used as items. The PIMIT consists of completely novel metaphors that participants would have no prior experience of, whereas the D-KEFS Proverbs Test consists of two subscales – one with common metaphors (e.g. “don’t count your chickens before they are hatched”) and the other with uncommon metaphors (e.g. “an old ox ploughs a straight row”). Post hoc analyses focusing on the D-KEFS Proverbs Test indicated that participant scores on the T-MIT were more strongly correlated with comprehension of *unfamiliar* metaphors than they were to *familiar* metaphors. Given that research has shown that metaphors can become conventionalised with increased familiarity (Bowlby & Getner, 2005), and given that the use of more familiar metaphors in an abstraction test may contaminate results due to not engaging the neurocognitive processes required for pure abstraction (Kintsch & Bowles, 2002; Cardillo et al., 2012), it was important to find that performance on the T-MIT was more strongly related to unfamiliar than familiar metaphor comprehension. The correlation with the unfamiliar metaphors of the D-KEFS Proverbs Test and the novel metaphors of the PIMIT supports the validity of the T-MIT as a measure of abstraction performance.

7.2. Proposed model of abstraction

The clinical group performed significantly worse on the T-MIT than the healthy control participants, reflecting the well-known abstraction deficits for people with schizophrenia

(Thoma & Daum, 2006). Study II focused on better understanding the underlying contributors to this deficit. Increased negative symptoms are associated with increased neurocognitive impairment (Carlsson et al., 2006), and previous research had implicated autobiographical memory (Corcoran, 1999) and working memory (Chiappe & Chiappe, 2007; Kiang et al., 2007; Pierce & Chiappe, 2008; Pierce et al., 2010; Ritchie, 2004; Lee & Park, 2005) as necessary for metaphor comprehension. Autobiographical memory provides the episodic frame of reference that enables a person to link non-literal language to potential meanings and check the relevance of these meanings against their past experiences. Working memory is required to perform these multiple cognitive tasks simultaneously while temporarily 'holding' the metaphor in mind. Therefore, the proposed model suggested that the link between negative symptoms and abstraction performance would be mediated by autobiographical memory and working memory.

The proposed model was run twice – once with well-established measures of abstraction, and then again with the T-MIT as the abstraction measure. This enabled an assessment of whether the nature of the metaphors affected the relationship with autobiographical memory and working memory. Contrary to predictions, the relationship between working memory and abstraction was weaker when the T-MIT replaced the well-established abstraction measures in the model, and the relationship between autobiographical memory and abstraction was no longer significant. Considering the model as a whole, 54% of the variance in abstraction was explained when the traditional abstraction measures were the endogenous variable, whereas only 28% of the variance was explained when the T-MIT was used. Furthermore, goodness of fit analyses suggested that the first version of the model was a far more statistically satisfactory model than when the T-MIT was included.

The specific pathways of the proposed model will be addressed below, with reference to both the general abstraction measure and the T-MIT.

7.3. Abstraction and autobiographical memory, and the effect of metaphor familiarity

The relationship between abstraction and autobiographical memory has been highlighted by neurocognitive models of metaphor comprehension. Corcoran (1999), in particular, argued that a person needed to be able to access their autobiographical memory in order to interpret metaphors accurately. Within the model proposed in this thesis, a key hypothesis was that improved access to autobiographical memory would result in improved abstraction, particularly when the metaphors were therapeutically oriented and so more likely to be meaningful to the participants' experiences. It is, therefore, important to outline what this research tells us about the relationship between abstraction and autobiographical memory.

Correlational analyses of the two well-established abstraction measures used in this research and the autobiographical memory measure – the AMI, found a significant positive relationship between the PIMIT and the AMI ($r=.38$), but not between the D-KEFS Proverbs Test and the AMI ($r<.27$). Given the PIMIT provides a more pure measure of *unfamiliar* metaphor interpretation than the D-KEFS (see Section 7.1), this result may be due to autobiographical memory having a greater role in the comprehension of novel metaphors compared to familiar metaphors. This would be consistent with the career of metaphor theory (Bowdle & Gentner, 2005), which proposes that more familiar metaphors (i.e. conventionalised metaphors) are interpreted much like literal sentences, and would

therefore not require the same activation of autobiographical memory to search for an appropriate meaning.

Considering that the T-MIT correlated more strongly with unfamiliar metaphor interpretation, and the abstraction measure that consists entirely of unfamiliar metaphors (i.e. the PIMIT) showed a stronger correlation with autobiographical memory than the abstraction measure that included familiar metaphors (i.e. the D-KEFS proverbs Test), it was expected that the T-MIT would have a significant positive relationship with autobiographical memory. This was explored in Study II, but no significant relationship was found between the T-MIT and the AMI total score. However, the T-MIT did significantly correlate with the *autobiographical incidents* subscale of the AMI (see Table 12). This component of the test requires participants to recall specific incidents from their life. It is, therefore, more susceptible to confabulation than the *personal semantic* subscale as the latter can be checked against clinical file records. The investigators did confirm personal details (e.g. address, age) with participants' clinical records when scoring the *personal semantic* subscale, but Study II procedures did not include any form of corroboration with family or carers to confirm the accuracy of autobiographical incident memories recalled by participants.

Alternatively, previous research has found that healthy controls emphasise semantics to organise autobiographical memory, whereas people with schizophrenia rely more heavily on the emotional characteristics of autobiographical memories (Morise et al., 2011). Based on this finding, it could be argued that the different relationships found for the AMI subscales was due to the autobiographical incidents items of the AMI (e.g. tell me about your first day at work) evoking more emotions than semantic memory items (e.g. what qualifications, if any, did you get after leaving school?). However, this has not been investigated to date. The correlation between the T-MIT and at least part of the AMI is

consistent with Corcoran's (1999) model of abstraction, which emphasised the role of episodic memory for metaphor interpretation.

When the relationship between autobiographical memory and abstraction was evaluated using structural equation modelling, autobiographical memory had a significant and direct effect on general abstraction (unstandardised coefficient = .24, $p < .05$) but not on therapeutically oriented abstraction (unstandardised coefficient = .18, $p > .05$). One possible explanation for this latter result is that while the T-MIT might have evoked strong emotions in participants, these may have been negative rather than positive emotions. As noted earlier, metaphors that trigger an emotion will facilitate improved autobiographical memory recall, but only if the memories are associated with mildly positive affect (Conway & Pleydell-Pearce, 2000). However, research has not shown such emotional cues to trigger improved recall in people with schizophrenia. Another possibility is that the T-MIT did not evoke significant emotions at all. We will explore this possibility further in Section 7.6.1 and suggest some ways future research could improve on the T-MIT measure.

7.4. Abstraction and working memory

All models of abstraction consider working memory to be crucial to successful metaphor comprehension. To interpret unfamiliar metaphors successfully, one must simultaneously attend to a communication, search autobiographical memory for possible meanings of that communication, and check for a shared relevance of that meaning within the context of the communication. Working memory describes the process of temporarily holding and manipulating these various pieces of information in the mind. Numerous studies have demonstrated the important role of working memory in abstraction (Chiappe & Chiappe, 2007; Pierce & Chiappe, 2008; Pierce et al., 2010; Ritchie, 2004; Lee & Park, 2005), and so it

was predicted that working memory would also have a significant effect on abstraction in this study.

Across the correlational and path analyses, working memory was found to have a robust relationship with both general abstraction and therapeutically oriented abstraction. The relationship between working memory and abstraction was stronger for general abstraction than it was for therapeutically oriented abstraction on both correlational ($r=.67$ versus $r=.50$ respectively) and path analyses (unstandardised coefficient $=.59$ versus $.42$ respectively).

In addition, working memory was hypothesised to have a significant relationship with abstraction *indirectly* via autobiographical memory. In support of this, the pathway between working memory and autobiographical memory was found to be significant and positive. However, as already discussed, the pathway between autobiographical memory and abstraction was only significant when using the well-established metaphor interpretation tasks as the abstraction variable (but not when using the T-MIT). This result suggested autobiographical memory partially mediated the relationship between working memory and general abstraction, but did not mediate the relationship between working memory and the T-MIT. However, given the direct relationship between working memory and general abstraction was far larger than the indirect route, evidence for the mediating effects of autobiographical memory is not strong.

7.5. Negative symptoms, working memory and autobiographical memory

Negative symptoms were expected to have significant negative relationships with both working memory and autobiographical memory. These predictions were based on previous research, where people with schizophrenia have demonstrated deficits in autobiographical memory (Elvevåg et al., 2003) and in working memory (Lee & Park, 2005). However, the path analysis found a non-significant relationship between negative symptoms and both autobiographical memory (unstandardised coefficient = $-.20$, $p > .05$) and working memory (unstandardised coefficient = $-.11$, $p > .05$). In fact, neither positive nor negative psychotic symptoms were correlated with autobiographical memory or working memory, further reinforcing that the expected relationship was not evident in the data.

The hypothesised relationship between negative symptoms and negative symptoms was based on the argument that the various cognitive deficits and a history of social isolation combine to result in “impoverished autobiographical memory stores” (Corcoran & Frith, 2003, p.898). That is, people with schizophrenia don’t have the same number of experiences to recall as healthy controls (Riutort et al., 2003) and have trouble recalling the experiences they have had accurately (Corcoran & Frith, 2003). Study II is the first known investigation of the direct relationship between negative symptoms and autobiographical memory. Finding no significant association was inconsistent with previous research that found people with schizophrenia exhibit autobiographical memory deficits (Wood et al., 2006; Wilson & Ross, 2003). While the participants did demonstrate cognitive deficits (in the form of poor working memory, autobiographical memory and abstraction performance), there was no measure of social isolation. Therefore, we cannot draw a firm conclusion about the role of social isolation in respect to this finding.

Perhaps a more likely explanation for the lack of a significant relationship between negative symptoms and both autobiographical memory and working memory is the low levels of negative symptoms identified amongst the clinical group. The mean score on the PANSS-N was 8.60 (see Table 11), which falls within the bottom 5th percentile compared to other people with schizophrenia (Kay et al., 1987). This relatively low score may have limited the opportunities to detect significant relationships with other variables. Similarly, the low sample size (n=42) may have reduced the chances of finding significant relationships.

Another possible reason for these unexpected findings relates to whether the tasks used to measure working memory were pure, or whether the results were in fact contaminated by actually requiring a number of other cognitive processes in addition to working memory? A meta-analysis conducted by Lee and Park (2005) found working memory deficits to be evident amongst people with schizophrenia regardless of the modality of the test used. But they noted that *visuospatial* working memory deficits appeared more consistent and robust than *verbal* working memory deficits. However, the working memory variable used in Study II combined both of these forms of working memory, and even when separated into the different forms of working memory, the correlations between psychotic symptoms and working memory indices were insignificant (see Table 12). Therefore, it is unlikely that the lack of a relationship between negative psychotic symptoms and working memory is attributable to using an impure measure of working memory.

Yet another possible explanation for the lack of significant relationships between negative symptoms and other key variables focuses on the way psychotic symptoms were measured. It is worth noting here that the PANSS full scale has been thoroughly evaluated at both the factor and individual item levels (Rodriguez-Jimenez et al., 2013) and it is common practice to use the Negative symptoms scale independently from the full scale (Khan et al., 2013; Kay et al., 1987). However, the procedures for this study did not include

calibration (i.e. confirmed scoring consistency across assessors) for the PANSS-N subscale. This raises the possibility that negative psychotic symptoms were not accurately measured. However, all but two participants were assessed by the principal researcher making it likely that if there were any inaccuracies in rating negative symptoms, they would have been consistent across the sample. Nevertheless, calibration of the PANSS-N subscale assessment would have helped support the validity of the negative psychotic symptoms measure.

As with all structural equation modeling, it is also possible that any non-significant relationship between variables may be due to missing variables, (i.e. factors that were not included in the proposed model but that do have a significant effect on the endogenous variable, Schreiber, Stage, King, Nora & Barlow, 2006). The possibility that other variables explain how people with schizophrenia interpret metaphorical language used in therapy, warrants further research. Some of these potential explanatory variables are outlined below (e.g. the degree to which metaphors are overtly explained by the therapist).

7.6. Limitations and recommendations for future research

7.6.1. *The T-MIT measure*

This research established an abstraction test that incorporates metaphors that are actually used in psychological treatment – the T-MIT. Construct and discriminant validity was demonstrated, and the T-MIT was able to differentiate between people with schizophrenia and healthy controls even when statistically controlling for the potentially confounding effects of depression. However, the discriminant validity assertion is made with caution due to Study I not controlling for age, education or IQ. There was likely a significant

difference between the groups on educational attainment and IQ, as the healthy controls were university students and the clinical group were patients of an inpatient psychiatric ward. However, these factors were not measured across both groups and so could not be statistically controlled in the analyses. These omissions from the research design limit the generalisability of the findings and further research is needed to further establish whether the T-MIT can reliably discriminate between people with schizophrenia and healthy controls. Further research is also needed to establish the test-retest reliability of the T-MIT with both healthy controls and people with schizophrenia.

Post hoc analyses found the overall length of items and the average word length of the metaphors used in the T-MIT was not correlated with performance for either group in Study I, but some participants verbally commented on the length of metaphor 3 of the T-MIT in particular (407 words). The length of this and other T-MIT metaphors may have resulted in participants feeling less enthusiastic about the testing generally or negatively affected their concentration, thereby influencing their performance across all T-MIT metaphors. In terms of words per item, the T-MIT items ($M=222.50$, $SD=116.85$) were significantly longer than both the PIMIT ($M=7.95$, $SD=2.17$) and the D-KEFS Proverbs Test ($M=7.25$, $SD=1.16$) items. This is a significant difference between the T-MIT and other abstraction measures. With more information to temporarily 'hold' to comprehend the T-MIT metaphors, it seems likely that the T-MIT demanded more of working memory than the other abstraction measures. Future revisions of the T-MIT may consider choosing shorter metaphors to avoid this potential problem in order to make the T-MIT more comparable to other abstraction measures.

The T-MIT differed from the well-established abstraction measures in that it consisted of metaphors that came directly from the seminal ACT text (Hayes et al., 1999). More specifically, the metaphors chosen are examples of metaphors that have been used in ACTp

(Bach & Hayes, 2002). The inclusion of therapeutically oriented metaphors was to increase the meaningfulness of the metaphors' message, but their meaningfulness to the participants was neither guaranteed nor assessed. While participants in these studies were asked to identify the most appropriate meaning of the T-MIT metaphors *if they were used in the context of therapy*, this may not have been sufficient for participants to relate the metaphors' message directly to their own struggles or recovery.

Improving the meaningfulness or resonance of metaphor items without facilitating the interpretation of them is difficult. One option would be to learn more about a participant's struggle prior to choosing a metaphor for them to interpret. However, to present a metaphor in the context of discussing a person's struggles could go some way towards interpreting the metaphor for them as the proximity of the metaphor to the relevant context limits the chances of misinterpretation. For example, a person is less likely to interpret 'part of you has been ripped away' literally when they have just been talking about their relationship break up. If the same metaphor were presented without the context of that conversation, it would likely require more cognitive effort to accurately interpret.

Another possible method of improving the meaningfulness of metaphors would be to present participants with a set of metaphors (e.g. 4-5), from which they are asked to choose the one that resonates with their recovery (or other struggles in life for healthy controls). They could then be asked to indicate the extent to which that item resonated with them emotionally before providing their interpretation of that metaphor, in both free inquiry and multiple choice formats.

Some would argue that a metaphor doesn't actually become meaningful until it has been interpreted correctly. That is, it is the understanding of the metaphor that generates the

emotion. The model proposed in this research hypothesised that it is the emotion associated with metaphor meaningfulness that facilitates autobiographical memory retrieval and subsequent accurate understanding of the metaphor. Therefore, the model may in fact be presenting a circular formula for metaphor interpretation, putting the metaphorical 'cart' before the 'horse', followed by the 'cart' again.

Alternatively, the meaningfulness of the T-MIT could be improved by spending some time discussing the participants' recovery (or general life struggles for healthy controls) prior to administration. The T-MIT could then be interpreted in this context, again directly asking the participant to interpret the metaphors in relation to their recovery. Future research focusing on the importance of meaningfulness should also consider measuring meaningfulness as a separate variable so as to enable overt examination of its influence on metaphor comprehension. Qualitative research on the client experience of metaphorical language in psychological therapies would also contribute to our understanding of their role within the context of therapy. While research has begun evaluating the client experience of ACTp (Bacon, Farhall & Fossey, 2013), the role of metaphorical language was not the focus.

The choice of therapeutic metaphors for inclusion in the T-MIT might also be improved by providing a combination of CBTp-oriented metaphors and ACTp-oriented metaphors. It is possible that some people with schizophrenia could 'connect' better with the principles of one therapy over the other. Providing metaphors from a mixture of therapeutic approaches would increase the potential for participants to find meaning in the metaphors and prevent the results from only being relevant to ACTp metaphor comprehension.

On the issue of metaphor meaningfulness, it should be noted that not all metaphors associated with ACT are used in ACTp (Morris, Johns & Oliver, 2013). In particular, the *Joe*

the Tramp metaphor is often discouraged within ACTp, due to many people with schizophrenia having their own experience of being at risk of homelessness. This could potentially make it difficult for them to know which part of the metaphor to relate to. This is consistent with our finding that performance was worst on the *Joe the Tramp* metaphor for those in the clinical group, with only one in three answering correctly (see Table 8). Future revisions of the T-MIT should consider revising the metaphors included to ensure they are simple and applicable for people with psychosis.

7.6.2. *General abstraction measure*

The general abstraction measure that was used in this thesis was derived by combining two well-established abstraction measures – the PIMIT and the D-KEFS Proverbs Test. The inclusion of the familiar metaphors that form part of the D-KEFS Proverbs Test may have improved the participants' interpretation accuracy as research has shown that familiar metaphors that have become part of everyday communication are interpreted much like literal sentences (Kintsch & Bowles, 2002; Cardillo et al., 2012). This would have subsequently inflated their abstraction scores. On the other hand, the therapeutically oriented abstraction measure used in this thesis – the T-MIT, consisted entirely of unfamiliar metaphors and so would not have been inflated in the same way. It is possible that this confounded comparisons between the models, as the two endogenous variables differed in terms of familiarity as well as therapeutic relevance. Future research might consider using a general abstraction measure consisting exclusively of novel metaphors so as to provide a more accurate comparison to the unfamiliar therapeutic metaphors of the T-MIT.

The structural equation model proposed in Study II used a composite working memory variable that consisted of both auditory and visual performance. Results on these two components were significantly positively correlated ($r=.58$), which is consistent with the assertion that they are both essentially measuring different aspects of the same cognitive process. On the other hand, the three components of the general abstraction measure did not correlate – the two D-KEFS Proverbs Test achievement scores significantly correlated with each other ($r=.73$), but neither correlated with the PIMIT. When used independently, all three measures are intended to provide a barometer of abstraction performance. Therefore, this lack of correlation raises questions about the validity of the composite abstraction variable.

7.6.3. *Design issues*

While there are some improvements that could be made to the T-MIT, there were also some investigations of this version we were not able to perform. For example, it was not possible to determine the extent to which autobiographical memory or working memory accounted for the between group differences found on the T-MIT in Study I. Applying all measures to both the clinical group and the healthy control group would have made these investigations possible.

7.7. Clinical implications of findings

This thesis examined one possible explanation for the contradictory findings that people with schizophrenia can benefit from psychological therapies laden with metaphorical language despite demonstrated abstraction deficits. It was proposed that metaphors

aligned with a therapeutic context would be more meaningful and, therefore, more accurately comprehended. However, findings did not support specific hypotheses about therapeutically oriented metaphors having a stronger relationship with autobiographical memory, and the proposed model was more statistically sound when using standard metaphors compared to using therapeutically oriented metaphors. And so, the contradictory findings in the literature remain unexplained.

Future research should explore alternative explanations for this contradiction in the literature. One possibility is that psychological treatments can be effective even if people with schizophrenia do not accurately comprehend any of the metaphorical language. Therapeutic conversations do not consist entirely of metaphors, and so perhaps people with schizophrenia are able to benefit from the therapy *despite* the prevalence of metaphors. It may be warranted for future research to measure exactly how many metaphors are actually used in the context of psychological treatments, and across different theoretical orientations. This would provide further insight into the prominence of metaphorical language in therapy. If it were found that novel metaphors are in fact rarely used in therapy, this would probably lessen the impact of abstraction deficits on treatment outcomes.

An extension of that line of investigation could be to analyse *how* therapists use metaphorical language in their treatments – are they using them to communicate constructs central to the mechanisms of change or are they using them as an additional way of communicating what they have already stated or soon will state more literally? Some of the literature espousing the benefits of using metaphors in psychological therapy actually recommends therapists overtly explain the meaning of metaphors to avoid misinterpretations (Friedberg & Wilt, 2010; Blenkiron, 1999), whereas others highlight the importance of allowing clients to come to their own interpretation (Hayes et al., 1999).

Some ACTp texts (Morris et al., 2013) recommend using physical props to act out metaphors in therapy (e.g. acting out the *Tug of War* metaphor using an actual piece of rope). This is consistent with Corcoran and Frith's (2003) finding that providing contextual cues aided the performance of people with schizophrenia on autobiographical memory and theory of mind tasks. Where therapists adopt an approach whereby metaphors are explained using concrete props or additional literal explanations, treatment outcomes are likely to be far less dependent on abstraction skills. It is likely that clinicians play a significant role in ensuring metaphorical language is correctly understood by their clients, and adapt their approach as needed. Future research could focus on what strategies clinicians use to ensure metaphorical language is understood by clients.

It may also be worthwhile for future research to test the hypothesis that metaphors do in fact trigger a more prominent affective or emotional response, and whether this effect relates to the saliency of the metaphor's non-literal or literal meaning.

Finally, it is possible that despite demonstrated abstraction deficits compared to healthy controls, people with schizophrenia are able to interpret metaphorical language accurately *enough* to benefit from psychological treatments. As Ritchie (2004) puts it: "humans frequently misunderstand each other or at best understand each other imperfectly, but in most circumstances, approximate understanding is quite sufficient" (p.268).

8. CONCLUSIONS

Schizophrenia is a complex brain disorder with both psychological and neurocognitive symptoms. Not only do these symptoms significantly affect people's functioning and wellbeing, but they also affect a person's ability to benefit from psychological therapies. In

response, psychological treatments such as CBTp and ACTp have been adapted for people with schizophrenia with some promising results.

The potential effectiveness of ACTp stands out, not because it appears more effective than CBTp, but because of its prominent use of metaphorical language to communicate complex constructs. This emphasis on metaphors might suggest it would be less effective with people with schizophrenia due to their characteristic deficits in abstraction. However, early studies evaluating the use of ACTp have contradicted this prediction.

This thesis examined one possible explanation for these contradictory findings by differentiating between therapeutically oriented abstraction (i.e. interpreting metaphors that are therapeutically meaningful) and non-therapeutic abstraction.

After developing a therapeutic-metaphor interpretation test, this research analysed two versions of a model of abstraction. While it was predicted that therapeutically oriented metaphors would enable greater access to autobiographical memories and subsequently more accurate comprehension of the metaphors, this was not evident in the results. The well-established general abstraction measures had a stronger relationship with both autobiographical memory and working memory.

The proposed model itself was not supported, given the surprising lack of significant relationship between negative psychotic symptoms and working memory or autobiographical memory. While some possible explanations for this unexpected result are outlined, it remains unclear as to how negative psychotic symptoms specifically relate to abstraction.

This research is the first to focus on the comprehension of metaphors within the context of therapy, which is of particular relevance for people with schizophrenia. While further

improvements to the T-MIT are warranted, the process of measuring therapeutic metaphor comprehension remains important for examining the use of psychological therapies with people with established abstraction deficits.

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APPENDIX A: CORE PROCESSES OF ACT

Six Core Processes of Acceptance and Commitment Therapy (ACT)

ACT targets each of these core problems with the general goal of increasing psychological flexibility—the ability to contact the present moment more fully as a conscious human being, and to change or persist in behavior when doing so serves valued ends. Psychological flexibility is established through six core ACT processes as is show in [Fig. 2](#). Each of these areas are conceptualized as a positive psychological skill, not merely a method of avoiding psychopathology.

Acceptance

Acceptance is taught as an alternative to experiential avoidance. Acceptance involves the active and aware embrace of those private events occasioned by one's history without unnecessary attempts to change their frequency or form, especially when doing so would cause psychological harm. For example, anxiety patients are taught to feel anxiety, as a feeling, fully and without defense; pain patients are given methods that encourage them to let go of a struggle with pain, and so on. Acceptance (and defusion) in ACT is not an end in itself. Rather acceptance is fostered as a method of increasing values-based action.

Cognitive defusion

Cognitive defusion techniques attempt to alter the undesirable functions of thoughts and other private events, rather than trying to alter their form, frequency or situational

sensitivity. Said another way, ACT attempts to change the way one interacts with or relates to thoughts by creating contexts in which their unhelpful functions are diminished. There are scores of such techniques that have been developed for a wide variety of clinical presentations (Hayes & Strosahl, 2005). For example, a negative thought could be watched dispassionately, repeated out loud until only its sound remains, or treated as an externally observed event by giving it a shape, size, color, speed, or form. A person could thank their mind for such an interesting thought, label the process of thinking (“I am having the thought that I am no good”), or examine the historical thoughts, feelings, and memories that occur while they experience that thought. Such procedures attempt to reduce the literal quality of the thought, weakening the tendency to treat the thought as what it refers to (“I am no good”) rather than what it is directly experienced to be (e.g., the thought “I am no good”). The result of defusion is usually a decrease in believability of, or attachment to, private events rather than an immediate change in their frequency.

Being present

ACT promotes ongoing non-judgmental contact with psychological and environmental events as they occur. The goal is to have clients experience the world more directly so that their behavior is more flexible and thus their actions more consistent with the values that they hold. This is accomplished by allowing workability to exert more control over behavior; and by using language more as a tool to note and describe events, not simply to predict and judge them. A sense of self called “self as process” is actively encouraged: the defused, non-judgmental ongoing description of thoughts, feelings, and other private events.

Self as context

As a result of relational frames such as I versus You, Now versus Then, and Here versus There, human language leads to a sense of self as a locus or perspective, and provides a transcendent, spiritual side to normal verbal humans. This idea was one of the seeds from which both ACT and RFT grew (Hayes, 1984), and there is now growing evidence of its importance to language functions such as empathy, theory of mind, sense of self, and the like (e.g., see McHugh, Barnes-Holmes, & Barnes-Holmes, 2004). In brief the idea is that “I” emerges over large sets of exemplars of perspective-taking relations (what are termed in RFT “deictic relations”), but since this sense of self is a context for verbal knowing, not the content of that knowing, its limits cannot be consciously known. Self as context is important in part because from this standpoint, one can be aware of one’s own flow of experiences without attachment to them or an investment in which particular experiences occur: thus defusion and acceptance is fostered. Self as context is fostered in ACT by mindfulness exercises, metaphors, and experiential processes.

Values

Values are chosen qualities of purposive action that can never be obtained as an object but can be instantiated moment by moment. ACT uses a variety of exercises to help a client choose life directions in various domains (e.g., family, career, spirituality) while undermining verbal processes that might lead to choices based on avoidance, social compliance, or fusion (e.g., “I should value X” or “A good person would value Y” or “My mother wants me to value Z”). In ACT, acceptance, defusion, being present, and so on are not ends in themselves; rather they clear the path for a more vital, values consistent life.

Committed action

Finally, ACT encourages the development of larger and larger patterns of effective action linked to chosen values. In this regard, ACT looks very much like traditional behavior therapy, and almost any behaviorally coherent behavior change method can be fitted into an ACT protocol, including exposure, skills acquisition, shaping methods, goal setting, and the like. Unlike values, which are constantly instantiated but never achieved as an object, concrete goals that are values consistent can be achieved and ACT protocols almost always involve therapy work and homework linked to short, medium, and long-term behavior change goals. Behavior change efforts in turn lead to contact with psychological barriers that are addressed through other ACT processes (acceptance, defusion, and so on).

The core ACT processes are both overlapping and interrelated. Taken as a whole, each supports the other and all target psychological flexibility: the process of contacting the present moment fully as a conscious human being and persisting or changing behavior in the service of chosen values. The six processes can be chunked into two groupings. Mindfulness and acceptance processes involve acceptance, defusion, contact with the present moment, and self as context. Indeed, these four processes provide a workable behavioral definition of mindfulness (Fletcher & Hayes, [in press](#)). Commitment and behavior change processes involve contact with the present moment, self as context, values, and committed action. Contact with the present moment and self as context occur in both groupings because all psychological activity of conscious human beings involves the now as known.

Source: Hayes et al. (2006)

APPENDIX B: RECRUITMENT ADVERTISEMENT FOR CONTROL PARTICIPANTS

Study Information	
Study Name	Do you know what being 'heartbroken' means?
Description	We are trying to find out how people understand metaphors, such as 'to take the bull by the horns', 'dead tired' and 'heart broken'. This research is part of a larger study looking at a new treatment for people with Schizophrenia. Sign on via online timeslots, or call Alex to organise an alternative time to participate.
Duration	40 minutes
Credits	1 Credits
Researcher	Alex Hains Email: uow@alexhains.com
Principal Investigator	Hamish McLeod
Participant Sign-Up Deadline	24 hours before the study is to occur
Participant Cancellation Deadline	24 hours before the study is to occur
Study Status	Visible to participants (approved) Active study (appears on list of available studies)
Automatic Credit Granting	Credit will be automatically granted for timeslots where no action was taken, that are more than 36 hours old. Automatic credit grant is done once per day.
IRB Approval Code	

APPENDIX C: ASSESSMENT BATTERY FOR CONTROL PARTICIPANTS

ToP TiP

(Trial of Psychological Treatment in Psychosis)

Assessment Pack

Introduction to Study

Read the following aloud to the participant:

This research is aiming to determine the applicability of a new psychological treatment for people with psychotic disorders. One of the characteristic features of this new treatment is its use of metaphors to teach clients alternative ways of responding to hallucinations and delusions. This part of the research is designed to enhance our understanding of the cognitive processes required to understand metaphors.

Participating in this study involves meeting with the primary researcher, who will read a number of short metaphors and you will be asked to explain what you think they mean. It is anticipated that this will take approximately 40 minutes of your time.

Your participation in this research is voluntary, your responses will remain confidential, and no participants will be identified in future publications or used for any other purposes. A de-identified code will be generated so that you can withdraw your information from this research at any time. Your withdrawal or refusal to participate in this research will not in any way affect your relationship with your university.

This summary is also on the *Information Sheet*, which the participant may take with them for future reference.

Consent form for Student Participants

I, (participant's name), consent to participate in the research to be conducted by Mr Alex Hains and Dr Hamish McLeod as it has been described to me in the *Information Sheet*. I understand that group trends from the data collected may be used for article publications and conference presentations and I consent for the data to be used in that manner.

.....

(signature)

/ /

(date)

Information Sheet for Student Participants

This research is aiming to determine the applicability of a new psychological treatment for people with psychotic disorders. One of the characteristic features of this new treatment is its use of metaphors to teach clients alternative ways of responding to hallucinations and delusions. This part of the research is designed to enhance our understanding of the cognitive processes required to understand metaphors.

Participating in this study involves meeting with the primary researcher, who will read a number of short metaphors and you will be asked to explain what you think they mean. It is anticipated that this will take approximately 40 minutes of your time.

Your participation in this research is voluntary, your responses will remain confidential, and no participants will be identified in future publications or used for any other purposes. A de-identified code will be generated so that you can withdraw your information from this research at any time. Your withdrawal or refusal to participate in this research will not in any way affect your relationship with your university.

If you would like to discuss this research further, please contact Mr Alex Hains (research@privatemind.com.au) or Dr Hamish McLeod (hamish@uow.edu.au). If you have any enquiries regarding the conduct of the research, please contact the Ethics Manager of the Human Research Ethics Committee (02 4221 4457).

Demographics

Participant name:	DOB:	Sex:
Date of assessment:	Ethnicity:	

Any mental health diagnoses?

	Current?	Age at onset (if psychosis):
1.		
2.		
3.		

[If no mental health concerns, go to next page.]

Any mental health medications?:

	Dose	Compliance (%)
1.		
2.		
3.		

How many times have you attended the Emergency Department (or Casualty) in the past 6 months for mental health concerns?

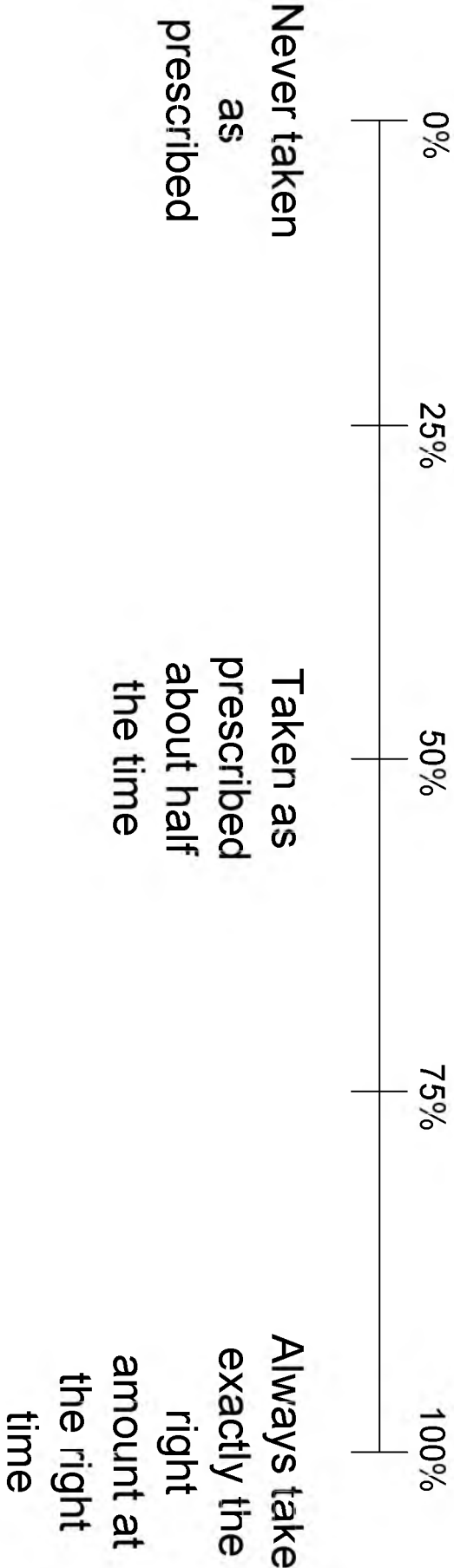
Have you ever been admitted to hospital due to these problems?

If so, how many times have you been admitted to hospital due to these problems in the past 5 years?

Have you ever received any psychological treatments for these problems (e.g. group or individual counselling)?

If so, when and where? And what did they involve?

To what degree do you take your medication exactly as prescribed?



Psychotic Disorders Screen

Clinician says:

Now I'm going to ask you about unusual experiences that people sometimes have. For each one, try to described the actual content of the experience and indicate when it occurred.

Delusions Screen

Has it ever seemed like people were talking about you or taking special notice of you? (If YES) Were you convinced they were talking about you, or did you think it might have been your imagination?

Did you ever feel that you were especially important in some way, or that you had special powers to do things that other people couldn't do? (If YES) Specify.

Did you ever feel that something was very wrong with you physically even though your doctor said nothing was wrong... like you had cancer or some other terrible disease? (If YES) Specify.

Did you ever have any unusual religious experiences?

Did you ever feel that you had committed a crime or had done something terrible for which you should be punished?

Did you ever feel that someone or something outside yourself was controlling your thoughts or actions against your will?

Did you ever feel that someone could read your mind?

Did you ever feel that certain thoughts that were not your own were put into your head? What about taken out of your head?

Hallucinations Screen

Did you hear things that other people couldn't hear, such as noises, or the voices of people whispering or talking? (If YES) What did you hear? How often did you hear it?

Did you ever have visions or see things other people couldn't see? Were you awake at the time? (If YES) Specify.

What about strange sensations in your body or on your skin? (If YES) Specify.

What about smelling or tasting things that other people couldn't smell or taste? (If YES) Specify.

Give details for any of the above.



The Beck Depression Inventory-II (BDI-II)
assessment form on page 153 & 154
removed for copyright reasons.

The Beck Depression Inventory-II (BDI-II)
assessment form on page 153 & 154
removed for copyright reasons.

Plausible / Implausible Metaphor Test (PIMIT)

Below are a number of metaphors. Some of them make sense as a figure of speech, while others do not. Say YES if you consider the metaphor plausible, or NO if you think it is implausible.

1. This city is a chimney	yes / no
2. The woman had a headache of pickle	yes / no
3. The close friends were elastic bands	yes / no
4. The shoppers at the sale were full moons	yes / no
5. The politician who didn't give straight answers was jumping ditches	yes / no
6. The pretentious young lady was an ant at a picnic	yes / no
7. The meaning of life is an itch you can't scratch	yes / no
8. The hard working man was burrowing through a full moon	yes / no
9. Tim had been poured into his clothes and forgotten to say when	yes / no
10. The old man had a head full of dead leaves	yes / no
11. The lady's jewels were barrels of tar	yes / no
12. The newly wed's heart was a lovebird's egg	yes / no
13. Their cross mother was a bag of toffees	yes / no
14. The stubborn old man was a tram	yes / no
15. The new army recruits were knitting patterns	yes / no
16. The student had a headache a yard wide	yes / no
17. The outlandish model was a cut snake	yes / no
18. The politician who would not give straight answers was a cat	yes / no
19. Paul has the sense of a goose	yes / no
20. The investors were squirrels collecting nuts	yes / no
21. The pretentious young lady was 100% polyester	yes / no
22. Paul has the sense of Epsom salts	yes / no
23. The conceited boy could put out Hell with one bucket of water	yes / no
24. The newly wed's heart was a timber yard	yes / no
25. The man who won the pools was a blue canary	yes / no
26. The close friends were a bag of toffees	yes / no
27. This city is a goose	yes / no
28. The investors were trams	yes / no
29. The situation yielded a crop of stars	yes / no
30. Their cross mother was an elastic band	yes / no
31. This job is a jail	yes / no
32. The conceited boy was a dog with no bark	yes / no
33. The shoppers at the sale were ants at a picnic	yes / no
34. The little girl's Mackintosh was an itch you can't scratch	yes / no
35. The man who won the pools was a dog with the biggest bone	yes / no
36. The lady's jewels were bursting stars	yes / no
37. The outlandish model was a blue canary	yes / no
38. The situation yielded a chimney	yes / no
39. The stubborn old man was a squirrel collecting nuts	yes / no
40. This job is a glass	yes / no

Therapeutic Metaphor Interpretation Test (T-MIT)

Directions for Clinician

Slowly read the 'Instructions for Participant' passage (below) aloud to the participant before commencing. Ensure they understand that the general purpose of a metaphor is to communicate a non-literal meaning, and that their task is to try to correctly interpret the meaning of each metaphor.

Provide the participant with a copy of the metaphors and response options they are to choose from. You are to read each metaphor aloud while the participant follows along from their copy. Then ask the participant to choose the *most* appropriate meaning of each metaphor from the list of options provided at the bottom of the page.

Use the 'Response Record Sheet' during the testing to record the participant's responses by circling their response.

Instructions for Participant

Sometimes, therapists use metaphors to explain particular concepts to their clients. Therapists might help someone described their bodily response to anxiety by saying they are a "wound up spring". Or a therapist might describe being depressed by saying that it feels as though you're "stuck in a deep dark hole".

You're going to read some other examples of metaphors that might be used in therapy. You will need to identify the *most* appropriate meaning of each metaphor from a list of possible interpretations at the bottom of each page.

Remember, try to identify the *most* appropriate meaning of each metaphor if it were used in the context of therapy.

Question 1

Suppose you are in a tug-of-war with a monster. It is big, ugly and very strong. In between you and the monster is a pit, and so far as you can tell, it is bottomless. If you lose this tug-of-war, you will fall into this pit and will be destroyed. So you pull and pull, but the harder you pull, the harder the monster pulls, and you edge closer and closer to the pit. The hardest thing to see is that our job here is not to win the tug-of-war... Our job is to drop the rope.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. If I fall into the pit, the monster will not help me climb out
- b. If I keep struggling against my situation, I'll end up depressed and lonely
- c. Struggling against my situation will only lead to more suffering, so I'm better off not getting involved in the struggle at all
- d. Trying to win tug-of-war against a monster will probably result in me falling into the pit between us. Instead, what I should do is stop pulling and just drop the rope

Question 2

Suppose I had you hooked up to the best polygraph machine that's ever been built. This is a perfect machine, the most sensitive ever made. When you are all wired up to it, there is no way you can be stressed or anxious without the machine knowing it.

So I tell you that you have a very simple task here: all you have to do is stay relaxed. If you get the least bit anxious, however, I will know it. I know you want to try hard, but I want to give you an extra incentive, so I also tell you that you'll lose everything you own if you get even a bit anxious. If you just stay relaxed, you won't lose everything you own, but if you get nervous (and I'll know it because you're wired up to this perfect machine), you're going to lose every single thing you own. So, just relax!

What do you think would happen? How do you think you'd feel?

The tiniest bit of anxiety would be terrifying. You'd naturally be saying "Oh, my gosh! I'm getting anxious! Here it comes!" BAMM – everything you own is gone!

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. If someone threatens to take away everything I own, I will not be able to help getting anxious even when told to stay relaxed
- b. Focusing on not experiencing difficult emotions paradoxically brings them on even more
- c. A really good polygraph machine can even pick up when I'm only a little bit anxious
- d. I can't get rid of difficult emotions even when someone else motivates me to do so

Question 3

Imagine a chessboard that goes out infinitely in all directions. It's covered with black pieces and white pieces. They work together in teams, as in chess – the white fight against the black pieces. So it seems that the way the game is played is that we select the side we want to win. We put the “good” pieces on one side, and the “bad” pieces on the other. Then we get up on the back of the black horse and ride to battle, fighting to win the war against the other side. It's a war game.

If you imagine that you're on one of these two teams and on the same level as these pieces, they can be as big or even bigger than you are. Somehow, even though it is not logical, the more you fight the bigger they get. As you fight these pieces they become more central to your life, more habitual, more dominating, and more linked to every area of living. The logical idea is that you will knock enough of them off the board so that you eventually dominate them – except that your experience tells you that the exact opposite happens. Apparently, the white pieces can't be deliberately knocked off the board because remember the chess board goes out infinitely in all directions. So the battle goes on. You feel hopeless, you have a sense that you can't win, and yet you can't stop fighting. If you're on the back of that black horse, fighting is the only choice you have, because the white pieces seem life threatening. Yet living in a war zone is no way to live.

Suppose you're not the chess pieces, or the player, but are the board. Without a board, these pieces have no place to be. The board holds them. The pieces need you. They cannot exist without you – but you contain them, they don't contain you. Notice that if you are the pieces, the game is very important, you've got to win, your life depends on it. But if you are the board, it doesn't matter whether the war stops or not. The game may go on, but it doesn't make any difference to the board. As the board, you can see all the pieces, you can hold them, you are in intimate contact with them; you can watch the war being played out in your consciousness, but it doesn't matter. It takes no effort.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. I will need to use chess-like strategies to beat my difficult emotions and thoughts
- b. The chess pieces will continue to fight against each other forever, with neither side winning because the board goes out in all directions infinitely. The pieces put in a lot of effort, but the board does not
- c. My thoughts, feelings, sensations, emotions, memories and so on are not me, just parts of me. I am bigger than my difficult emotions
- d. Chess pieces appear a lot smaller when compared to the size of the board

Question 4

Imagine that you selected a spot to plant a garden. You worked the soil, planted the seeds, and waited for them to sprout. Meanwhile, you started noticing a spot just across the road, which also looked like a good spot – maybe even a better spot. So you pulled up your vegetables and went across the street and planted your garden there. Then you noticed another spot that looked even better.

You can grow some things very quickly, but others require time and dedication. The question is, “Do you want to live on lettuce, or do you want to live on something more substantial – potatoes, beetroot, and the like?” You can’t find out how things work in gardens when you have to pull up stakes again and again.

Of course, if you stay in the same spot, you’ll start to notice its imperfections. Maybe the ground isn’t quite as level as it looked when you started, or perhaps the water has to be carried for quite a distance. Some things you plant may seem to take forever to come up. It is at times like this that your mind will tell you, “You should have planted elsewhere”, “This will probably never work”, “It was stupid of you to think you could grow anything here”, and so on.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. Planting vegetables in different spots results in different sorts of vegetables
- b. Constantly searching for perfection is the only way to achieve significant things
- c. If you keep moving the location of your vegetable garden, you’ll have to live on lettuce rather than potatoes and beetroot
- d. To achieve significant things, I may need to maintain a fixed course in the face of difficulties and discouraging circumstances

Question 5

Imagine that you are a soap bubble. Have you ever seen how a big soap bubble can touch smaller ones and the little ones are simply absorbed into the bigger one? Well, imagine that you are a soap bubble like that and you are moving along a path you have chosen. Suddenly, another bubble appears in front of you and says “Stop!” You float there for a few moments. When you move to get around, over, or under that bubble, it moves just as quickly to block your path. Now you have only two choices. You can stop moving in your valued direction, or you can touch the other soap bubble and continue on with it inside you.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. To achieve what I want to achieve, I need to confront and deal with the obstacles that may be in the way
- b. The only way for a bubble to avoid bursting is to stop or absorb smaller bubbles
- c. It's important to be wary of obstacles getting in the way of me achieving my goals
- d. A big bubble can not move around a smaller bubble; it can only stop or absorb the smaller bubble into it

Question 6

Imagine that you got a new house and you invited all the neighbours over to a housewarming party. Everyone in the whole neighbourhood is invited – you even put up a sign at the supermarket. So all the neighbours show up, the party's going great, and here comes Joe-the-Tramp, who lives behind the supermarket in the trash dumpster. He's stinky and smelly, and you think, "Oh no, why did he show up?" But you did say on the sign, "Everyone's welcome."

Can you see that it's possible for you to welcome him, and really, fully, do that without liking that he's here? You can welcome him even though you don't think well of him. You don't have to like him. You don't have to like the way he smells, or his life-style, or his clothing. You may be embarrassed about the way he's dipping into the punch or the sandwiches. Your opinion of him, your evaluation of him, is absolutely distinct from your willingness to have him as a guest in your home.

You could also decide that even though you said everyone was welcome, in reality Joe is not welcome. But as soon as you do that, the party changes. Now you have to be at the front of the house, guarding the door so he can't come back in. Or if you say, "Ok, you're welcome," but you don't really mean it, you only mean that he's welcome as long as he stays in the kitchen and doesn't mingle with the other guests, then you're going to have to be constantly making him do that and your whole party will be about that. Meanwhile, life's going on, the party's going on, and you're off guarding the tramp. It's just not life enhancing. It's not much like a party. It's a lot of work.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. Allowing some guests and not others to come to my party will probably mean I spend the whole party kicking unwanted people out rather than having fun
- b. Trying to avoid one negative experience will only result in other negative experiences, but being willing to have some negative experiences will allow me to have positive experiences as well
- c. The only way to stop unwanted guests from coming to my party is to not put a sign up at the supermarket inviting everyone
- d. It takes a lot of effort to avoid really difficult emotions, thoughts or situations

Therapeutic Metaphor Interpretation Test (T-MIT)

Response Record Sheet

Question	Responses			
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d

D-KEFS Proverb Test

Do not discontinue.

Condition 1:
Free Inquiry
Circle Score

Condition 2:
Multiple Choice
Circle Letter Choice/Score

	Accuracy Score	Abstraction Score	Total Achievement Score (Score 0 if Accuracy = 0)	0 Points		2 Points		4 Points	
				Phon	Unrel	Concrete	Abstract		
1. You can't judge a book by its cover.	0 1 2	0 2		b	a	d	c		
				0		2	4		
2. Don't count your chickens before they are hatched.	0 1 2	0 2		c	b	d	a		
				0		2	4		
3. Rome wasn't built in a day.	0 1 2	0 2		a	d	c	b		
				0		2	4		
4. Too many cooks spoil the soup.	0 1 2	0 2		d	a	b	c		
				0		2	4		
5. People who live in glass houses shouldn't throw stones.	0 1 2	0 2		a	c	b	d		
				0		2	4		
6. An old ox plows a straight row.	0 1 2	0 2		d	c	a	b		
				0		2	4		
7. A small leak will sink a large ship.	0 1 2	0 2		b	d	a	c		
				0		2	4		
8. No bread is without a crust.	0 1 2	0 2		d	c	a	b		
				0		2	4		

Common Proverbs (Items 1–5)

Uncommon Proverbs (Items 6–8)

Total
Accuracy
Score
Total
Abstraction
Score
Total
Achievement
Score

Free Inquiry

Total
Achievement
Score

Multiple Choice

APPENDIX D: ASSESSMENT BATTERY FOR CLINICAL PARTICIPANTS

ToP TiP

(Trial of Psychological Treatment in Psychosis)

Introduction to Study

Read the following aloud to the participant:

We would like to offer you the chance to participate in an assessment that will help the development of psychological treatments. We are trialling these programs to see if we can get better results by matching treatments to how people think. Your participation in this research will help us to improve the treatments provided by mental health services.

If you agree to be involved, you will attend an initial assessment involving tasks where you will be read short metaphors and be asked to explain what you think they mean. Some tasks will require you to remember things. The whole assessment is expected to take about 1½ hours. If need be, you can do it over more than one appointment. Although some of the tasks may require some mental effort it is not expected that participating will cause you any distress. However, professional support is available should you require it at any point.

Agreeing or not agreeing to participate in this research will not alter the other aspects of your mental health care.

Your participation in this research is voluntary and you are able to withdraw any time. The assessment information gained will be stored securely according to the Health Records and Information Privacy Act 2002. You will not be identified in any publications that result from this research. If you choose not to participate or withdraw at a later stage, this will not affect your relationships with your health providers.

This summary is also on the *Information Sheet*, which the participant may take with them for future reference.

Consent form for Clinical Participants

I, (participant's name), consent to participate in the research to be conducted by Mr Alex Hains and Dr Hamish McLeod as it has been described to me in the *Information Sheet*. I understand that group trends from the data collected may be used for article publications and conference presentations and I consent for the data to be used in that manner.

.....

/ /

(signature)

(date)

Information Sheet for Clinical Participants

We would like to offer you the chance to participate in an assessment that will help the development of psychological treatments. We are trialling these programs to see if we can get better results by matching treatments to how people think. Your participation in this research will help us to improve the treatments provided by mental health services.

If you agree to be involved, you will attend an initial assessment involving tasks where you will be read short metaphors and be asked to explain what you think they mean. Some tasks will require you to remember things. The whole assessment is expected to take about 1½ hours. If need be, you can do it over more than one appointment. Although some of the tasks may require some mental effort it is not expected that participating will cause you any distress. However, professional support is available should you require it at any point.

Agreeing or not agreeing to participate in this research will not alter the other aspects of your mental health care.

Your participation in this research is voluntary and you are able to withdraw any time. The assessment information gained will be stored securely according to the Health Records and Information Privacy Act 2002. You will not be identified in any publications that result from this research. If you choose not to participate or withdraw at a later stage, this will not affect your relationships with your health providers.

If you would like to discuss this research further, please contact Mr Alex Hains (research@privatemind.com.au) or Dr Hamish McLeod (hamish@uow.edu.au). If you have any enquiries regarding the conduct of the research, please contact the Ethics Manager of the Human Research Ethics Committee (02 4221 4457).

Demographics

Participant name:	DOB:	Sex:
Date of assessment:	Ethnicity:	

Any mental health diagnoses?

	Current?	Age at onset (if psychosis):
1.		
2.		
3.		

Any mental health medications?:

	Dose	Compliance (%)
1.		
2.		
3.		

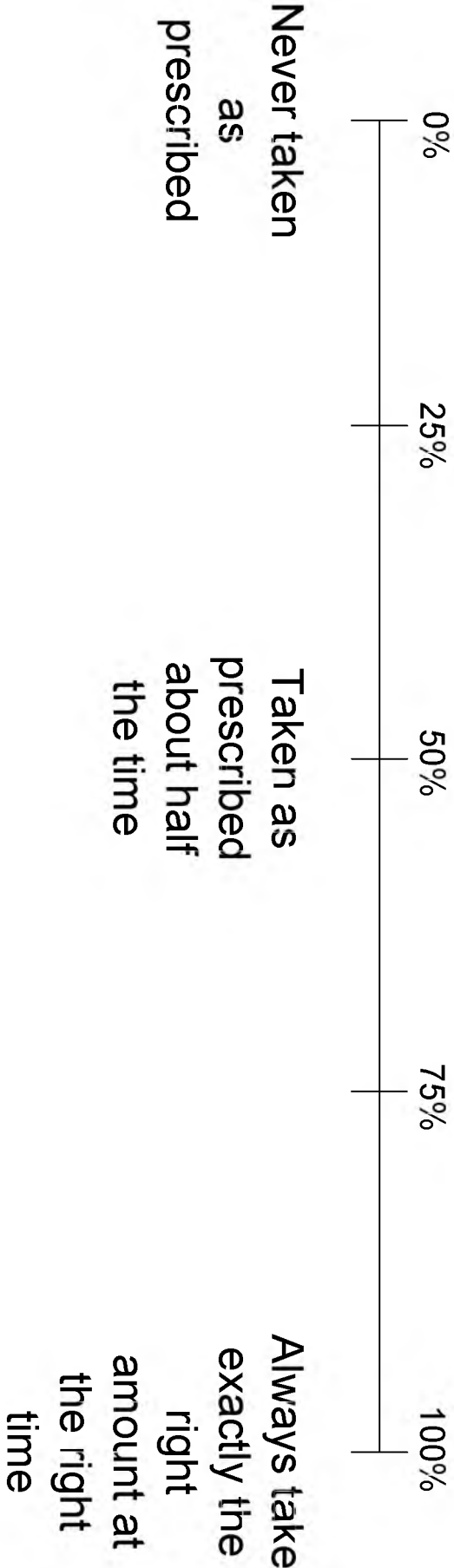
How many times have you attended the Emergency Department (or Casualty) in the past 6 months for mental health concerns?

How many times have you been admitted to hospital due to these problems in the past 5 years?

Have you ever received any psychological treatments for these problems (e.g. group or individual counselling)?

If so, when and where? And what did they involve?

To what degree do you take your medication exactly as prescribed?



PSYRATS

Timeframe: remember to rate over the last week

AUDITORY HALLUCINATIONS

SCID Screening question

Do you hear things that other people can't hear, such as noises, or the voices of people whispering or talking?

(If YES) What did you hear? How often did you hear it?

1. Frequency

Probing questions

How often have you heard your voices over the last week?

Thinking about the last week, what has it been like?" e.g. every day, all day long etc"

Scoring criteria:

- 0 Voices not present or present less than once a week (specify frequency if present)
- 1 Voices occur for at least once a week
- 2 Voices occur at least once a day
- 3 Voices occur at least once an hour
- 4 Voices occur continuously or almost continuously i.e., stop for only a few seconds or minutes

2. Duration

Probing questions

When you have heard your voices over the last week, how long have they lasted?

Have they lasted for a few seconds, minutes, hours, all day long for example....?"

Scoring criteria:

- 0 Voices not present
- 1 Voices last for a few seconds, fleeting voices
- 2 Voices last for several minutes
- 3 Voices last for at least one hour

- 4 Voices last for hours at a time

3. Location

Probing questions

When you have heard your voices over the last week, where did they sound like they were happening?

Did they sound like they were inside your head and/or outside your head?

Whereabouts do your voices sound like they are coming from?

Scoring criteria:

- 0 No voices present
- 1 Voices sound like they are inside head only
- 2 Voices outside the head, but close to ears or head. Voices inside the head may also be present.
- 3 Voices sound like they are inside or close to ears and outside head away from ears
- 4 Voices sound like they are from outside the head only

4. Loudness

Probing questions

How loud are your voices?

Are they louder than my voice, about the same loudness, quieter or just a whisper?

Scoring criteria:

- 0 Voices not present
- 1 Quieter than own voice, whispers.
- 2 About same loudness as own voice
- 3 Louder than own voice

5. Beliefs regarding the origin of voices

Probing questions

What do you think has caused your voices?

Are the voices caused by factors related to you, or due to other people or factors?

Are your voice caused by your mental health problems or illness?

How much do you believe that your voices are caused by (add interviewee's contribution) on an scale from 0-100 with 100 being that you are totally convinced, have no doubts and 0 being that it is completely untrue?

Scoring criteria:

- 0 Voices not present
- 1 Believes voices to be solely internally generated and related to self
- 2 Holds a less than 50% conviction that voices originate from external causes
- 3 Holds 50% or more conviction (but less than 100%) that voices originate from external causes
- 4 Believes voices are solely due to external causes (100% conviction)

6. Amount of negative content of voices

Probing questions

Do you think that your voices have said unpleasant things or negative things over the last week?

How much of the time do the voices say these types of unpleasant or negative items?

Scoring criteria:

- 0 No unpleasant content
- 1 Occasional unpleasant content
- 2 Minority of voice content is unpleasant or negative (less than 50%)
- 3 Majority of voice content is unpleasant or negative (50% or more)
- 4 All of voice content is unpleasant or negative

7. Degree of negative content

Probing questions

Can you tell me a bit about what you have heard your voices saying over the last week?

Can you give me some examples of the things you have heard this week?

Scoring criteria:

- 0 Not unpleasant or negative

- 1 Some degree of negative content, but not personal comments relating to self or family e.g. swear words or comments not directed to self, e.g. “the milkman’s ugly”
- 2 Personal verbal abuse, comments on behaviour e.g. “shouldn’t do that or say that”
- 3 Personal verbal abuse relating to self-concept e.g. “you’re lazy, ugly, mad, perverted”
- 4 Personal threats to self e.g. threats to harm self or family, extreme instructions or commands to harm self or others and personal verbal abuse as in (3)

8. Amount of distress

Probing questions

Have you found your voices to be distressing over the last week?

How much of the time have they caused you distress over the last week?

Scoring criteria:

- 0 Voices not distressing at all
- 1 Voices occasionally distressing, majority not distressing (<10%)
- 2 Minority of voices distressing (<50%)
- 3 Majority of voices distressing, minority not distressing ($\geq 50\%$)
- 4 Voices always distressing

9. Intensity of distress

Probing questions

Over the last week when your voices have been distressing, how distressing has that been?

Thinking about the worst distress you could feel, over the last week, how have your voices compared to that? For example, has it been slightly, moderately distressing etc?

Scoring criteria:

- 0 Voices not distressing at all
- 1 Voices slightly distressing
- 2 Voices are distressing to a moderate degree
- 3 Voices are very distressing, although interviewee could feel worse
- 4 Voices are extremely distressing, feel the worst he/she could possibly feel

10. Disruption to life caused by voices

Probing questions

How much disruption have the voices caused to your life over the last week?

Can you tell me how the voices stopped you from working or doing any other daytime activity that you wanted to do?

How much have they interfered with your relationships with friends and/or family?

How much have they prevented you from looking after yourself, e.g. bathing, changing clothes, etc?

Scoring criteria:

- 0 No disruption to life, able to maintain social and family relationships (if present)
- 1 Voices cause minimal amount of disruption to life e.g. interferes with concentration although able to maintain daytime activity and social and family relationships and be able to maintain independent living without support.
- 2 Voices cause moderate amount of disruption to life causing some disturbance to daytime activity and/or family or social activities. The interviewee is not in hospital although may live in supported accommodation or receive additional help with daily living skills.
- 3 Voices cause severe disruption to life so that hospitalisation is usually necessary. The interviewee is able to maintain some daily activities, self-care and relationships whilst in hospital. The interviewee may also be in supported accommodation but experiencing severe disruption of life in terms of activities, daily living skills and/or relationships.
- 4 Voices cause complete disruption of daily life requiring hospitalisation. The interviewee is unable to maintain any daily activities and social relationships. Self-care is also severely disrupted.

11. Controllability of voices

Probing questions

What control had you had over your voices over the last week?

How much control have you had over your voices when they happened over the last week?

Can you get rid of, dismiss or bring on your voices?"

Scoring criteria:

- 0 Interviewee believes they can have control over the voices and can always bring on or dismiss them at will

- 1 Interviewee believes they can have some control over the voices on the majority of occasions
- 2 Interviewee believes they can have some control over their voices approximately half of the time
- 3 Interviewee believes they can have some control over their voices but only occasionally. The majority of the time the interviewee experiences voices which are uncontrollable
- 4 Interviewee has no control over when the voices occur and cannot dismiss or bring them on at all.

Optional items

(i) Number of voices

How many voices do you experience?

(ii) Form of each voice

How does each voice refer to you? Does it say things that start with 'you', or 'he/she' or 'I'?(1st person, 2nd person, 3rd person etc)

(iii) Sex of voices

Are the voices males or female? How many voices are male and how many are female?

DELUSIONAL BELIEFS

SCID Screening questions

Has it ever seemed like people were talking about you or taking special notice of you?

(If YES) Were you convinced they were talking about you, or did you think it might have been your imagination?

Did you ever feel that you were especially important in some way, or that you had special powers to do things that other people couldn't do?

(If YES) Specify

Did you ever feel that something was very wrong with you physically even though your doctor said nothing was wrong... like you had cancer or some other terrible disease?

(If YES) Specify

Have you ever been convinced that something was very wrong with the way a part or parts of your body looked? Did you ever feel that something strange was happening to parts of your body?

(If YES) Specify

Did you ever have any unusual religious experiences?

Did you ever feel that you had committed a crime or had done something terrible for which you should be punished?

Did you ever feel that someone or something outside yourself was controlling your thoughts or actions against your will?

Did you ever believe that someone could read your mind?

Did you ever feel that certain thoughts that were not your own were put into your head? What about taken out of your head?

1. Amount of preoccupation with delusions

Probing questions

Over the last week, how much time have you spent thinking about your beliefs about[insert client's beliefs] ?

Scoring criteria:

- 0 No delusions, or delusions which the interviewee thinks about less than once a week.
- 1 Interviewee thinks about beliefs at least once a week.
- 2 Interviewee thinks about beliefs at least once a day.
- 3 Interviewee thinks about beliefs at least once an hour.
- 4 Interviewee thinks about delusions continuously or almost continuously.

2. Duration of preoccupation with delusions

Probing questions

When you have thought about any of your beliefs (i.e. [insert interviewee's beliefs]...) over the last week, how long do they tend to stay in your mind? - Few seconds/minutes/hours, etc.?

Scoring criteria:

- 0 No delusions
- 1 Thoughts about beliefs last for a few seconds, fleeting thoughts
- 2 Thoughts about delusions last for several minutes
- 3 Thoughts about delusions last for at least one hour
- 4 Thoughts about delusions usually last for hours at a time

3. Conviction

Probing questions

At the moment, do you have any doubts about any of your beliefs, for example do you sometimes wonder whether they are real or not? (Go through each belief in turn).

How much do you believe in ,,,[insert belief/beliefs]? Can you estimate this on a scale from 0 – 100, where 100 means that you are totally convinced by your beliefs and 0 being that you are not convinced at all?

Scoring criteria:

- 0 No conviction at all
- 1 Very little conviction in reality of beliefs, less than 10%
- 2 Some doubts relating to conviction in beliefs, between 10-49%
- 3 Conviction in belief is very strong, between 50 – 99%
- 4. Conviction is 100%

4. Amount of Distress

Probing questions

*Have your beliefs about [inset interviewee's beliefs] caused you distress over the last week?
- How much of the time have they caused you distress over the last week?*

Scoring criteria:

- 0 Beliefs never cause distress
- 1 Beliefs cause distress on the minority of occasions.
- 2 Beliefs cause distress on less than 50 % of occasions
- 3 Beliefs cause distress on the majority of occasions when they occur between 51-99% of time
- 4 Beliefs always cause distress when they occur

5. Intensity of Distress

Probing questions

Over the last week, when you have felt distressed by your beliefs about {insert interviewee's beliefs} how severe does this feel?" Have you felt slightly, distressed, moderately distressed etc..

Scoring criteria:

- 0 No distress
- 1 Beliefs cause slight distress
- 2 Beliefs cause moderate distress
- 3 Beliefs cause marked distress
- 4 Beliefs cause extreme distress, couldn't be worse

6. Disruption to life caused by beliefs

Probing questions

In what way have your beliefs caused disruption for you over the last week?

In what way have they stopped you working or carrying out a day-time activity?

In what way have they interfered with your relationships with family or friends?

In what way have they interfered with your ability to look after yourself, e.g. washing, changing clothes, etc?

Scoring criteria:

- 0 No disruption to life, able to maintain independent living with no problems in daily living skills. Able to maintain social and family relationships (if present)
- 1 Beliefs cause minimal amount of disruption to life, e.g. interferes with concentration although able to maintain daytime activity and social and family relationships and be able to maintain independent living without support.
- 2 Beliefs cause moderate amount of disruption to life causing some disturbance to daytime activity and/or family or social activities. The interviewee is not in hospital although may live in supported accommodation or receive additional help with daily living skills.
- 3 Beliefs cause severe disruption to life so that hospitalisation is usually necessary. The interviewee is able to maintain some daily activities, self-care and relationships whilst in hospital. The interviewee may also be in supported accommodation but experiencing severe disruption of life in terms of activities, daily living skills and/or relationships.
- 4 Beliefs cause complete disruption of daily life requiring hospitalisation. The interviewee is unable to maintain any daily activities and social relationships. Self-care is also severely disrupted.

Optional items

(i) Number of beliefs

Record the number of beliefs considered in the interview, use further probing questions if necessary

(ii) Content of each belief

Record the content of each belief considered in the interview, use further probing questions if necessary

PANSS (N subscale)

0= Absent	1=Minimal	2=Mild	3=Moderate	4=Moderate severe	5=Severe	6=Extreme
------------------	------------------	---------------	-------------------	--------------------------	-----------------	------------------

N1 Blunted affect

Diminished emotional responsiveness as characterised by a reduction in facial expression, modulation of feelings, and communicative gestures. Basis for rating: Observation of physical manifestations of affective tone and emotional responsiveness during the course of interview.

N2 Emotional withdrawal

Lack of interest in, involvement with, and affective commitment to life's events. Basis for rating: Reports of functioning from primary care workers or family and observation of interpersonal behaviour during the course of interview.

N3 Poor rapport

Lack of interpersonal empathy, openness in conversation, and sense of closeness, interest, or involvement with the interviewer. This is evidenced by interpersonal distancing and reduced verbal and nonverbal communication. Basis for rating: Interpersonal behaviour during the course of interview.

N4 Passive/apathetic social withdrawal

Diminished interest and initiative in social interactions due to passivity, apathy, anergy (lack of response), or avolition (lack of initiative or motivation). This leads to reduced interpersonal involvements and neglect of daily activities.

N5 Difficulty in abstract thinking

Impairment in the use of the abstract-symbolic mode of thinking, as evidenced by difficulty in classification, forming generalisations, and proceeding beyond concrete or egocentric thinking in problem-solving tasks. Basis for rating: Responses to questions on similarities and proverb interpretation, and use of concrete vs. abstract mode during the course of the interview.

N6 Lack of spontaneity and flow of conversation

Reduction in the normal flow of communication associated with apathy, avolition, defensiveness, or cognitive deficit. This is manifested by diminished fluidity and productivity of the verbal-interactive process. Basis for rating: Cognitive-verbal processes observed during the course of interview.

N7 Stereotyped thinking

Decreased fluidity, spontaneity, and flexibility of thinking, as evidenced in rigid, repetitious, or barren thought content. Basis for rating: Cognitive-verbal processes during the course of interview.

CALGARY DEPRESSION SCALE FOR SCHIZOPHRENIA (CDSS)

Interviewer:

Ask the first question as written. Use follow up probes or qualifiers at your discretion. Time frame refers to last two weeks unless stipulated.

NB. The last item, #9, is based on observations of the entire interview.

(1)**DEPRESSION:** How would you describe your mood over the last two weeks? Do you keep reasonably cheerful or have you been very depressed or low spirited recently? In the last two weeks, how often have you (own words) each day? All day?

- | | | |
|----|----------|---|
| 0. | Absent | |
| 1. | Mild | Expresses some sadness or discouragement on questioning. |
| 2. | Moderate | Distinct depressed mood persisting up to half the time over last 2 weeks; present daily. |
| 3. | Severe | Markedly depressed mood persisting daily over half the time interfering with normal motor and social functioning. |

(2)**HOPELESSNESS:** How do you see the future for yourself? Can you see any future? – or has life seemed quite hopeless? Have you given up or does there still seem some reason for trying?

- | | | |
|----|----------|--|
| 0. | Absent | |
| 1. | Mild | Has at times felt hopeless over the last two weeks but still has some degree of hope for the future |
| 2. | Moderate | Persistent, moderate sense of hopelessness over last week. Can be persuaded to acknowledge possibility of things being better. |
| 3. | Severe | Persisting and distressing sense of hopelessness. |

(3)**SELF DEPRECIATION:** What is your opinion of your self compared to other people? Do you feel better, not as good, or about the same as others? Do you feel inferior or even worthless?

- | | | |
|----|----------|--|
| 0. | Absent | |
| 1. | Mild | Some inferiority; not amounting to feeling of worthlessness. |
| 2. | Moderate | Subject feels worthless, but less than 50% of the time. |
| 3. | Severe | Subject feels worthless more than 50% of the time. May be challenged to acknowledge otherwise. |

(4)GUILTY IDEAS OF REFERENCE: Do you have the feeling that you are being blamed for something or even wrongly accused? What about? (Do not include justifiable blame or accusation. Exclude delusions of guilt.)

- | | | |
|----|----------|---|
| 0. | Absent | |
| 1. | Mild | Subject feels blamed but not accused less than 50% of the time. |
| 2. | Moderate | Persisting sense of being blamed, and/or occasional sense of being accused. |
| 3. | Severe | Persistent sense of being accused. When challenged, acknowledges that it is not so. |

(5)PATHOLOGICAL GUILT: Do you tend to blame yourself for little things you may have done in the past? Do you think that you deserve to be so concerned about this?

- | | | |
|----|----------|--|
| 0. | Absent | |
| 1. | Mild | Subject sometimes feels over guilty about some minor peccadillo, but less than 50% of time. |
| 2. | Moderate | Subject usually (over 50% of time) feels guilty about past actions, the significance of which he or she exaggerates. |
| 3. | Severe | Subject usually feels he or she is to blame for everything that has gone wrong, even when not his or her fault. |

(6)MORNING DEPRESSION: When you have felt depressed over the last 2 weeks, have you noticed the depression being worse at any particular time of day?

- | | | |
|----|----------|---|
| 0. | Absent | No depression. |
| 1. | Mild | Depression present but no diurnal variation. |
| 2. | Moderate | Depression spontaneously mentioned to be worse in a.m. |
| 3. | Severe | Depression markedly worse in a.m., with impaired functioning which improves in p.m. |

(7)EARLY WAKENING: Do you wake earlier in the morning than is normal for you? How many times a week does this happen?

- | | | |
|----|----------|--|
| 0. | Absent | No early waking. |
| 1. | Mild | Occasionally wakes (up to twice weekly) 1 hour or more before normal time to wake or alarm time. |
| 2. | Moderate | Often wakes early (up to 5 times weekly) 1 hour or more before normal time to wake or alarm. |
| 3. | Severe | Daily wakes 1 hour or more before normal time. |

(8)**SUICIDE:** Have you felt that life wasn't worth living? Did you ever feel like ending it all? What did you think you might do? Did you actually try?

- | | | |
|----|----------|--|
| 0. | Absent | |
| 1. | Mild | Frequent thoughts of being better off dead, or occasional thoughts of suicide. |
| 2. | Moderate | Deliberately considered suicide with a plan, but made no attempt. |
| 3. | Severe | Suicidal attempt apparently designed to end in death (i.e. accidental discovery or inefficient means). |

(9)**OBSERVED DEPRESSION:** Based on interviewer's observations during the entire interview. The question "Do you feel like crying?" used at appropriate points in the interview may elicit information useful to this observation.

- | | | |
|----|----------|--|
| 0. | Absent | |
| 1. | Mild | Subject appears sad and mournful even during parts of the interview, involving affectively neutral discussion. |
| 2. | Moderate | Subject appears sad and mournful throughout the interview, with gloomy monotonous voice and is tearful or close to tears at times. |
| 3. | Severe | Subject chokes on distressing topics, frequently sighs deeply and cries openly, or is persistently in a state of frozen misery if examiner is sure that this is present. |

WTAR Word List

Say, I will show you some words that I will ask you to pronounce. Place the WTAR Word Card in front of the examinee. As you point to the card, say, beginning with the first word on the list, pronounce each word aloud. Start with this word (point to Item 1), and go down this column, one right after the other, without skipping any. When you finish this column, go to the next column (point to the second column). Pronounce each word even if you are unsure. Do you understand? When you are sure that the examinee understands the task, say, Ready? Begin.

ITEM	PRONUNCIATION	SCORE (0,1)	ITEM	PRONUNCIATION	SCORE (0,1)
1 again	uh-GEHN or uh-GAIN		26 conscientious	kon-chee-EN-shus or kon-chee-INCH-us	
2 address	uh-DRESS or AD-dress		27 homily	HAHM-uh-lee	
3 cough	kawf or kof		28 malady	MAL-uh-dee	
4 preview	PREE-vyue		29 subtle	SUH-tl	
5 although	awl-THO		30 fecund	FE-cund or FEE-cund	
6 most	mohst		31 palatable	PAL-uh-tuh-bul	
7 excitement	eck-SITE-munt or ik-SITE-munt		32 menagerie	muh-NAJ-uh-ree	
8 know	noh or no		33 obfuscate	OB-fuh-skate or ob-FUH-skate	
9 plumb	plum		34 liaison	lee-A-zahn or LAV-a-zahn or LEE-ah-zahn	
10 decorate	DEK-uh-rate		35 exigency	EKS-eh-jen-see or ek-ZEE-jen-see	
11 fierce	fihrriss		36 xenophobia	zen-uh-FO-bee-uh or zeen-uh-FO-bee-uh	
12 knead	need		37 ogre	OH-gur	
13 aisle	EYE-I		38 scurrilous	SKUR-uh-lus or SKUH-ruh-lus	
14 vengeance	VEN-junts or VIN-junts		39 ethereal	ih-THEER-ee-uhl or ih-THIR-ee-uhl	
15 prestigious	pre-STJL-us or pre-STEEL-us		40 paradigm	PAIR-uh-dime or PAIR-uh-dim	
16 wreath	reeth		41 perspicuity	pur-spuh-KYEW-uh-tee	
17 gnat	nat		42 plethora	PLETH-er-aah	
18 amphitheatre	AM(p)-fuh-the-uh-ter		43 lugubrious	loo-GOO-bree-us or luh-GOO-bree-us or loo-GYEW-bree-us	
19 lieu	loo		44 treatise	TREET-us	
20 grotesque	gro-TESK		45 diletante	DILL-uh-tahnt	
21 iridescent	ih-uh-DESS-unt		46 vertiginous	vor-TJjin-us or vur-TJj-uh-nus	
22 ballet	BA-lay or ba-LAY		47 ubiquitous	you-BIC-wuh-tus or you-BIH-kwah-tus	
23 equestrian	ih-KWESS-tree-un		48 hyperbole	hi-PUR-buh-lee	
24 porpoise	POR-pus		49 insouciant	in-SOO-see-yunt	
25 aesthetic	ess-THEET-ik or ess-THEET-ik		50 hegemony	heh-JEM-o-nee or he-je-MO-nee	

WTAR WORD CARD

1	again	26	conscientious
2	address	27	homily
3	cough	28	malady
4	preview	29	subtle
5	although	30	fecund
6	most	31	palatable
7	excitement	32	menagerie
8	know	33	obfuscate
9	plumb	34	liaison
10	decorate	35	exigency
11	fierce	36	xenophobia
12	knead	37	ogre
13	aisle	38	scurrilous
14	vengeance	39	ethereal
15	prestigious	40	paradigm
16	wreath	41	perspicuity
17	gnat	42	plethora
18	amphitheatre	43	lugubrious
19	lieu	44	treatise
20	grotesque	45	dilettante
21	iridescent	46	vertiginous
22	ballet	47	ubiquitous
23	equestrian	48	hyperbole
24	porpoise	49	insouciant
25	aesthetic	50	hegemony

WORD LISTS I

Say **I am going to read a list of words. Listen carefully. When I am finished, I want you to repeat as many of the words as you can remember. It doesn't matter in what order you read them. Just try to remember as many as you can. Are you ready?**

Read List A from the Record Form at a rate of approximately 1 word per 1½ seconds.

After reading the entire list, say **Now tell me as many words as you can remember.**

Repeat this procedure for Trials 2-4, using the following instructions:

I will read the same words again, and once again, when I stop, I want you to tell me as many words as you can remember, including the words you said before. It doesn't matter in what order you say them. Just try to recall as many words as you can remember.

When all 4 trials of List A have been administered and recorded, say **Now I am going to read a new list of words and I want to see how many words from the new list you can remember. Are you ready?**

Read List B from the Record Form at a rate of approximately 1 word per 1½ seconds.

After reading List B, say **Now tell me as many words as you can remember.**

Record the responses on the Record Form.

Short-Delay Recall

Say **Remember the first list of words that we did 4 times? I want you to tell me as many of the words from that first list as you can.**

6. Word Lists I (Optional)



RECORDING:
Place a check mark (✓) next to each word recalled. Write intrusions verbatim.



SCORING RULE:
0–1 pt. for each item

List A	Trial 1 Responses	Trial 2 Responses	Trial 3 Responses	Trial 4 Responses
Target				
Finger				
Sunset				
Crocodile				
Dollar				
Yard				
Student				
Traffic				
Broom				
Ocean				
Wing				
Giant				
Intrusions				

+
Trial 1 Recall
Range = 0 to 12

+
Trial 2 Recall
Range = 0 to 12

+
Trial 3 Recall
Range = 0 to 12

=
Trial 4 Recall
Range = 0 to 12

Recall Total Score
Range = 0 to 48

1st Recall Total Score
Range = 0 to 12

List B	List B Responses	List A (Do not read)	Short-Delay Responses
Diamond		Target	
Garden		Finger	
Court		Sunset	
Hero		Crocodile	
Sand		Dollar	
Kitten		Yard	
Branch		Student	
Kitchen		Traffic	
Daisy		Broom	
Lake		Ocean	
Gorilla		Wing	
Jail		Giant	
Intrusions			

List B Recall
Range = 0 to 12

Short-Delay Recall
Range = 0 to 12

Contrast 1 Calculation

$$\boxed{} - \boxed{} = \boxed{} \quad \text{Contrast 1}$$

Trial 1 Recall Range = 0 to 12 List B Recall Range = 0 to 12 Range = -12 to +12

Learning Slope Calculation

$$\boxed{} - \boxed{} = \boxed{} \quad \text{Learning Slope}$$

Trial 4 Recall Range = 0 to 12 Trial 1 Recall Range = 0 to 12 Range = -12 to +12

Contrast 2 Calculation

$$\boxed{} - \boxed{} = \boxed{} \quad \text{Contrast 2}$$

Trial 4 Recall Range = 0 to 12 Short-Delay Recall Range = 0 to 12 Range = -12 to +12

LETTER-NUMBER SEQUENCING

Say I am going to say a group of numbers and letters. After I say them, I want you to tell me the numbers first, in order, starting with the lowest number. Then tell me the letters in alphabetical order. For example, if I say B-7, your answer should be 7-B. The number goes first, then the letter. If I say 9-C-3, then your answer should be 3-9-C, the numbers in order first, then the letters in alphabetical order. Let's practice.

Administer all practice trials. Say each combination at a rate of one number or letter per second. Allow the examinee ample time to respond (correct responses are in parentheses).

6-F	(6-F)
G-4	(4-G)
3-W-5	(3-5-W)
T-7-L	(7-L-T)
1-J-A	(1-A-J)

If the examinee makes an error on any practice trial, correct her or him and repeat the instructions as necessary. Even if the examinee fails all practice trials, continue with subtest.

Proceed to Item 1. Administer the items from the Record Form. Record the examinee's responses.

8. Letter-Number Sequencing



DISCONTINUE RULE:
After scores of 0 for all
three trials of an item.



RECORDING:
All responses verbatim



SCORING RULE:
0–1 pt. for each trial

Item/Trial	(Correct Response)/Response	Score 0 or 1
1. Trial 1	L-2 (2-L)	
Trial 2	6-P (6-P)	
Trial 3	B-5 (5-B)	
2. Trial 1	F-7-L (7-F-L)	
Trial 2	R-4-D (4-D-R)	
Trial 3	H-1-8 (1-8-H)	
3. Trial 1	T-9-A-3 (3-9-A-T)	
Trial 2	V-1-J-5 (1-5-J-V)	
Trial 3	7-N-4-L (4-7-L-N)	
4. Trial 1	8-D-6-G-1 (1-6-8-D-G)	
Trial 2	K-2-C-7-S (2-7-C-K-S)	
Trial 3	5-P-3-Y-9 (3-5-9-P-Y)	
5. Trial 1	M-4-E-7-Q-2 (2-4-7-E-M-Q)	
Trial 2	W-8-H-5-F-3 (3-5-8-F-H-W)	
Trial 3	6-G-9-A-2-S (2-6-9-A-G-S)	
6. Trial 1	R-3-B-4-Z-1-C (1-3-4-B-C-R-Z)	
Trial 2	5-T-9-J-2-X-7 (2-5-7-9-J-T-X)	
Trial 3	E-1-H-8-R-4-D (1-4-8-D-E-H-R)	
7. Trial 1	5-H-9-S-2-N-6-A (2-5-6-9-A-H-N-S)	
Trial 2	D-1-R-9-B-4-K-3 (1-3-4-9-B-D-K-R)	
Trial 3	7-M-2-T-6-F-1-Z (1-2-6-7-F-M-T-Z)	

Total Score
Range = 0 to 21

SPATIAL SPAN

Forward

Place the Spatial Span Board on the table with the cube numbers facing you and with the board centered at the examinee's midline, so that he or she can easily reach the cubes. Say **Now I want you to do exactly what I do. Touch the blocks I touch, in the same order.**

Use the Record Form for the tapping sequence. Tap out the sequence for Trial 1 of Spatial Span Forward Item 1 at a rate of one cube per second.

Continue administering the items for Spatial Span Forward, using the sequences on the Record Form. Record the examinee's responses. If the criterion for discontinuing is met (i.e. scores of 0 on both trials of an item), or if all Spatial Span Forward items have been administered, proceed with Spatial Span Backward.

Backward

Say **Now I am going to touch some more blocks. This time when I stop, I want you to touch the blocks backward, in the reverse order of mine. For example, if I touch this block (cube 3), then this one (cube 5), what would you do?**

If the examinee responds correctly, say **That's right. Here's the next one. Remember to touch them in the reverse order.**

Then proceed with Item 1.

If the examinee responds incorrectly on the 3-5 example sequence, point appropriately as you say **No, I touched this one, then this one; so, to do it in reverse, you would touch this one, then this one. Now let's try another one. If I touch this one (cube 9), then this one (cube 1), what would you do?**

Whether the examinee succeeds or fails on the second example, proceed to Item 1.

Continue administering the items for Spatial Span Backward (using the sequences on the Record Form) until the criterion for discontinuing is met (i.e. scores on 0 on both trials of an item) or until all items are administered. Record the examinee's responses.

9. Spatial Span


DISCONTINUE RULE:

After scores of 0 on both trials of any item. For both Spatial Span Forward & Spatial Span Backward, administer both trials of each item even if Trial 1 is passed.


RECORDING:

All responses verbatim


SCORING RULE:

0–1 pt. for each trial

Spatial Span Forward

Item/Trial	Response	Score 0 or 1
1. Trial 1 3 – 10		
Trial 2 7 – 4		
2. Trial 1 1 – 9 – 3		
Trial 2 8 – 2 – 7		
3. Trial 1 4 – 9 – 1 – 6		
Trial 2 10 – 6 – 2 – 7		
4. Trial 1 6 – 5 – 1 – 4 – 8		
Trial 2 5 – 7 – 9 – 8 – 2		
5. Trial 1 4 – 1 – 9 – 3 – 8 – 10		
Trial 2 9 – 2 – 6 – 7 – 3 – 5		
6. Trial 1 10 – 1 – 6 – 4 – 8 – 5 – 7		
Trial 2 2 – 6 – 3 – 8 – 2 – 10 – 1		
7. Trial 1 7 – 3 – 10 – 5 – 7 – 8 – 4 – 9		
Trial 2 6 – 9 – 3 – 2 – 1 – 7 – 10 – 5		
8. Trial 1 5 – 8 – 4 – 10 – 7 – 3 – 1 – 9 – 6		
Trial 2 8 – 2 – 6 – 1 – 10 – 3 – 7 – 4 – 9		

Forward Total Score
Range = 0 to 16

Spatial Span Backward

Item/Trial	(Correct Response)/Response	Score 0 or 1
1. Trial 1 7 – 4 (4 – 7)		
Trial 2 3 – 10 (10 – 3)		
2. Trial 1 8 – 2 – 7 (7 – 2 – 8)		
Trial 2 1 – 9 – 3 (3 – 9 – 1)		
3. Trial 1 10 – 6 – 2 – 7 (7 – 2 – 6 – 10)		
Trial 2 4 – 9 – 1 – 6 (6 – 1 – 9 – 4)		
4. Trial 1 5 – 7 – 9 – 8 – 2 (2 – 8 – 9 – 7 – 5)		
Trial 2 6 – 5 – 1 – 4 – 8 (8 – 4 – 1 – 5 – 6)		
5. Trial 1 9 – 2 – 6 – 7 – 3 – 5 (5 – 3 – 7 – 6 – 2 – 9)		
Trial 2 4 – 1 – 9 – 3 – 8 – 10 (10 – 8 – 3 – 9 – 1 – 4)		
6. Trial 1 2 – 6 – 3 – 8 – 2 – 10 – 1 (1 – 10 – 2 – 8 – 3 – 6 – 2)		
Trial 2 10 – 1 – 6 – 4 – 8 – 5 – 7 (7 – 5 – 8 – 4 – 6 – 1 – 10)		
7. Trial 1 6 – 9 – 3 – 2 – 1 – 7 – 10 – 5 (5 – 10 – 7 – 1 – 2 – 3 – 9 – 6)		
Trial 2 7 – 3 – 10 – 5 – 7 – 8 – 4 – 9 (9 – 4 – 8 – 7 – 5 – 10 – 3 – 7)		
8. Trial 1 8 – 2 – 6 – 1 – 10 – 3 – 7 – 4 – 9 (9 – 4 – 7 – 3 – 10 – 1 – 6 – 2 – 8)		
Trial 2 5 – 8 – 4 – 10 – 7 – 3 – 1 – 9 – 6 (6 – 9 – 1 – 3 – 7 – 10 – 4 – 8 – 5)		

Backward Total Score
Range = 0 to 16

Total Score
Range = 0 to 32

(Sum Forward Total Score & Backward Total Score)

The Autobiographical Memory Interview: Sequence of questions

Section A: Childhood

Part 1: Period before school

Personal semantic questions

- | | |
|---|--|
| 1.1 Ask the subject for the address where he or she was living before going to school. | 2 points for the full address
1 point for the street and town only
1/2 point for the town or street only |
| 1.2 Ask the names of three friends or neighbours from the period before the subject went to school. | 1 point for each surname
1/2 point each if first name only |

Autobiographical incident question

- A1 Ask the subject to recall an incident from the period before he or she went to school.
Prompts
 'Your first memory?'
 'Involving a brother or sister?'

It is to be expected that memories from this period are likely to be a little less specific and precise than memories from later periods. This can be allowed for in the scoring.

Part 2: First school (i.e. 5–11 years)

Personal semantic questions

- | | |
|---|--|
| 2.1 Ask the subject for the name of the first school he or she attended. | 1 point for the name of the school |
| 2.2 Ask for the location of this school (town or city is sufficient). | 1 point for the town or city |
| 2.3 Ask for the subject's age when starting at this school. | 1 point for age |
| 2.4 Ask the subject for the address where he or she was living when starting at this school. | 2 points for the full address
1 point for the street and town only
1/2 point for the town or street only |
| 2.5 Ask for the names of three teachers or friends from this school.
<i>Prompts</i>
'The headteacher?'
'Your form teacher?'
'A friend?' | 1 point for each surname
1/2 point each if first name only |

the subject attended several schools between the ages of 5 and 11, the details of only the first one are required.

This may or may not be the same as the answer given for question 1.1. (Repeated answers should be checked as far as possible for correctness).

It is not acceptable for the subject to repeat the names of friends previously given.

General notes	The Autobiographical Memory Interview	Sequence of questions	Scoring notes
	Questions	Scoring details	
	<hr/>		
	Autobiographical incident question		
	A2 Ask the subject to recall an incident which occurred while he or she was at primary school (i.e. aged 5–11 years). <i>Prompts</i> 'Involving a teacher?' 'Involving a friend?'		If it becomes evident that this memory is from a later period (e.g. secondary school), the memory is unacceptable.
	<hr/>		
	Part 3: Main secondary or high school (i.e. 11–18 years)		
	Personal semantic questions		
	3.1 Ask the subject for the name of his or her main secondary (or high) school. If the subject attended several secondary (or high) schools ask which one was attended when the subject was 13 years old.	1 point for the correct name	If the subject only ever attended one school, it can be scored twice if correct, but separate incidents must be given for primary and secondary schools, with a total of six names of friends or teachers.
	3.2 Ask for the location of this secondary (or high) school (town or city is sufficient).	1 point for correct location	
British subjects Specific subjects and grades are not required. (Examples of acceptable responses: 'Two A levels' or 'five O levels' or 'Didn't get any'.) Users outside the U.K. and U.S.A This question may not be suited to your secondary schooling procedures. Please insert a question which both matches 3.3 and is appropriate for your subjects.	3.3 <i>British version</i> Ask for the number of examinations which the subject passed on concluding secondary school. <i>American version</i> Ask whether the subject graduated. If 'yes', ask for the year of graduation. If 'no', ask for the year of leaving school.	1 point for the number and level of qualification obtained 1 point for correct year	
	3.4 Ask the subject for the address where he or she was living while attending this secondary (or high) school. This may or may not be the same as the answer given for questions 1.1 and 2.4.	2 points for the full address 1 point for the street and town only 1/2 point for the town or street only	
	3.5 Ask for the names of three teachers or friends from this school. It is not acceptable for the subject to repeat the names of friends previously given. <i>Prompts</i> 'The headteacher?' 'Your form teacher?' 'A friend?'	1 point for each surname 1/2 point each if first name only	

Autobiographical incident question

- A3 Ask the subject to recall an incident which occurred while he or she was at secondary (or high) school (i.e. aged 11–18 years).

Prompts

- 'Involving a teacher?'
'Involving a friend?'

If it becomes evident that this memory is from a different period (e.g. school attended between 5–11 years), the memory is unacceptable.

Section B: Early adult life**Part 4: Career**

Personal semantic questions

- 4.1 Ask the subject whether any qualifications were obtained after leaving school.
1 point for qualification(s) correctly recalled or 'No qualifications'
No points if 'Don't know' or inaccurate response
- 4.2 *Either*
If the subject did obtain a qualification ask for the name of the course *and* the institution.
1 point for name of course
1 point for name of institution
Or
If the subject did not obtain a qualification ask for his or her first job *and* the name of the firm or organisation.
1 point for description of first job
1 point for name of firm or organisation
- 4.3 Ask the subject for the address where he or she was living while obtaining the qualification(s) or starting the first job. A repeated address should be checked for accuracy.
2 points for the full address
1 point for the street and town only
1/2 point for the town or street only
- 4.4 Ask for the names of three friends or colleagues from this period. It is not acceptable for the subject to repeat the names of friends previously given.
1 point for each surname
1/2 point each if first name only
Prompts
'The Principal' or 'The boss?'
'The tutor/lecturer/teacher' or 'Your foreman?'
'Any class-mates' or 'Any work-mates?'

General notes	The Autobiographical Memory Interview	Sequence of questions	Scoring notes
	Questions	Scoring details	

Autobiographical incident question

If the subject has never been employed or had a formal training, he/she should be asked for an incident from the first few years after leaving school.

A4 Ask the subject to recall an incident from college or the first job.

Prompts

'Your first day at work or college?'

'An incident with a friend?'

If it becomes evident that this memory is from a different period (e.g. while the subject was in his/her forties), the memory is unacceptable.

Part 5: Wedding

Personal semantic questions

5.1 *Either*

If the subject was married in his/her late teens, twenties, or early thirties, ask for the date of this marriage *and* ask for the place where this marriage was held (town or city is sufficient).

Or

If the subject was not married in this time period, ask for the name of someone else whose marriage the subject attended during his or her twenties *and* ask for the place where this marriage took place (town or city is sufficient).

1 point for correct date of marriage
1/2 point for year only
1 point for correct place of marriage

1 point for correct name of person
1 point for correct place of marriage

5.2 Ask the subject for the address where he or she was living before this wedding.

2 points for the full address
1 point for the street and town only
1/2 point for the town or street only

5.3 Ask the subject for the address where he or she was living *immediately after* this wedding. If the subject repeats the address given in 5.2, the interviewer should check that the address had not changed.

2 points for the full address
1 point for the street and town only
1/2 point for the town or street only

5.4 Ask for the name of the best-man from this wedding. (If there was no best-man, the name of a guest is sufficient.)

1 point for correct name
1/2 point for first name only

5.5 Ask for the name of a bridesmaid from this wedding. (If there was no bridesmaid, the name of a guest is sufficient.)

1 point for correct name
1/2 point for first name only

General notes	The Autobiographical Memory Interview	Sequence of questions	Scoring notes
	Questions	Scoring details	

General notes	The Autobiographical Memory Interview	Sequence of questions	Scoring notes
	Questions	Scoring details	

Section 6: Recent life

Part 7: Present hospital or institution

Personal semantic questions

It is expected that most subjects will be seen in a hospital or institution (e.g. a research institute). However, if the subject is being seen in another location (e.g. own home) the question should be rephrased to accommodate this.

- | | |
|---|---|
| 7.1 Ask the subject for the name of the hospital or place (e.g. institution) where he or she is currently being seen. | <i>1 point for the correct name of the hospital or institution</i> |
| 7.2 Ask for the location of this hospital or institution (town or city is sufficient). | <i>1 point for the correct location</i> |
| 7.3 Ask for the year or month when the subject arrived at (or moved to) this hospital or institution. | <i>1 point for the correct month or year</i> |
| 7.4 Ask the subject for the address where he or she is currently living. | <i>2 points for the full address
1 point for the street and town only
1/2 point for the town or street only</i> |
| 7.5 Ask for the names of three staff members or fellow patients from this hospital or institution. If this is inappropriate, ask for the names of three current neighbours or colleagues. | <i>1 point for each surname
1/2 point each if first name only</i> |

Month required, if arrived within the last 12 months. Otherwise, year only required.

If the subject has been to the hospital relatively infrequently, minor errors in recalling these names are acceptable.

Autobiographical incident question

- A7 Ask the subject to recall an incident which has occurred at the present hospital or institution. If necessary, it is permissible for the subject to recall an incident from a previous outpatient visit.
- Prompts*
- 'Involving the other patients?'
'To do with the doctors or nurses?'
or, if the subject is being seen at some other type of institution two appropriate prompts should be used, e.g.
'Involving the warden?'
'Involving the daily care staff?'
'Involving the social worker?'
'Involving the psychologist?'

Part 8: Previous hospital or institution

Personal semantic questions

If the subject has undergone two distinct periods of hospitalisation at the same hospital, details of the same hospital or institution given in Part 7 may be given. Different date of arrival, address, friends' names and incident must, of course, be given where necessary.

8.1 Ask the subject for the name of the last (previous) hospital or place (e.g. institution) which he or she attended.

1 point for the correct name of the hospital or institution

8.2 Ask for the location of this hospital or institution, or practitioner (town or city is sufficient).

1 point for the correct location

8.3 Ask for the year or month when the subject arrived at this hospital or institution, or made this visit.

1 point for the correct month or year

Month if within the last 12 months. Otherwise, year is sufficient.

If the subject has not attended another hospital or institution, ask for the name of the last hospital he or she visited, so long as this was within the last five years. Failing that, ask the subject for the name of the last doctor, dentist or optician he or she visited within the last five years.

8.4 Ask the subject for the address where he or she was living when attending or visiting this hospital or institution, or practitioner.

*2 points for the full address
1 point for the street and town only
1/2 point for the town or street only*

8.5 Ask for the names of three friends, colleagues or acquaintances connected with this hospital or institution. If this is inappropriate, ask for the names of three people who have visited the subject in the last year.

*1 point for each surname
1/2 point each if first name only*

Autobiographical incident question

A8 Ask the subject to recall an incident involving a relative or visitor in the last year. A visit to the subject's home is acceptable.

Prompts

'A visit by or to a relative?'

'Involving some news about a relative?'

If the subject is hospitalised, a recent visit is acceptable, although the subject should be encouraged to produce a memory of a specific incident if possible. However, any visit by a relative or friend to the subject's home is acceptable, and again the subject is encouraged to produce a memory of a specific incident, rather than a general description. The prompts allow the subject to produce a memory about a visit to a relative, or to report news about a relative. What is required is recall about an incident involving the chosen person during the last year.

General notes	The Autobiographical Memory Interview	Sequence of questions	Scoring notes
	Questions	Scoring details	

Part 9: Last Christmas or Thanksgiving

Personal semantic questions

Subjects should be questioned about another major religious festival should this be appropriate to their culture.

- | | | |
|-----|--|--|
| 9.1 | Ask the subject where last Christmas or Thanksgiving was spent. | <i>1 point for the correct place</i> |
| 9.2 | Ask for the name of a person with whom last Christmas or Thanksgiving was spent. | <i>1 point for the correct surname
1/2 point for first name only</i> |

Part 10: Holiday or journey

Personal semantic questions

If no such holiday or journey has taken place, the subject is asked about any holiday or journey within the last five years. The subject is also asked who accompanied him or her on this journey. If a journey, this does not have to be related to any holiday.

- | | | |
|------|--|---|
| 10.1 | Ask the subject to name a place visited on a holiday or on a journey in the last year. If necessary, a place visited in the last five years is acceptable. (The name of a town or city is sufficient.) | <i>1 point for the place where the holiday was taken or which the subject visited</i> |
| 10.2 | Ask when this holiday or journey took place. If it took place in the last year, the month is required. If it took place in the last five years, the year or number of years ago is sufficient. | <i>1 point for the correct month or year</i> |
| 10.3 | Ask for the name of a person who accompanied the subject on this holiday or journey. Any person who has accompanied the subject on a holiday or journey is acceptable. | <i>1 point for the correct surname
1/2 point for first name only</i> |

Autobiographical incident question

- A9 Ask the subject to recall an incident which took place while on any holiday or journey within the last year (or five years if necessary).
Prompts
 'At the place you visited?'
 'Involving someone you met?'

Plausible / Implausible Metaphor Test (PIMIT)

Below are a number of metaphors. Some of them make sense as a figure of speech, while others do not. Say YES if you consider the metaphor plausible, or NO if you think it is implausible.

1. This city is a chimney	yes / no
2. The woman had a headache of pickle	yes / no
3. The close friends were elastic bands	yes / no
4. The shoppers at the sale were full moons	yes / no
5. The politician who didn't give straight answers was jumping ditches	yes / no
6. The pretentious young lady was an ant at a picnic	yes / no
7. The meaning of life is an itch you can't scratch	yes / no
8. The hard working man was burrowing through a full moon	yes / no
9. Tim had been poured into his clothes and forgotten to say when	yes / no
10. The old man had a head full of dead leaves	yes / no
11. The lady's jewels were barrels of tar	yes / no
12. The newly wed's heart was a lovebird's egg	yes / no
13. Their cross mother was a bag of toffees	yes / no
14. The stubborn old man was a tram	yes / no
15. The new army recruits were knitting patterns	yes / no
16. The student had a headache a yard wide	yes / no
17. The outlandish model was a cut snake	yes / no
18. The politician who would not give straight answers was a cat	yes / no
19. Paul has the sense of a goose	yes / no
20. The investors were squirrels collecting nuts	yes / no
21. The pretentious young lady was 100% polyester	yes / no
22. Paul has the sense of Epsom salts	yes / no
23. The conceited boy could put out Hell with one bucket of water	yes / no
24. The newly wed's heart was a timber yard	yes / no
25. The man who won the pools was a blue canary	yes / no
26. The close friends were a bag of toffees	yes / no
27. This city is a goose	yes / no
28. The investors were trams	yes / no
29. The situation yielded a crop of stars	yes / no
30. Their cross mother was an elastic band	yes / no
31. This job is a jail	yes / no
32. The conceited boy was a dog with no bark	yes / no
33. The shoppers at the sale were ants at a picnic	yes / no
34. The little girl's Mackintosh was an itch you can't scratch	yes / no
35. The man who won the pools was a dog with the biggest bone	yes / no
36. The lady's jewels were bursting stars	yes / no
37. The outlandish model was a blue canary	yes / no
38. The situation yielded a chimney	yes / no
39. The stubborn old man was a squirrel collecting nuts	yes / no
40. This job is a glass	yes / no

Therapeutic Metaphor Interpretation Test (T-MIT)

Directions for Clinician

Slowly read the 'Instructions for Participant' passage (below) aloud to the participant before commencing. Ensure they understand that the general purpose of a metaphor is to communicate a non-literal meaning, and that their task is to try to correctly interpret the meaning of each metaphor.

Provide the participant with a copy of the metaphors and response options they are to choose from. You are to read each metaphor aloud while the participant follows along from their copy. Then ask the participant to choose the *most* appropriate meaning of each metaphor from the list of options provided at the bottom of the page.

Use the 'Response Record Sheet' during the testing to record the participant's responses by circling their response.

Instructions for Participant

Sometimes, therapists use metaphors to explain particular concepts to their clients. Therapists might help someone described their bodily response to anxiety by saying they are a "wound up spring". Or a therapist might describe being depressed by saying that it feels as though you're "stuck in a deep dark hole".

You're going to read some other examples of metaphors that might be used in therapy. You will need to identify the *most* appropriate meaning of each metaphor from a list of possible interpretations at the bottom of each page.

Remember, try to identify the *most* appropriate meaning of each metaphor if it were used in the context of therapy.

Question 1

Suppose you are in a tug-of-war with a monster. It is big, ugly and very strong. In between you and the monster is a pit, and so far as you can tell, it is bottomless. If you lose this tug-of-war, you will fall into this pit and will be destroyed. So you pull and pull, but the harder you pull, the harder the monster pulls, and you edge closer and closer to the pit. The hardest thing to see is that our job here is not to win the tug-of-war... Our job is to drop the rope.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. If I fall into the pit, the monster will not help me climb out
- b. If I keep struggling against my situation, I'll end up depressed and lonely
- c. Struggling against my situation will only lead to more suffering, so I'm better off not getting involved in the struggle at all
- d. Trying to win tug-of-war against a monster will probably result in me falling into the pit between us. Instead, what I should do is stop pulling and just drop the rope

Question 2

Suppose I had you hooked up to the best polygraph machine that's ever been built. This is a perfect machine, the most sensitive ever made. When you are all wired up to it, there is no way you can be stressed or anxious without the machine knowing it.

So I tell you that you have a very simple task here: all you have to do is stay relaxed. If you get the least bit anxious, however, I will know it. I know you want to try hard, but I want to give you an extra incentive, so I also tell you that you'll lose everything you own if you get even a bit anxious. If you just stay relaxed, you won't lose everything you own, but if you get nervous (and I'll know it because you're wired up to this perfect machine), you're going to lose every single thing you own. So, just relax!

What do you think would happen? How do you think you'd feel?

The tiniest bit of anxiety would be terrifying. You'd naturally be saying "Oh, my gosh! I'm getting anxious! Here it comes!" BAMM – everything you own is gone!

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. If someone threatens to take away everything I own, I will not be able to help getting anxious even when told to stay relaxed
- b. Focusing on not experiencing difficult emotions paradoxically brings them on even more
- c. A really good polygraph machine can even pick up when I'm only a little bit anxious
- d. I can't get rid of difficult emotions even when someone else motivates me to do so

Question 3

Imagine a chessboard that goes out infinitely in all directions. It's covered with black pieces and white pieces. They work together in teams, as in chess – the white fight against the black pieces. So it seems that the way the game is played is that we select the side we want to win. We put the “good” pieces on one side, and the “bad” pieces on the other. Then we get up on the back of the black horse and ride to battle, fighting to win the war against the other side. It's a war game.

If you imagine that you're on one of these two teams and on the same level as these pieces, they can be as big or even bigger than you are. Somehow, even though it is not logical, the more you fight the bigger they get. As you fight these pieces they become more central to your life, more habitual, more dominating, and more linked to every area of living. The logical idea is that you will knock enough of them off the board so that you eventually dominate them – except that your experience tells you that the exact opposite happens. Apparently, the white pieces can't be deliberately knocked off the board because remember the chess board goes out infinitely in all directions. So the battle goes on. You feel hopeless, you have a sense that you can't win, and yet you can't stop fighting. If you're on the back of that black horse, fighting is the only choice you have, because the white pieces seem life threatening. Yet living in a war zone is no way to live.

Suppose you're not the chess pieces, or the player, but are the board. Without a board, these pieces have no place to be. The board holds them. The pieces need you. They cannot exist without you – but you contain them, they don't contain you. Notice that if you are the pieces, the game is very important, you've got to win, your life depends on it. But if you are the board, it doesn't matter whether the war stops or not. The game may go on, but it doesn't make any difference to the board. As the board, you can see all the pieces, you can hold them, you are in intimate contact with them; you can watch the war being played out in your consciousness, but it doesn't matter. It takes no effort.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. I will need to use chess-like strategies to beat my difficult emotions and thoughts
- b. The chess pieces will continue to fight against each other forever, with neither side winning because the board goes out in all directions infinitely. The pieces put in a lot of effort, but the board does not
- c. My thoughts, feelings, sensations, emotions, memories and so on are not me, just parts of me. I am bigger than my difficult emotions
- d. Chess pieces appear a lot smaller when compared to the size of the board

Question 4

Imagine that you selected a spot to plant a garden. You worked the soil, planted the seeds, and waited for them to sprout. Meanwhile, you started noticing a spot just across the road, which also looked like a good spot – maybe even a better spot. So you pulled up your vegetables and went across the street and planted your garden there. Then you noticed another spot that looked even better.

You can grow some things very quickly, but others require time and dedication. The question is, “Do you want to live on lettuce, or do you want to live on something more substantial – potatoes, beetroot, and the like?” You can’t find out how things work in gardens when you have to pull up stakes again and again.

Of course, if you stay in the same spot, you’ll start to notice its imperfections. Maybe the ground isn’t quite as level as it looked when you started, or perhaps the water has to be carried for quite a distance. Some things you plant may seem to take forever to come up. It is at times like this that your mind will tell you, “You should have planted elsewhere”, “This will probably never work”, “It was stupid of you to think you could grow anything here”, and so on.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. Planting vegetables in different spots results in different sorts of vegetables
- b. Constantly searching for perfection is the only way to achieve significant things
- c. If you keep moving the location of your vegetable garden, you’ll have to live on lettuce rather than potatoes and beetroot
- d. To achieve significant things, I may need to maintain a fixed course in the face of difficulties and discouraging circumstances

Question 5

Imagine that you are a soap bubble. Have you ever seen how a big soap bubble can touch smaller ones and the little ones are simply absorbed into the bigger one? Well, imagine that you are a soap bubble like that and you are moving along a path you have chosen. Suddenly, another bubble appears in front of you and says “Stop!” You float there for a few moments. When you move to get around, over, or under that bubble, it moves just as quickly to block your path. Now you have only two choices. You can stop moving in your valued direction, or you can touch the other soap bubble and continue on with it inside you.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. To achieve what I want to achieve, I need to confront and deal with the obstacles that may be in the way
- b. The only way for a bubble to avoid bursting is to stop or absorb smaller bubbles
- c. It's important to be wary of obstacles getting in the way of me achieving my goals
- d. A big bubble can not move around a smaller bubble; it can only stop or absorb the smaller bubble into it

Question 6

Imagine that you got a new house and you invited all the neighbours over to a housewarming party. Everyone in the whole neighbourhood is invited – you even put up a sign at the supermarket. So all the neighbours show up, the party's going great, and here comes Joe-the-Tramp, who lives behind the supermarket in the trash dumpster. He's stinky and smelly, and you think, "Oh no, why did he show up?" But you did say on the sign, "Everyone's welcome."

Can you see that it's possible for you to welcome him, and really, fully, do that without liking that he's here? You can welcome him even though you don't think well of him. You don't have to like him. You don't have to like the way he smells, or his life-style, or his clothing. You may be embarrassed about the way he's dipping into the punch or the sandwiches. Your opinion of him, your evaluation of him, is absolutely distinct from your willingness to have him as a guest in your home.

You could also decide that even though you said everyone was welcome, in reality Joe is not welcome. But as soon as you do that, the party changes. Now you have to be at the front of the house, guarding the door so he can't come back in. Or if you say, "Ok, you're welcome," but you don't really mean it, you only mean that he's welcome as long as he stays in the kitchen and doesn't mingle with the other guests, then you're going to have to be constantly making him do that and your whole party will be about that. Meanwhile, life's going on, the party's going on, and you're off guarding the tramp. It's just not life enhancing. It's not much like a party. It's a lot of work.

Circle what you think is the MOST appropriate meaning of this metaphor:

- a. Allowing some guests and not others to come to my party will probably mean I spend the whole party kicking unwanted people out rather than having fun
- b. Trying to avoid one negative experience will only result in other negative experiences, but being willing to have some negative experiences will allow me to have positive experiences as well
- c. The only way to stop unwanted guests from coming to my party is to not put a sign up at the supermarket inviting everyone
- d. It takes a lot of effort to avoid really difficult emotions, thoughts or situations

Therapeutic Metaphor Interpretation Test (T-MIT)

Response Record Sheet

Question	Responses			
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d

D-KEFS Proverb Test

Do not discontinue.

Condition 1:

Free Inquiry

Circle Score

Condition 2:

Multiple Choice

Circle Letter Choice/Score

		Accuracy Score	Abstraction Score	Total Achievement Score (Score 0 if Accuracy = 0)	0 Points		2 Points		4 Points	
					Phon	Unrel	Concrete		Abstract	
Common Proverbs (Items 1-5)	1. You can't judge a book by its cover.	0 1 2	0 2		b	a	d		c	
					0		2		4	
	2. Don't count your chickens before they are hatched.	0 1 2	0 2		c	b	d		a	
					0		2		4	
	3. Rome wasn't built in a day.	0 1 2	0 2		a	d	c		b	
Uncommon Proverbs (Items 6-8)					0		2		4	
	4. Too many cooks spoil the soup.	0 1 2	0 2		d	a	b		c	
					0		2		4	
	5. People who live in glass houses shouldn't throw stones.	0 1 2	0 2		a	c	b		d	
					0		2		4	
	6. An old ox plows a straight row.	0 1 2	0 2		d	c	a		b	
					0		2		4	
	7. A small leak will sink a large ship.	0 1 2	0 2		b	d	a		c	
					0		2		4	
	8. No bread is without a crust.	0 1 2	0 2		d	c	a		b	
					0		2		4	

Total
Accuracy
Score
Total
Abstraction
Score
Total
Achievement
Score

Free Inquiry

Total
Achievement
Score

Multiple Choice

APPENDIX E: ETHICS PAPERWORK

TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
HUMAN RESEARCH ETHICS APPLICATION GUIDELINES

07/029

Mr Alex Hains
52 William Street
KEIRAVILLE NSW 2500
p: 0416.149.529
e: ah310@uow.edu.au

27 February 2007

A/Professor Arthur Jenkins,
Chairperson
Health & Medical Human Research Ethics Committee
Faculty of Health & Behavioural Science
Department of Biomedical Sciences
University of Wollongong



Dear Associate Professor Jenkins and committee

Re: Research ethics application

I wish to submit this research ethics application as part of the Doctor of Psychology (Clinical) degree. A copy of the application has also been sent to the SESIAHS Research committee for review. I will forward a copy of the Area Health Service approval to the UOW HREC when it is available.

Please do not hesitate to contact me should you have any further inquiries about the proposed research.

Thank you for considering my application.

Kind regards,

Alex Hains
Clinical Psychologist

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Research Office use only

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UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE

HUMAN RESEARCH ETHICS COMMITTEE

**INITIAL APPLICATION FOR APPROVAL TO UNDERTAKE
RESEARCH INVOLVING HUMAN PARTICIPANTS
(A separate application is required for each project)**

Please answer questions in terms understandable to the layperson.

1. Descriptive Title of Project:

Metaphor comprehension in people with psychotic disorders

2. 7 line summary of project aims:

This study has two aims: 1. to develop a measure of the ability to interpret clinically-relevant metaphorical language; and 2. to evaluate the role of memory and abstraction skills in metaphor comprehension amongst people with psychotic disorders.

This is a pilot study for a project that will examine psychological factors that predict treatment outcomes from psychosocial therapies for people with psychotic disorders.

**3. Name Position/Appointment Institution Qualifications
Chief Investigator(s) (Academic or Professional)**

Mr Alex Hains student UoW BBS, PGDipAppPsync, MPsync(Clin)

Address for Correspondence (1st named investigator):

22 / 22-24 Victoria St, Wollongong NSW 2500

Contact Phone Number:

Email: ah310@uow.edu.au

Other Participating Researchers: (names/address/contact details of other researchers working on this project)

Dr Hamish McLeod Lecturer, School of Psychology UoW PhD

Contact Phone Number:

Email: hamish@uow.edu.au

4. Where will potential participants be approached by the researchers to seek their participation in the research and where will research activities involving participants be conducted:

Schizophrenia participants will be recruited through various Community Mental Health services of the SESIAHS. Five probable recruitment sites have been identified: Wollongong CMHT, Lake Illawarra CMHT, Nowra CMHT, the Wollongong Hospital Mental Health Inpatient Unit, and Fernhill Rehabilitation Centre, Fairy Meadow. Healthy control participants will be recruited through the Undergraduate Participant Pool Scheme.

Assessment and treatment activities involving participants will be conducted at various AHS facilities or Northfields Clinic, University of Wollongong.

Purpose and Funding of Project

5.a Is this: ☐ Staff Research (University of Wollongong)

☒ Staff Research (Illawarra Area Health Service)

☒ Student Research (Post grad. degree or subject)

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Course undertaken DPsyc(Clin)
 Unit/ Faculty/Department School of Psychology
 Supervisor Hamish McLeod
 _____ Other (Please specify e.g. for external people who want to research Uni
 students or IAHS clients)

5.b What is the source and amount of funding from all sources for this research?

Source (Name of Organisation / Funding Scheme)	Amount
none	none

5.c Is there any affiliation or financial interest between the sponsor/funding body and the researcher(s) or supervisor associated with this research? If Yes, Please declare.

not applicable – no funding

5.d Are there any conditions placed on this research by the funding body? (please provide details) YES/NO

not applicable – no funding

5.e Is a copy of the HREC approval to be forwarded to the Granting Body?

NA

If YES, please advise of any deadlines:

6. Has this research project been reviewed by any other Institutional Ethics Committee? (for example multi-centre research)

No

If YES, include a copy of any correspondence the sponsor or researcher has entered into with the other Ethics Committee(s) to this point.

7. Research Categories

Please mark the research categories relevant to this research proposal. See guidelines for descriptions of the categories. At least one category should be marked for each grouping. For "Other", please specify.

If your research only involves participants and research procedures from a-d under A Participants and B Research Procedures Used, it may be open to expedited review by the Chair of the HREC. In that case, submit only one copy of your application (please see guidelines regarding expedited review).

A Participants

- ☒ a. Healthy members of the community
- ☐ b. University students
- ☐ c. Employees of a specific company/organisation

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- d. Members of a specific community group, club or association
- e. Clients of a service provider
- ☒ f. Health Service clients (e.g. users/clients of a health service)
- ☐ g. School children
- ☒ h. Hospital in-patients
- ☒ i. Clinical clients (e.g. patients)
- j. Aboriginal/Torres Strait Islander people
- k. Members of socially disadvantaged groups
- l. Cadavers/ cadaveric organs
- m. Other: _____

Expected age(s) of participants – please circle one or more

Children (under 14)

Young people (14-18)

☒ Adults (> 18)

B Research procedures used

- ☐ a. Anonymous questionnaires/ surveys
- ☒ b. Coded (potentially identifiable) questionnaires/ surveys
- ☐ c. Identifiable questionnaires/ surveys
- d. Examination of student work, journals etc
- ☒ e. Examination of medical, educational, personnel or other confidential records
- ☐ f. Observation (overt)
- ☐ g. Observation (covert)
- ☒ h. Interviews (structured or unstructured)
- ☐ i. Telephone interviews
- j. Procedures involving physical experiments (e.g. exercise, reacting to computer images)
- k. Procedures involving administration of substances (e.g. drugs, alcohol, food)
- l. Physical examination of participants (including eg. blood glucose, blood pressure and temperature monitoring)
- m. Collection of body tissues or fluid samples
- n. Surgical procedures
- o. Other: _____

C Research areas

- a. Qualitative research
- b. Social Science research
- c. Humanities research
- d. Educational research
- ☐ e. Health research
- ☒ f. Psychological research
- ☐ g. Comparison or evaluation of drugs or surgical or other therapeutic devices
- ☒ h. Comparison or evaluation of clinical procedures
- ☒ i. Comparison or evaluation of counselling or training methods
- j. Investigation of the effects of an agent (drug or other substance)
- k. Investigation of bio-mechanical processes
- l. Biomedical research
- m. Epidemiology
- n. Genetic research
- o. Other: _____

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8.a Does the project involve the use of drugs?

No

If YES give details:

Is the research clarified as a:

CTN Trial

CTX Trial

Other (Please detail)

8.b Does the project involve the use of a surgical or other therapeutic device? (please detail)

No

8.c If you answered YES to 8a. or 8b., is there any business or similar association between the researcher and the supplier of a drug or surgical or other therapeutic device to be used in the trial? (please detail).

If you answered YES to 8a. or 8b., please include the budget for this trial including information about capitation fees, payments to researchers, institutions or organisations involved in the research, current and consequential costs and costs which may be incurred by participants.

Please include evidence of arrangements to ensure adequate compensation to participants for any injury suffered as a result of participation in the trial. (Indemnification forms and, if the research is being undertaken in a private practice, evidence of adequate and appropriate insurance coverage)

9. Justify the design of your proposed research and describe what you want participants to do. Please provide an explanation, in terms understandable by a non-expert reader. For student researchers, please provide (in no more than 2 pages) the background to this project (Attach extra sheets if necessary)

Background

It is well-established that people with schizophrenia exhibit general cognitive and specific memory deficits (Corcoran & Frith, 2003; Fioravanti, Carlone, Vitale, Cinti & Clare, 2005; Heydebrand, 2006). Memory deficits, in particular, have been shown to be common amongst schizophrenia patients and disproportionate to the overall intellectual impairment typically found in this population (Aleman et al., 1999).

Within the memory domain, *autobiographical memory* (AM) has been identified as a particular area of weakness amongst people with schizophrenia (Corcoran & Frith, 2003; Riutort, Cuervo, Danion, Peretti & Salame, 2003; Wood, Brewin & McLeod, 2006). AM is considered a subtype of episodic memory and provides a measure of the capacity an individual has to recollect personal events and facts from their life (Riutort et al., 2003). It has also been proposed that AM is involved in the understanding of abstract language, such as metaphors and proverbs (Corcoran, 1999). Corcoran (1999) found that schizophrenia patients made errors that suggested impaired AM, abstraction, and an inability to check that their interpretation was relevant to the context of the situation and speaker. These findings were consistent with other studies that found associations between severity of formal thought disorder in people with schizophrenia and poor understanding of metaphors (Drury, Robinson & Birchwood, 1998; Langdon, Coltheart, Ward & Catts, 2002).

Metaphorical language is commonly incorporated into everyday conversation (eg. 'too many cooks spoil the broth', 'let sleeping dogs lie'; Gibbs & Beitel, 1995; McCurry & Hayes, 1992), and so it is pertinent to investigate why some people are unable to understand such language. Also, the difficulties schizophrenia patients have understanding metaphors has the potential to become a barrier to the effectiveness of psychosocial treatments (Keefe, 1995). A relatively

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recently developed treatment, *Acceptance and Commitment Therapy* (ACT), relies heavily on the use of metaphors to explain its fundamental therapeutic principles (McCurry & Hayes, 1992). The originators of ACT – Hayes, Strosahl and Wilson (1999), provide many metaphor scripts to be used at various prescribed points in therapy to explain these principles. While preliminary studies provide some support for the use of ACT with schizophrenia patients, understanding the correct meaning of these metaphors is considered vital to successful outcomes. The degree to which patients' cognitive deficits affect the applicability of this treatment approach has not yet been investigated.

It is often proposed that the comprehension of metaphorical language also requires the capacity for *abstraction* (Corcoran, 1999; Gibbs & Beitel, 1995), which involves being able to generate solutions beyond the obvious and concrete (Lezak, Howieson & Loring, 2004). As mentioned, in the understanding of metaphors, one needs to deduce the intended meaning of the speaker in relation to the context of the conversation (Corcoran, 1999), which requires the ability to put yourself in the mind of others as well as yourself (Sperber & Wilson, 2002). Deficits in abstraction skills, such as this, have been found to account for approximately 39% of variance in metaphor interpretation, as measured by the Proverbs Tests (Brune & Bodenstein, 2005). As schizophrenia patients demonstrate particularly poor abstraction (Cancro, 1969; Glahn et al., 2000), this is one of the explanations for their poor performance on metaphor comprehension tasks.

It is theorised that *working memory* (WM) also plays a key role in metaphor comprehension by enabling the two components of AM – (1) an autobiographical knowledge base, and (2) an autobiographical memory retrieval system – to work together (Conway & Pleydell-Pearce, 2000; Maruszewski, 2005). Glahn et al. (2000) found that while schizophrenic patients performed significantly worse than healthy controls on higher-level tasks generally, the addition of a minimal WM requirement disproportionately exaggerated their impairment.

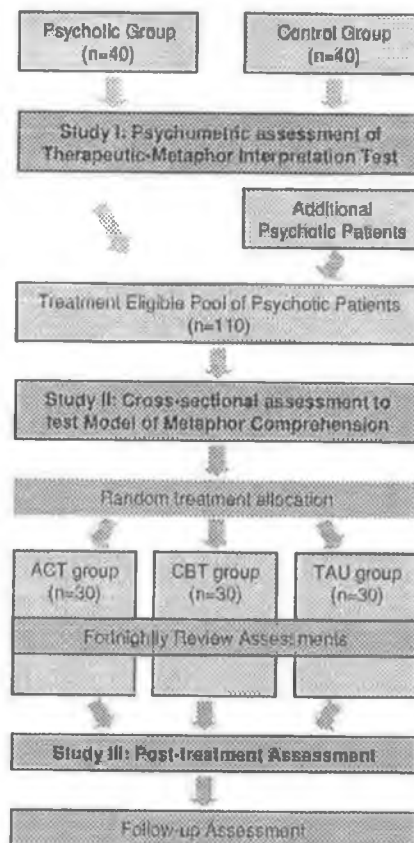
There are a number of tests available for measuring a person's ability to understand the correct abstract meaning of metaphorical language (Gorham, 1956; Delis, Kaplan & Kramer, 2001; Bottini et al., 1994). In the development of these tests, the importance of using metaphors not commonly used in everyday communication was emphasised. It was argued that this would minimise the confounding influence of previous exposure to the metaphors included in the test (Bottini et al., 1994). While this consideration enables a less ambiguous assessment of the cognitive ability to interpret metaphorical language, it has not been determined whether an individual's performance on these tests would translate to their ability to comprehend metaphors that are used in psychological therapy. Currently, there are no tests that measure a patient's ability to comprehend the meaning of therapy-relevant metaphors.

Purpose of this research

This study aims to address some of the omissions in the current literature by (1) developing a measure of patients' ability to interpret clinically-relevant metaphorical language, and (2) evaluating a model outlining the role of factors that impact on metaphor comprehension. This study is pilot work for a bigger project that will then test this model of metaphor comprehension against actual treatment outcomes from psychosocial therapies for people with schizophrenia. Participants with schizophrenia who complete Study I (n=40) will be considered for inclusion in the subsequent phases (Study II and III).

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Research design



See Appendix A for outline of measures to be used at the various stages of this research.

10. Please provide a brief statement of the ethical considerations relevant to the proposed research; specifically in relation to the participants' welfare, rights, beliefs, perceptions, customs and cultural heritage both individual and collective. (Attach an extra sheet if necessary)

The study procedures are non-invasive and there are no reports in the literature that completion of the proposed tests produce undue distress. However, the participants will be required to devote their time (around 90 minutes) and exert a mild degree of effort to complete the tasks. This will be made clear in the consent procedures and it will be emphasised that participation is voluntary and that it is possible to withdraw at any point without adverse consequences.

Participants are not expected to experience any adverse effects during or after testing. However, the principal researcher is a clinical psychologist and will provide appropriate debriefing should clients desire this. Only patients who are capable of giving informed consent (as deemed by their mental health case manager and/or carer) will be involved in this research. All schizophrenia participants will be in the care of the mental health services, and any risk issues identified during the assessment will be referred to the relevant services within their area.

In addition, all appropriate attention will be given to any cultural issues arising and related customs and beliefs.

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- 11. Referring to the categories of participants to be involved in this project identified in question 7, above, What is the rationale for selecting participants from this/these group/s?**

Improving the understanding and care of people with schizophrenia is an important ongoing challenge for applied clinical psychology research. Previous studies have indicated that individuals with psychotic disorders have difficulty with abstraction and some aspects of memory. Recently developed psychological treatments that depend heavily on the use of metaphorical language are being introduced as a treatment option for people with psychotic symptoms. We are examining whether the cognitive deficits typical of people with schizophrenia will impact on their capacity to benefit from these treatment approaches.

The development of the clinically-relevant metaphor test also requires us to compare the performance of those with a psychotic disorder to those without. Therefore, a healthy control sample will also be recruited for the initial phase of the research.

- 12. How will potential participants be approached initially and informed about the project? Please explain in detail and include copies of any letters, advertisements or other recruitment information. (e.g. direct approach to people on the street, mail-out to potential participants through an organisation, posters or newspaper advertisements, etc)**

Study information sheets will be distributed to mental health staff involved in the care of potential participants. The health staff will discuss participation with their patient gaining verbal consent for the researcher to contact the patient directly or, if the patient prefers, they will be given the option of contacting the researchers independently. In the former case, once the health staff member has contacted the primary researcher to activate the referral, the researcher will contact the patient directly to organise a suitable time and place for the assessment to take place.

When talking to the researcher, the participant will have the opportunity to ask questions about the study. Ample opportunity will be provided for the patient to ask questions before they sign consent to participate.

Healthy control participants will be recruited via the School of Psychology Undergraduate Participant Pool Scheme. Information about the study will be placed on the psychology notice board, and students interested in participating will contact the researchers directly to organise a time and place to meet. All relevant information will be approved by the School of Psychology and Doug Cornford (Undergraduate Participation Coordinator) prior to commencing any such recruitment.

- 13. How many participants in total do you anticipate will be involved in the project? If the research has several stages involving different participants, please provide the total number of participants expected as well as the number of participants involved in each stage.**

Approximately 40 psychotic participants and 40 healthy participants will participate in Study I. The healthy participants will not be involved in the latter studies. Studies II and III will involve approximately 110 psychotic participants, including the 40 who participate in the initial study (provided the T-MIT does not require major revisions).

- 14. Participant Consent**
Attach copies of any letters of invitation, information packages, consent forms, proxy/substitute consent forms, debriefing information, identification cards, contact detail cards, etc.

- 14 a. Is it anticipated that all participants will have the capacity to consent to their participation in the research?**

Yes

**TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
HUMAN RESEARCH ETHICS APPLICATION GUIDELINES**

If NO, please explain why (e.g. children, incompetent participants, etc.) and explain how proxy or substitute consent will be obtained from the person with legal authority to consent on behalf of the participant (see Guidelines).

- 14 b. For participants who have the capacity to consent, how does the process ensure that informed consent is freely obtained from the participant?**

The procedures and the planned use of the data will be explained clearly and the participant will be offered the opportunity to ask questions. There is no deception involved in the study. Participants will be encouraged to discuss their involvement with a third party who has their interests in mind if they wish. Potential participants will be given an information sheet and consent form. They will be advised verbally and in writing that they are under no obligation to participate and that if they do agree, they can withdraw at any time with no adverse consequences.

- 14 c. Will written consent from participants be obtained?**

Yes

If NO, please explain why it would be inappropriate or unethical to seek written evidence of consent to this project.

- 15. Are any participants in a dependant relationship with the researcher, the institution or the funding body (for example the researcher's clinical clients or students; employees of the institution; recipients of services provided by the funding body)? If so, what steps will be taken to ensure that participants are free to participate or refuse to participate in the research?**

No. No funding complications.

- 16. How does the project address the participants' freedom to discontinue participation? Will there be any adverse effects on participants if they withdraw their consent and will they be able to withdraw data concerning themselves if they withdraw their consent?**

Participants will be informed at the beginning of the study that they are free to withdraw from the study at any time. Withdrawal of participation can be done without any adverse physical or psychological consequences.

- 17. Does the project involve withholding relevant information from participants or deceiving them about some aspect of the research?**

No

If YES, what is the justification for this withholding or deception and what steps will be taken to protect the participants' interest in having full information about their participation?

- 18. Will participants be paid or offered any form of reward or benefit (monetary or otherwise) for participation in the research? If so, please detail and provide a justification for the payment, reward or benefit.**

No monetary benefits to participants are planned.

- 19. Confidentiality:**

What measures will be taken to protect the privacy of individual subjects in terms of the test results and other confidential data obtained (both in recording the data and in its publication)?

**TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
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Participant responses will only be identified by a study code. The key for the study codes will be stored separately from the primary data. All reported data will be anonymous and in the form of group means and other summary data. No individual will be identified in subsequent publications or other presentation of the results.

20. Will information collected from data or interview be published?

Yes

If YES, please indicate what form this will take (Please note that any further use of information which may identify a participant is conditional upon the participant's permission for such use):

Journal article

21. Will any part of the research activities be placed on an audiotape, film, photograph or video-tape?

Yes

To what purpose will the audiotape, film, photograph or video-tape be used?

For what audience(s) will the audiotape, film, photograph or video-tape be exhibited?

Responses on the Autobiographical Memory Test will be recorded for subsequent determination of inter-rater reliability.

22. How will the data (including questionnaires, surveys, computer data, tapes, transcripts and specimens) be held securely, during and on completion of the project?

Please confirm that original data will be held securely for a minimum of 5 years (15 years for clinical research).

Yes

If NO, please give reasons why it would be unethical to store the data for this period.

23. Does the project involve the use of invasive procedures (e.g. blood sampling) or the risk of physical harm or emotional distress?

No

If YES, give details:

Explain how the risks of harm or distress will be minimised. In the case of risks of emotional distress, what provisions have been made for an exit interview or the necessity of counselling?

24. Does this project involve obtaining information (e.g. data) of a private nature from any Commonwealth/State/Local Government Department or any other Agency, including health records from Area Health Services.

Yes

If YES, which Department (s)/Agency?

SESAHS Mental Health service file records.

**TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
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Please include copies of any correspondence regarding permission to access this information from a responsible officer of the Agency and complete a Privacy Guideline Form (available from Ethics Officer).

25. Does the research intend to determine whether illegal activity has occurred or anticipate that participants may reveal information about criminal activity?

No

If YES, how do you propose to respond to the legal issues raised?

26. Period of Research Clearance Requested (Please specify as near as possible 'start' and 'finish' dates for the conduct of research):

FROM: 01/02/2007

TO: 01/07/2008

27. Any research project that involves the collection of data should be designed so that it is capable of providing information that can be analysed to achieve the aims of the project. Usually, although not always, this will involve various important statistical issues. It is important that the design and analysis be properly planned in the early stages of the project. You should seek statistical advice. The University of Wollongong has a Statistical Consulting Service that provides such advice to research students and staff undertaking research.

Are statistical issues relevant to this project?

Yes

If so, have you discussed this project with the Statistical Consulting Service?

No, but the study design and analysis strategies have been discussed with one of the School of Psychology statistics consultants.

28. Does this project involve the collection or use of personal health information or information relating to the provision of a health service to an individual? This includes general information such as a gymnasium would collect as well as information collected for a medical purpose.
If so, you need to complete the Initial Application Form Part 2 – Privacy Addition for Health Information. For additional information regarding this please read the document 'Health Records and Privacy Act' and the NSW Privacy Commissioners' Statutory guidelines on research. Both documents are available from the HREC webpage.

No

29. Comments. If you would like to make any comment about the application or the application process please do so.

TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
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DECLARATION BY CHIEF INVESTIGATOR

I, the undersigned, have read the current National Statement on Ethical Conduct in Research Involving Humans:

<http://www.health.gov.au/nhmrc/publications/synopses/e35svn.htm>

and accept responsibility for the conduct of the research activities detailed in this application in accordance with the principles contained in the National Statement and any other conditions laid down by the University of Wollongong's Human Research Ethics Committee.

Chief Investigator's signature/s:

Date: 27.02.07

If the Chief Investigator is a student include:

Supervisor's signature:

Date: 27.2.07

Signature/s of other researcher/s: (The first named researcher will assume responsibility for the project in the absence of the Chief Investigator)

Date:

DECLARATION BY HEAD OF UNIT

As Head of Unit I have responsibility for ensuring that Occupational Health and Safety (OHS) issues surrounding research in the Unit are addressed.

(please tick all relevant boxes)

- ☒ I am satisfied that a general risk assessment for the research project addressed in this application has been completed adequately
- ☐ I will ensure that a risk assessment specific to this application will be completed prior to commencing the activities described in this application
- ☐ I will ensure that there exist appropriate mechanisms to address potential OHS issues that may arise and I have responsibility for implementing those mechanisms
- ☐ I will ensure that mechanisms exist for ongoing assessment of the OHS issues related to this research
- ☐ This research involves use of radiation, chemicals or biohazards. A Risk Assessment has been conducted and is attached to this application

Head of Unit's Signature..

.....Date..... 27/2/07

<p>NOTE: RESEARCH MUST NOT COMMENCE UNTIL APPLICATION HAS BEEN FULLY APPROVED.</p>

**TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
HUMAN RESEARCH ETHICS APPLICATION GUIDELINES**

CHECKLIST

Applications should be sent to the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong, Northfields Ave, Wollongong NSW 2522

- _____ **Original Ethics Application plus appropriate number of copies (See Guidelines)**
- _____ **Consent Form(s)**
- _____ **Participant Information Sheet/Package**
- _____ **Copies of Questionnaire(s)/Survey(s) or Interview Questions**
- _____ **Copies of all documents and other material used to inform potential participants about the research including advertisements and letters of invitation.**
- _____ **Evidence of permission to conduct research in locations not associated with the University of Wollongong**
- _____ **Evidence of approval/rejection by other HREC(s), including comments and requested alternations to the protocol**
- _____ **Any form requiring signature by the HREC (one copy)**
- _____ **For Clinical Trials : Application Form (original +14 copies), Patient Information Package (14 copies), Consent Forms (14 copies), Indemnity Form (14 copies), Protocols (14 copies), Advertisement (14 copies), Summary Sheet (14 copies), Budget (14 copies), Insurance information (if in Private Practice) (14 copies), Investigator's Brochure (5 copies), CTN or CTX Form (1 original copy)**

Form Revised Jan 2003

TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE HUMAN RESEARCH ETHICS APPLICATION GUIDELINES

APPENDIX A

	FOCUS	TEST	TIME	STUDY I	STUDY II	STUDY III †			
						pre-Rx	mid-Rx	post-Rx	follow-up
Psychosis	Positive psychotic symptoms	Psychotic Symptom Rating Scales (PSYRATS)	20		•	•	•	•	•
	Negative psychotic symptoms	Positive and Negative Symptom Scale (PANSS - N subscale)	10		•	•	•	•	•
	Mood	Calgary Depression Scale for Schizophrenia (CDSS)	10	•†	•	•	•	•	•
	Social functioning	Social Behaviour Schedule (SBS)	15-30			◻		◻	◻
IQ & Memory	Intelligence	Wechsler Test of Adult Reading (WTAR)	5		•				
	Working memory	WMS-III Letter-Number Sequencing	5		•				
		WMS-III Spatial Span	10		•				
	Autobiographical memory	Autobiographical Memory Interview (AMI)	20		•				•
Abstraction	Learning	WMS-III List Learning	15		•				
	Metaphor interpretation	Plausible/Implausible Metaphor Test	10	•	•			•	•
		D-KEFS Proverbs Test	15	•	•			•	•
		Therapeutic Metaphor Interpretation Test (T-MIT)	15	•	•			•	•
General	Hospitalisation rates	Sci-MHOAT (past 5 years)	-		•†			•	•
	Psychological treatment history	Self-report			•				•
	Medication	Current dose & compliance	5		•	•	•	•	•
	Age at onset	Self-report & file records			•†				
	Ethnicity	Self-report			•				

• administered by clinician / researcher

◻ administered by case manager / carer

† for schizophrenia participants only (ie. not health controls)

**INITIAL REVIEW - RESPONSE REQUESTED**In reply please quote: **HE07/029**

Further Information Phone: 4221 4457

27 March 2007

Mr Alex Hains
22 / 22-24 Victoria Street
Wollongong
NSW 2500

Dear Mr Hains,

The HREC has **REVIEWED** your application in accordance with the *National Statement on Ethical Conduct in Research Involving Humans*.

Ethics Number: HE07/029
 Project Title: Metaphor comprehension in people with psychotic disorders.
 Researchers: Mr Alex Hains, Dr Hamish McLeod
 Reviewed Date: 15 March 2007

The Committee agreed that more information is needed before Phases 2 and 3 can be considered. Phase 1 of the study can be approved if the Executive Committee receives a satisfactory response to the following items:

- i. You will need approval from each of the Mental Health Services, please forward copies of the letters of approval from the Mental Health Services involved. Please note that you will also need approval from the SESIAHS, who may require that the project include an investigator who is employed by the SESIAHS.
- ii. The tasks involved are quite long and complex and could be distressing for the participants. Would it be possible for the participants to complete the instruments over more than one session?
- iii. The Participant Information Sheet (PIS) needs to state exactly what will be involved if people agree to participate. This should include some form of listing of all the tasks involved and how long they are expected to take, an indication of any risks (eg distress) which may be involved, and details about any follow up support that is available. The HREC contact should be the Ethics Manager. Please see the guidelines and examples provided at the following URL:
<http://www.uow.edu.au/research/rso/ethics/UOW009383.html>
- iv. The consent form also needs to state the risks involved and exactly what they are consenting to (eg filling in a number of surveys)
- v. The PIS states that the tasks will take 40 minutes to complete, however in your response to Q10 you state that it will take 120 minutes. Please clarify.
- vi. The two groups involved should receive PISs appropriate to their involvement. Please provide a separate PIS for the schizophrenic participants.
- vii. The Committee is concerned that there is the potential for participation to cause distress, in which case follow up support will be required. Please provide details of any follow up support that will be provided, or explain why it is not necessary.
- viii. Will debriefing be offered to all participants?



- ix. Please clarify who the 'healthy members of the public' are in your answer to Q7. Does this refer to the control group of University students? ✓
- x. There is a recruitment notice for the Uni students; should there be another one for the participants with the disorders? ✓
- xi. The Committee was concerned that question 2 of the T-MIT (Patient's copy) is very confronting, and could cause unnecessary anxiety. Is this question necessary? Would it be possible to use a less personal scenario? ✓
- xii. Please provide more details about how the questionnaires are being distributed, and where they are going to be completed. ✓
- xiii. Will there be anyone helping participants complete the questionnaires? ✓
- xiv. Please provide revised PIS and consent forms back to the VIREC Executive. ✓

Please send a written response to the Ethics Officer, Research Services Office, University of Wollongong. The response can be emailed to eves@uow.edu.au. This response will be reviewed by the Executive Committee and can be submitted at any time, you do not need to consider the agenda deadline for the next meeting of the full Committee.

Yours Sincerely,

A/Professor Garry Hoban
Chairperson
Human Research Ethics Committee

Cc: Dr Hamish McLeod, Department of Psychology

checked
8/20/12

TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
HUMAN RESEARCH ETHICS APPLICATION GUIDELINES

Mr Alex Hains
52 William Street
KEIRAVILLE NSW 2500

e: ah310@uow.edu.au

13-6-07

5 December 2007

A/Professor Garry Hoban,
Chairperson
Human Research Ethics Committee
Faculty of Education
University of Wollongong

Dear A/Professor Hoban and committee

Re: HE07/029 Metaphor comprehension in people with psychotic disorders

Thank you for reviewing my research ethics application on 15 March 2007. I submit the following in response to the concerns raised (see your letter dated 27 March 2007 for the corresponding item numbers).

- i. Approval for this project has been attained from Monica Taylor, Network Director, Southern Network Mental Health Services (see attached letter). The principal researcher, Alex Hains, is a permanent employee of SESIAHS who works in most of the Mental Health facilities where participants will be recruited.
- ii. The PISs have been adjusted to inform participants of the anticipated length of the assessments, and their right to complete the testing over more than one appointment or with a reasonable break in the middle. This is to accommodate any distress they may experience as a result of the length and complexity of the testing.
- iii. Information outlining more specifically what is involved in participating in this research has been incorporated into the PISs. The purpose and tasks of the assessment have been described, and the availability of follow up support will be emphasised on the PISs as well as verbally.

*TO BE READ IN CONJUNCTION WITH THE UNIVERSITY OF WOLLONGONG/ILLAWARRA AREA HEALTH SERVICE
HUMAN RESEARCH ETHICS APPLICATION GUIDELINES*

- iv. In addition to emphasising the availability of follow up support (see point iii), all participants will be explicitly told that they are able to withdraw from this research at any point if they should begin to feel distressed or upset.
- v. It seems that an administrative error has meant the HREC did not receive the full application package, which included separate PISs for the control group (UoW psychology undergraduates) and the experimental group (AHS psychotic patients). The PIS for UoW students states the assessment will take approximately 40 mins as they are only involved in Study I. This assessment involves fewer tests and so is expected to take less time. The AHS patients will receive a PIS that states their assessment will take around 90 minutes (as echoed in the ethics application). Their testing will take more time as these participants will also be involved in Study II, which incorporates more tests.
- vi. An administrative error meant the HREC did not receive the complete application package (see point v).
- vii. Participants are not expected to experience any adverse effects during or after testing. However, the principal researcher is a clinical psychologist and will provide immediate debriefing should clients desire this. All schizophrenia participants will be in the care of the mental health services, and any risk issues identified during the assessment will be referred to the relevant services within their area. In addition, participants will be given the opportunity to discuss the research and ask any questions at the completion of their participation.
- viii. (see point vii)
- ix. 'Healthy members of the community' has now been amended to 'university students' as advised.
- x. Schizophrenia participants will be recruited via their case managers rather than posters. It is hoped that this will ensure more appropriate referrals (see Staff Information Sheet).
- xi. In consideration of the possibility that participants might be distressed by the second metaphor featured in the T-MIT, that question has been modified. Instead of using a hypothetical "gun to the head", the threat is now "you will lose everything you own". We would like to emphasise to the committee that metaphors of this type are used

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commonly in ACT treatment and so it is relevant for us to empirically examine how patients interpret them.

- xii. Please see attached outline of the procedures for each Study (page 5 for Study I, and page 7 for Study II).
- xiii. All data will be gathered via clinical interview/testing, to be conducted by an AHS clinical psychologist. Information regarding social functioning will be gathered during Studies II & III by the patients' case manager or carer. The researcher will be available throughout to monitor the participants' progress and provide clarification where necessary.
- xiv. See revised PIS and consent forms attached, as requested.

Please do not hesitate to contact me should you have any further inquiries about the proposed research.

Thank you for considering my application.

Kind regards,

Alex Hains
Clinical Psychologist

**SOUTH EASTERN SYDNEY
ILLAWARRA
NSW HEALTH**

Mental Health Executive Administration
Level 3, Block C, Wollongong Hospital
Locked Mail Bag 8808
South Coast Mail Centre 2521
Facsimile: (02) 4253 4313

3 September 2007

Mr Alex Hains
Community Mental Health
1-5 Atchison Street
WOLLONGONG NSW 2500

Dear Alex

Re: Trial of Psychological Treatments in Psychosis (ToP TiP) research project
(UoW reference: HEO7/029 Metaphor comprehension in people with psychotic disorders)

Thank you for your letter clarifying some aspects of this research proposal.

I am pleased to inform you that the ToP TiP project has been approved to be conducted within the relevant mental health services, subject to final approval by the University of Wollongong HREC.

Yours sincerely

Monica Taylor
Network Director
Southern Network Mental Health Service

cc Dr Hamish McLeod – Research Supervisor, School of Psychology, UoW

South Eastern Sydney and Illawarra Area Health Service
Locked Mail Bag 8808 South Coast Mail Centre NSW 2521
Level 8 Block C Wollongong Hospital
Tel (02) 4253 4861 Fax (02) 4253 4878
ABN 78 390 886 131

University of Wollongong

**INITIAL APPLICATION APPROVAL****In reply please quote: HE07/029**

Further Enquiries Phone: 4221 4457

18th December, 2007

Mr Alex Hains
52 William St
Keiraville NSW 2500

Dear Mr Hains,

Thank you for your response dated 5th December, 2007 to the HREC review of the application detailed below. I am pleased to advise that the application has been **approved**.

Ethics Number: HE07/029

Project Title: *Metaphor comprehension in people with psychotic disorders*

Researchers: Mr Alex Hains, Dr Hamish McLeod

Approval Date: 13th December, 2007

Expiry Date: 12 December 2008

The University of Wollongong/SESIAHS Humanities, Social Science and Behavioural HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*. The HREC has reviewed the research proposal for compliance with the *National Statement* and approval of this project is conditional upon your continuing compliance with this document. As evidence of continuing compliance, the Human Research Ethics Committee requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete monitoring reports annually and at the end of your project. These reports are sent out approximately 6 weeks prior to the date your ethics approval expires. The reports must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

Yours Sincerely,

A/Professor Garry Hoban

Chairperson**Human Research Ethics Committee**

cc: Dr Hamish McLeod, Department of Psychology



UNIVERSITY OF WOLLONGONG
HUMAN RESEARCH ETHICS COMMITTEE
PROGRESS / RENEWAL REPORT

HREC Approval No: HE07/029

Expiry Date: 12 December 2008

Project Title: Metaphor comprehension in people with psychotic disorders

Chief Investigator: Mr Alex Hains

General Notes and Conditions

The National Statement on Ethical Conduct in Research Involving Humans requires institutions to monitor research projects involving human participants to ensure that they are conducted ethically and in compliance with the HREC approval for that project, including any conditions placed on that approval.

For the most part, the monitoring requirement will be satisfied by the chief investigator:

- o notifying the HREC immediately of any serious or unexpected adverse effects on participants;
- o notifying the HREC of any proposed changes to the protocol or procedures to be used in the research;
- o notifying the HREC of unforeseen events that might affect continued ethical acceptability of the project;
- o providing the HREC with an annual report on the project; and
- o providing the HREC with a report at the completion of the project.

In special circumstances the HREC may ask for more frequent reports and may require additional monitoring if it considers this necessary to ensure that the project continues to conform to ethical standards. While the principal objective of monitoring is to ensure that the rights and interests of human participants are not jeopardised, it is also concerned to foster responsible research.

This form is to be used for:

- o Reports of serious or unexpected adverse effects on participants;
- o Reports of proposed changes to protocols/projects;
- o Reports of unforeseen events that might affect ethical acceptability of projects;
- o Annual reports on approved research project;
- o Request for renewal of approval; and
- o Final reports on projects at the completion of research

Please complete this report referring back where necessary to your application for ethics clearance, which is the approved protocol, and any special conditions imposed by the HREC. If there is insufficient space to answer any question please attach a separate sheet. If a question does not apply to your research please write "N/A" or "not applicable" in the space provided.

Please return your completed report within 14 days to the Human Research Ethics Officer, Research Office, University of Wollongong, Wollongong NSW 2522 (Ph: 4221 4457; Fax: 4221 4338).

TO BE COMPLETED FOR ALL RESEARCH PROJECTS INVOLVING HUMAN PARTICIPANTS.

Please tick where appropriate.

1. Purpose of this report (tick as many as are appropriate):

- ☐ Report of serious or unexpected adverse effects on participants
☐ Report of proposed changes to the protocol/project
☐ Report of unforeseen events that might affect ethical acceptability of the project
☐ Annual report on approved research project
☒ Request for renewal of approval
☐ Final report on project
-

2. Status of Research Project

- ☐ Completed (date) _____
☐ In progress. Anticipated completion date of Research Project _____
☒ Renewal of approval requested until (date) 15 January 2010
☐ Commenced but abandoned on (date) _____
 (please give below brief reasons why the project was abandoned, then sign and return this report.)
-

3. Report on ethical aspects of project to date (or outcome in the case of completed research).
 Please detail method of contact with subjects, number of subjects involved, and the nature of their involvement in the research. Please comment on whether the research has complied with the approved protocol and any conditions of that approval from the HREC.

The project has recruited eight healthy control participants via the UoW student research participation scheme. The process of recruitment and the conduct of the study has conformed to the approved protocol and no ethical problems have been encountered thus far.

4. In the conduct of this project have there been any variations to the approved protocol/project in respect of:

* Investigators	Yes	<input type="radio"/> No
* Duration of Project (e.g. 1 year, 3 years)	Yes	<input type="radio"/> No
* Research procedures (e.g. study design, sample size, source & method of recruitment, information & consent forms)	Yes	<input type="radio"/> No
* Participant care & feedback	Yes	<input type="radio"/> No

If you have answered YES to any part of this question:

* Has the HREC been previously notified of this event?	Yes	No
--	-----	----

Please provide brief details of the reasons for variations and how you will accommodate any problems they may pose for your research.

For Multicentre research, please provide a list of the Protocol Amendment numbers relevant to the research and a summary of the amendments for the year to date.

5. Are any variations to the approved protocol/project proposed? If so, please detail below, noting that they must be approved by the HREC (attach an extra sheet if needed).

Not applicable.

6. Since your project commenced, how many participants have "dropped out"/withdrawn their consent?

0

Briefly list the reasons (if known) for participants dropping out/withdrawing from the project.

7. To the best of your knowledge, have any participants encountered adverse effects while participating in your research project? (e.g. side-effects of drugs or procedures, or other phenomena)

Yes

No

If YES: Number of participants involved _____

Briefly list adverse effects (attach and extra page if necessary).

For Multicentre research please attach a list and summary of Serious Adverse Event reports (for Australia only) relevant to this research for the year to date.

Were all these effects anticipated in the Consent documents

Yes

No

Have these adverse effects been previously reported to the HREC?

Yes

No

What other action has been taken in response to these adverse effects?

8. Have there been any other unforeseen incidents or complaints about the research that might affect the continued ethical acceptability of the project? (e.g. reactions to questionnaires or psychological tests)

Yes

No

If YES: Number of participants involved _____

Briefly list the incidents or complaints.

Have these events been previously reported to the HREC?

Yes

No

What other action has been taken in response to these incidents or complaints?

9. Please comment on the methods used to store research data and any other personal information associated with this research

All data stored in accordance with the Health Records and Information Privacy Act 2002, in a locked filing cabinet without any associated identifying information.

Have you encountered any problems associated with security and storage of data?

(All primary data must be retained for a period of at least five years to conform with the University's Code of Practice- Research.)

Yes

No

If YES, give details.

10. Is your research project a CTN* or CTX* drug trial?

Yes

No

*CTN = Clinical Trial Notification: CTX = Clinical Trial Exemption

If YES:

Have unused supplies of the trial drug been collected from participants?

Yes

No

Not applicable

Please attach one copy of the current information and consent package for this trial.

COMMENTS: Comments from you on ethical aspects relating to your research are very welcome.

DECLARATION:

I certify that the information provided by me in this Progress Report is an accurate account of the conduct of the above research project for which I am responsible and a copy of the Consent Form and Information Sheet used for this project is attached.

Alex Hains

Clinical Psychologist

Signed (Chief Investigator) _____

Date 19/11/08

If Student is Chief Investigator, then Supervisor's signature is also required.

Supervisor _____ (Name- Please Print) HAMISH McLEOD

Unit/ Faculty Psych. / HBS

Date 25/11/08

ALL REPORTS MUST BE SIGNED BY THE HEAD OF DEPARTMENT/UNIT

Head of Unit _____

Date 1/12/08

COPY

University of Wollongong

**RENEWAL APPROVAL****In reply please quote: HE07/029**

Further Enquiries Phone: 4221 4457

3 December 2008**Mr Alex Hains
22 / 22-24 Victoria Street
Wollongong
NSW 2500**

Dear Mr Hains,

I am pleased to advise that **renewal** of the following Human Research Ethics application has been **approved**. This certificate relates to the research protocol submitted in your original application and all approved amendments to date.

Ethics Number: HE07/029
Project Title: Metaphor comprehension in people with psychotic disorders.
Name of Researchers: Mr Alex Hains, Dr Hamish McLeod
Approval Date: 13 December 2008
Expiry Date: 12 December 2009

Please remember that in addition to completing an annual report the Human Research Ethics Committee requires that researchers immediately report:

- ♦ proposed changes to the protocol including changes to investigators involved
- ♦ serious or unexpected adverse effects on participants
- ♦ unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete a monitoring report at the end of your project. This report will be sent out approximately 6 weeks prior to the date your ethics approval expires. The report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office.

Yours sincerely

PP A/Professor Steven Roodenrys
Chair, Human Research Ethics Committee

cc: Dr Hamish McLeod, Department of Psychology

Research Services Office University of Wollongong NSW 2522 Australia
Telephone: +61 2 4221 3386 Facsimile: +61 2 4221 4338
research_services@uow.edu.au www.uow.edu.au/research
CRICOS Provider No. 00102E

UNIVERSITY OF WOLLONGONG
HUMAN RESEARCH ETHICS COMMITTEE
PROGRESS / RENEWAL REPORT



Renewal approved

HREC Approval No: HE07/029

Expiry Date: 15 January 2010

Project Title: Metaphor comprehension in people with psychotic disorders

28/1/10

Chief Investigator: Mr Alex Hains

General Notes and Conditions

The National Statement on Ethical Conduct in Research Involving Humans requires institutions to monitor research projects involving human participants to ensure that they are conducted ethically and in compliance with the HREC approval for that project, including any conditions placed on that approval.

For the most part, the monitoring requirement will be satisfied by the chief investigator:

- o notifying the HREC immediately of any serious or unexpected adverse effects on participants;
- o notifying the HREC of any proposed changes to the protocol or procedures to be used in the research;
- o notifying the HREC of unforeseen events that might affect continued ethical acceptability of the project;
- o providing the HREC with an annual report on the project; and
- o providing the HREC with a report at the completion of the project.

In special circumstances the HREC may ask for more frequent reports and may require additional monitoring if it considers this necessary to ensure that the project continues to conform to ethical standards. While the principal objective of monitoring is to ensure that the rights and interests of human participants are not jeopardised, it is also concerned to foster responsible research.

This form is to be used for:

- o Reports of serious or unexpected adverse effects on participants;
- o Reports of proposed changes to protocols/projects;
- o Reports of unforeseen events that might affect ethical acceptability of projects;
- o Annual reports on approved research project;
- o Request for renewal of approval; and
- o Final reports on projects at the completion of research

Please complete this report referring back where necessary to your application for ethics clearance, which is the approved protocol, and any special conditions imposed by the HREC. If there is insufficient space to answer any question please attach a separate sheet. If a question does not apply to your research please write "N/A" or "not applicable" in the space provided.

Please return your completed report within 14 days to the Human Research Ethics Officer, Research Office, University of Wollongong, Wollongong NSW 2522 (Ph: 4221 4457; Fax: 4221 4338).

TO BE COMPLETED FOR ALL RESEARCH PROJECTS INVOLVING HUMAN PARTICIPANTS.

Please tick where appropriate.

1. Purpose of this report (tick as many as are appropriate):

- ☐ Report of serious or unexpected adverse effects on participants
☐ Report of proposed changes to the protocol/project
☐ Report of unforeseen events that might affect ethical acceptability of the project
☐ Annual report on approved research project
☒ Request for renewal of approval
☐ Final report on project

2. Status of Research Project

- ☐ Completed (date) _____
☐ In progress. Anticipated completion date of Research Project _____
☒ Renewal of approval requested until (date) ____15 January 2011_____
☐ Commenced but abandoned on (date) _____
 (please give below brief reasons why the project was abandoned, then sign and return this report.)

3. Report on ethical aspects of project to date (or outcome in the case of completed research). Please detail method of contact with subjects, number of subjects involved, and the nature of their involvement in the research. Please comment on whether the research has complied with the approved protocol and any conditions of that approval from the HREC.

The project has completed testing of the healthy control participants (n=45) via the UoW student research participation scheme. We have also commenced testing of the experimental (psychotic) participants (n=6) via the Wollongong Hospital Mental Health Unit. The process of recruitment and the conduct of the study has conformed to the approved protocol and no ethical problems have been encountered thus far.

4. In the conduct of this project have there been any variations to the approved protocol/project in respect of:

* Investigators	Yes	<input type="radio"/> No
* Duration of Project (e.g. 1 year, 3 years)	Yes	<input type="radio"/> No
* Research procedures (e.g. study design, sample size, source & method of recruitment, information & consent forms)	Yes	<input type="radio"/> No
* Participant care & feedback	Yes	<input type="radio"/> No

If you have answered YES to any part of this question:

* Has the HREC been previously notified of this event? Yes No

Please provide brief details of the reasons for variations and how you will accommodate any problems they may pose for your research.

For Multicentre research, please provide a list of the Protocol Amendment numbers relevant to the research and a summary of the amendments for the year to date.

5. Are any variations to the approved protocol/project proposed? If so, please detail below, noting that they must be approved by the HREC (attach an extra sheet if needed).

Not applicable.

6. Since your project commenced, how many participants have "dropped out"/withdrawn their consent?

2

Briefly list the reasons (if known) for participants dropping out/withdrawing from the project.

One UoW student attended for testing, but found it too difficult to reliably understand the questions due to language difficulties. One Mental Health Unit patient commenced testing, but was discharged from the ward before being able to complete the assessment.

7. To the best of your knowledge, have any participants encountered adverse effects while participating in your research project? (e.g. side-effects of drugs or procedures, or other phenomena)

Yes

No

If YES: Number of participants involved _____

Briefly list adverse effects (attach and extra page if necessary).

For Multicentre research please attach a list and summary of Serious Adverse Event reports (for Australia only) relevant to this research for the year to date.

Were all these effects anticipated in the Consent documents

Yes

No

Have these adverse effects been previously reported to the HREC?

Yes

No

What other action has been taken in response to these adverse effects?

-
8. Have there been any other unforeseen incidents or complaints about the research that might affect the continued ethical acceptability of the project? (e.g. reactions to questionnaires or psychological tests)

Yes

No

If YES: Number of participants involved _____

Briefly list the incidents or complaints.

Have these events been previously reported to the HREC?

Yes

No

What other action has been taken in response to these incidents or complaints?

-
9. Please comment on the methods used to store research data and any other personal information associated with this research

All data stored in accordance with the Health Records and Information Privacy Act 2002, in a locked filing cabinet without any associated identifying information.

Have you encountered any problems associated with security and storage of data?

(All primary data must be retained for a period of at least five years to conform with the University's Code of Practice- Research.)

Yes

No

If YES, give details.

10. **Is your research project a CTN* or CTX* drug trial?**

Yes

No

*CTN = Clinical Trial Notification: CTX = Clinical Trial Exemption

If YES:

Have unused supplies of the trial drug been collected from participants?

Yes

No

Not applicable

Please attach one copy of the current information and consent package for this trial.

COMMENTS: Comments from you on ethical aspects relating to your research are very welcome.

DECLARATION:

I certify that the information provided by me in this Progress Report is an accurate account of the conduct of the above research project for which I am responsible and a copy of the Consent Form and Information Sheet used for this project is attached.

Signed (Chief Investigator) _____

Date 20/1/10

If Student is Chief Investigator, then Supervisor's signature is also required.

Supervisor _____ (Name- Please Print) HAMISH McLEOD

Unit/ Faculty Psyc. / HBS.

Date 21/1/10

ALL REPORTS MUST BE SIGNED BY THE HEAD OF DEPARTMENT/UNIT

Head of Unit _____

Date 21/1/10

University of Wollongong



RENEWAL APPROVAL

In reply please quote: HE07/029

Further Enquiries Phone: 4221 4457

4 February 2010

Mr Alex Hains
PO Box 66
Keiraville NSW 2500

COPY

Dear Mr Hains

I am pleased to advise that renewal of the following Human Research Ethics application has been approved. This certificate relates to the research protocol submitted in your original application and all approved amendments to date.

Ethics Number:	HE07/029
Project Title:	Metaphor comprehension in people with psychotic disorders.
Name of Researchers:	Mr Alex Hains, Dr Hamish McLeod
Approval Date:	13 December 2009
Expiry Date:	12 December 2010

Please remember that in addition to completing an annual report the Human Research Ethics Committee requires that researchers immediately report:

- ◆ proposed changes to the protocol including changes to investigators involved
- ◆ serious or unexpected adverse effects on participants
- ◆ unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete a monitoring report at the end of your project. This report will be sent out approximately 6 weeks prior to the date your ethics approval expires. The report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office.

Yours sincerely

A/Professor S Roodenrys
Chair, Human Research Ethics Committee

cc: Dr Hamish McLeod, Department of Psychology

HREC Amendment Application

Protocol Number: HE07/029

Principal Investigator: Mr Alex Hains

Project Title: Metaphor comprehension in people with psychotic disorders

1. What is the proposed change?

In addition to the services already approved for recruitment, we would like to add the Mental Health Units of Shellharbour Hospital (Eloura East, Eloura West, Mirrabrook) and Private Mind (the private practice of the principal researcher).

2. What is the reason for the change?

We have had a slower than expected rate of recruitment from the approved services and need to complete this research as soon as possible.

3. What are the ethical implications of the amendment?

None regarding the Shellharbour Mental Health Units, as this research has already had approval from the Area Health Service. For those participants recruited through Private Mind, it will be emphasised that participation in this research is voluntary and choosing not to participate or to withdraw from participating at a later date will in no way affect their treatment. Of course, any appointments attended for the purposes of this research would not be covered by Medicare.

4. Does the amendment require any changes to the Participant Information Sheet?

No

5. Attachments

Nil

University of Wollongong

**AMENDMENTS REVIEWED - RESPONSE REQUESTED****In reply please quote: HE07/029**

Further Information Phone: 42214457

COPY

20 September 2010

Mr Alex Hains
PO Box 66
Keiraville NSW 2500

Dear Mr Hains,

The Human Research Ethics Committee has **REVIEWED the amendments** dated 10 September 2010 to the following Human Research Ethics application.

Ethics Number: HE07/029

Project Title: Metaphor comprehension in people with psychotic disorders.

Name of Researcher/s: Mr Alex Hains, Dr Hamish McLeod

Reviewed Date: 16 September 2010

The Committee decided that approval can be granted if satisfactory responses are received to the matters detailed below.

Questions

1. Governance approval will be required for the additional site (Shellharbour). Please contact the Area Health Service Research Directorates' Governance Officer Ms Kristy Pierce on 02-42534876 or email: Kristy.pierce@sesiahs.health.nsw.gov.au for assistance with your approval.
2. Recruitment of clients of Private Mind should be done outside of clinical contact by letter. Please clarify that participants from Private Mind will not be charged for the testing session.

Please send a written response to the Ethics Officer, Research Services Office, University of Wollongong or email it to rso-ethics@uow.edu.au. This response will be reviewed by the Executive Committee and can be submitted at any time, you do not need to consider the agenda deadline for the next meeting of the full Committee.

Yours sincerely,

A/Professor Steven Roodenrys
Chairperson Human Research Ethics Committee

Cc: Dr Hamish McLeod, Department of Psychology

Mr Alex Hains
PO Box 66
Keiraville NSW 2500
m. 0431 113 722
e.
alex@privatemind.com.au

1 November 2010

A/Professor Steven Roodenrys
Chairperson
Human Research Ethics Committee
Research Services Office
University of Wollongong

Dear A/Prof Roodenrys and committee

Re: HE07/029 Metaphor comprehension in people with psychotic disorders

Thank you for reviewing my research ethics amendment application dated 10 September 2010. I submit the following in response to concerns raised (see your letter dated 20 September for the corresponding item numbers).

1. Please remove my application to recruit from Shellharbour AHS sites.
2. I confirm that recruitment of Private Mind clients will be done outside of regular private therapy sessions and via letter. Participants from Private Mind will not be charged for the testing session(s).

Please do not hesitate to contact me should you have any further inquiries about these changes.

Thank you for considering my application for amendment.

Kind regards,

Alex Hains
Clinical Psychologist

University of Wollongong
**AMENDMENT APPROVAL**

In reply please quote: HE07/029
Further Enquiries Phone: 4221 4457

8 November 2010

Mr Alex Hains
PO Box 66
Keiraville NSW 2500

Dear Mr Hains

I am pleased to advise that the amendment request 10 September 2010 to the following Human Research Ethics application has been approved. The University of Wollongong/SE Sydney and Illawarra Area Health Service Humanities, Social Science and Behavioural HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*.

Ethics Number: HE07/029

Project Title: Metaphor comprehension in people with psychotic disorders.

Name of Researchers: Mr Alex Hains, Dr Hamish McLeod

Amendment/s: Additional recruitments sites at the Mental health Units of Shellharbour Hospital (Eloura East, Eloura West, Mirrabrook) and Private Mind (private practice of the principal researcher)

Amendment Approval Date: 4 November 2010

Expiry Date: 12 December 2010

Please remember that in addition to reporting proposed changes to your research protocol the HREC requires that researchers immediately report:

- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete monitoring reports annually and at the end of your project. These reports are sent out approximately 6 weeks prior to the date your ethics approval expires. The reports must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

Yours sincerely

A/Professor Steven Roodenrys
Chair, Human Research Ethics Committee

Cc: Dr Hamish McLeod, Department of Psychology, University of Wollongong

Research Services Office University of Wollongong NSW 2522 Australia
Telephone: +61 2 4221 3386 Facsimile: +61 2 4221 4338
research_services@uow.edu.au www.uow.edu.au/research
CRICOS Provider No. 00102E

UNIVERSITY OF WOLLONGONG
HUMAN RESEARCH ETHICS COMMITTEE
PROGRESS / RENEWAL REPORT

HREC Approval No: HE07/029
Expiry Date: 15 January 2011
Project Title: Metaphor comprehension in people with psychotic disorders
Chief Investigator: Mr Alex Hains

General Notes and Conditions

The National Statement on Ethical Conduct in Research Involving Humans requires institutions to monitor research projects involving human participants to ensure that they are conducted ethically and in compliance with the HREC approval for that project, including any conditions placed on that approval.

For the most part, the monitoring requirement will be satisfied by the chief investigator:

- o notifying the HREC immediately of any serious or unexpected adverse effects on participants;
- o notifying the HREC of any proposed changes to the protocol or procedures to be used in the research;
- o notifying the HREC of unforeseen events that might affect continued ethical acceptability of the project;
- o providing the HREC with an annual report on the project; and
- o providing the HREC with a report at the completion of the project.

In special circumstances the HREC may ask for more frequent reports and may require additional monitoring if it considers this necessary to ensure that the project continues to conform to ethical standards. While the principal objective of monitoring is to ensure that the rights and interests of human participants are not jeopardised, it is also concerned to foster responsible research.

This form is to be used for:

- o Reports of serious or unexpected adverse effects on participants;
- o Reports of proposed changes to protocols/projects;
- o Reports of unforeseen events that might affect ethical acceptability of projects;
- o Annual reports on approved research project;
- o Request for renewal of approval; and
- o Final reports on projects at the completion of research

Please complete this report referring back where necessary to your application for ethics clearance, which is the approved protocol, and any special conditions imposed by the HREC. If there is insufficient space to answer any question please attach a separate sheet. If a question does not apply to your research please write "N/A" or "not applicable" in the space provided.

Please return your completed report within 14 days to the Human Research Ethics Officer, Research Office, University of Wollongong, Wollongong NSW 2522 (Ph: 4221 4457; Fax: 4221 4338).

TO BE COMPLETED FOR ALL RESEARCH PROJECTS INVOLVING HUMAN PARTICIPANTS.

Please tick where appropriate.

1. Purpose of this report (tick as many as are appropriate):

- ☐ Report of serious or unexpected adverse effects on participants
☐ Report of proposed changes to the protocol/project
☐ Report of unforeseen events that might affect ethical acceptability of the project
☐ Annual report on approved research project
☐ Request for renewal of approval
☒ Final report on project

2. Status of Research Project

- ☒ Completed (date) 15 January 2011
☐ In progress. Anticipated completion date of Research Project _____
☐ Renewal of approval requested until (date) 15 January 2011
☐ Commenced but abandoned on (date) _____
 (please give below brief reasons why the project was abandoned, then sign and return this report.)

3. Report on ethical aspects of project to date (or outcome in the case of completed research). Please detail method of contact with subjects, number of subjects involved, and the nature of their involvement in the research. Please comment on whether the research has complied with the approved protocol and any conditions of that approval from the HREC.

The project has completed testing of the healthy control participants (n=45) via the UoW student research participation scheme as well as the testing of the experimental (psychotic) participants (n=42) primarily via the Wollongong Hospital Mental Health Unit. The process of recruitment and the conduct of the study conformed to the approved protocol and no ethical problems were encountered.

4. In the conduct of this project have there been any variations to the approved protocol/project in respect of:

* Investigators	Yes	<input type="radio"/> No
* Duration of Project (e.g. 1 year, 3 years)	Yes	<input type="radio"/> No
* Research procedures (e.g. study design, sample size, source & method of recruitment, information & consent forms)	Yes	<input type="radio"/> No
* Participant care & feedback	Yes	<input type="radio"/> No

If you have answered YES to any part of this question:

* Has the HREC been previously notified of this event? Yes No

Please provide brief details of the reasons for variations and how you will accommodate any problems they may pose for your research.

For Multicentre research, please provide a list of the Protocol Amendment numbers relevant to the research and a summary of the amendments for the year to date.

5. Are any variations to the approved protocol/project proposed? If so, please detail below, noting that they must be approved by the HREC (attach an extra sheet if needed).

Not applicable.

6. Since your project commenced, how many participants have "dropped out"/withdrawn their consent?

2

Briefly list the reasons (if known) for participants dropping out/withdrawing from the project.

One UoW student attended for testing, but found it too difficult to reliably understand the questions due to language difficulties. One Mental Health Unit patient commenced testing, but was discharged from the ward before being able to complete the assessment. No participants have withdrawn.

7. To the best of your knowledge, have any participants encountered adverse effects while participating in your research project? (e.g. side-effects of drugs or procedures, or other phenomena)

Yes

No ☒

If YES: Number of participants involved _____

Briefly list adverse effects (attach and extra page if necessary).

For Multicentre research please attach a list and summary of Serious Adverse Event reports (for Australia only) relevant to this research for the year to date.

Were all these effects anticipated in the Consent documents

Yes

No

Have these adverse effects been previously reported to the HREC?

Yes

No

What other action has been taken in response to these adverse effects?

8. Have there been any other unforeseen incidents or complaints about the research that might affect the continued ethical acceptability of the project? (e.g. reactions to questionnaires or psychological tests)

Yes

No ☒

If YES: Number of participants involved _____

Briefly list the incidents or complaints.

Have these events been previously reported to the HREC?

Yes

No

What other action has been taken in response to these incidents or complaints?

9. Please comment on the methods used to store research data and any other personal information associated with this research

All data stored in accordance with the Health Records and Information Privacy Act 2002, in a locked filing cabinet without any associated identifying information.

Have you encountered any problems associated with security and storage of data?

(All primary data must be retained for a period of at least five years to conform with the University's Code of Practice- Research.)

Yes

No ☒

If YES, give details.

10. Is your research project a CTN* or CTX* drug trial?
 *CTN = Clinical Trial Notification; CTX = Clinical Trial Exemption

Yes

No

If YES:

Have unused supplies of the trial drug been collected from participants?

Yes

No

Not applicable

Please attach one copy of the current information and consent package for this trial.

COMMENTS: Comments from you on ethical aspects relating to your research are very welcome.

DECLARATION:

I certify that the information provided by me in this Progress Report is an accurate account of the conduct of the above research project for which I am responsible and a copy of the Consent Form and Information Sheet used for this project is attached.

Signed (Chief Investigator) _____

Date 19/8/2011 _____

If Student is Chief Investigator, then Supervisor's signature is also required.

Supervisor _____ (Name- Please Print) Dr Hamish McLeod _____

Unit/ Faculty School of Psychology/HBS _____

Date 19 August 2011

ALL REPORTS MUST BE SIGNED BY THE HEAD OF DEPARTMENT/UNIT

Head of Unit _____

Date _____