SOCIAL COGNITION AND SOCIAL FUNCTIONING IN SCHIZOTYPY

A thesis submitted
to Kent State University in partial
fulfillment of the requirements for the
degree of Master of Arts

by
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May, 2009
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Acknowledgments

Thank-you to Dr. Docherty, Annie St-Hilaire, Jennifer Aakre, Jim Seghers, Marielle Divilbiss, Emily Bell Schumann, and Kristen Cimera for their helpful suggestions and feedback throughout the project. I would also like to acknowledge the hard work of the undergraduate research assistants who were a tremendous help with data collection: Tara Baluck, Audrey Norris, Kym Redden, and Patrick Sullivan.
Introduction

Schizophrenia is a severe mental illness that impacts 2.4 million adults in the US (NIMH, 2006). It is marked by impairments in neurocognition, social cognition and social and occupational functioning (APA, 2000). Social cognition, as defined by Penn and colleagues (1997), refers to “cognitive processes related to how one thinks about themselves, others, and social interactions”. Theory of mind (ToM) is an aspect of social cognition which refers to one’s ability to attribute mental states to others; that is, the ability to make inferences about the thoughts, feelings, and intentions of others. Accurate ToM requires one to hold representations of the beliefs others hold about their environment, and to understand that the behaviour of others is influenced by these beliefs, regardless of whether the beliefs are correct. There is growing evidence that social cognition mediates the relationship between neuropsychological impairments and poor social and occupational functioning in schizophrenia patients (Addington, Saeedi, & Addington, 2006; Sergi, Rassovsky, Nuechterlein, & Green, 2006). Thus, a thorough understanding of social cognition is important if one hopes to improve functional outcome and quality of life for schizophrenia patients.

Unfortunately, research with schizophrenia populations can be subject to confounds such as the impact of anti-psychotic medication and differences among patients in severity of illness (Pickup, 2006; Savina & Beninger, 2007). Employment of the schizotypy paradigm, which is founded on the idea that features of schizophrenia fall
along a continuum in the normal population, can avoid these confounds by examining the variable of interest in a non-clinical population (Pickup, 2006).

ToM disruptions are hypothesized to play a role in the etiology and maintenance of psychotic symptoms such as disorganized speech and delusions (Brüne, 2005). As with other neurocognitive and social cognitive deficits, ToM impairments may precede the onset of psychotic symptoms and may represent trait markers for processes associated with the illness. That is, it is likely that ToM impairments are present among individuals who endorse schizotypal traits. Previous research has indicated that social functioning impairments are present in schizotypy (Claridge, 1997; Jahshan & Sergi, 2007). Poor social functioning in this group may be related to social cognitive deficits; alternatively, it may be due to depression, which is often comorbid with schizotypal traits or psychosis-proneness (Lewandowski et al., 2006; Verdoux et al., 1999). The purpose of the present study is to investigate the relationships among schizotypy, ToM, and social functioning while considering the role of depression.

Social Cognition and Schizophrenia

There is growing support for the assertion that the evolutionary cost for the development of the highly complex “social brain” is the emergence of disorders indicative of disrupted brain development and impaired social cognition, such as schizophrenia (Brüne & Brüne-Cohrs, 2006; Frith, 2004). Research has consistently demonstrated that schizophrenia patients have difficulty with social cognition tasks such as facial affect recognition, identification of emotions, affective prosody, and ToM (Brüne & Bodenstein,
2005; Craig, Hatton, Craig, & Bentall, 2004; Herold, Tenyi, Lenard, & Trixler, 2002; Langdon, Coltheart, Ward, & Catts, 2002; Pickup & Frith, 2001; Sarfati, Hardy-Bayle, Brunet, & Widocher, 1999). While schizophrenia patients do suffer from impaired neurocognition, impairments in social cognitive performance are not fully accounted for by general cognitive deficits. That is, specific social cognitive impairments appear to exist in schizophrenia (Lee, Farrow, Spence, & Woodruff, 2004).

Schizophrenia and Theory of Mind

ToM appears to develop between the ages of three and four in normal children, coinciding with development of frontal/executive functioning (Brüne & Brüne-Cohrs, 2006). While children with autism and Asperger’s syndrome fail to develop ToM abilities altogether (Brüne & Brüne-Cohrs, 2006), in schizophrenia ToM is impaired, but is not absent. That is, schizophrenia patients show inaccuracies in their judgements of the mental states of others; this has been well-replicated in the literature (e.g., Brüne & Bodenstein, 2005; Corcoran, Mercer, & Frith, 1995; Craig et al., 2004; Herold et al., 2002; Langdon et al., 2002; Pickup & Frith, 2001; Sarfati et al., 1999).

A common ToM task for children is the “Sally-Anne” false-belief task (Wimmer & Perner, 1983). The task consists of a vignette explaining that Sally has hidden a marble in basket. Unbeknownst to Sally, Anne moves the marble to a box. The child is asked where Sally will look for her marble; children aged four and older tend to respond correctly, that is, that Sally will look in the basket, although the real location of the marble is in the box, whereas younger children have difficulty distinguishing Sally’s knowledge
of the marble’s location from their own knowledge (i.e., they believe that Sally will look in
the box). ToM tasks for adults are similar, but they assess not only first-order ToM (i.e.,
knowledge of the character’s beliefs), but also second-order ToM (i.e., knowledge of one
character’s beliefs about another character’s beliefs). These tasks typically consist of
vignettes involving deception and false beliefs.

ToM impairments in schizophrenia are hypothesized to be related to both the etiology
and maintenance of psychotic symptoms (Brüne, 2005). For example, if a speaker is
unable to track the information to which the listener has access due to impaired social
judgement regarding the mental states of others and the contents of their minds, the
resulting speech may be missing information, contain unclear references, and be quite
disorganized. Furthermore, inaccuracies in judgment regarding the intentions of others
might contribute to persecutory delusions or ideas of reference, while the inability to
distinguish one’s own intentions from those of others could lead to delusions of control
(Brüne, 2005). In addition, ToM impairments are likely to have a negative direct impact
on the social functioning of individuals with schizophrenia because of frequent
misunderstandings with others due to misperception of their intentions, difficulty
appreciating irony and humour, etc.

Schizophrenia and Schizotypy

When conducting research with schizophrenia patients, and social cognition research in
particular, one must be mindful of potential confounds such as the impact of anti-
psychotic medication on cognition and behaviour, asociality and poor social skills due to
institutionalization, severity of illness and stigma (Pickup, 2006). Schizotypy, the personality construct thought to underlie psychosis-proneness, and schizophrenia are hypothesized to exist on a continuum (Claridge, 1997); using schizotypy as an analogue for schizophrenia can avoid confounds previously mentioned.

There is a good deal of support for the claim that schizotypy is an appropriate analogue for schizophrenia. For example, there is strong evidence that many features of schizophrenia are present prior to onset of illness, as well as among non-schizophrenic first-degree relatives and non-clinical individuals who endorse schizotypal traits. The similarities between schizotypy and schizophrenia include certain biobehavioural markers (e.g., “Red Light Effect”; Bedwell, Miller, Brown, & Yanasak, 2006); cognitive impairments, particularly in executive functioning, vigilance, spatial memory, verbal fluency, and early information processing (reviewed in Claridge, 1997); and neurological soft signs (Barkus, Stirling, Hopkins, & Lewis, 2006). There is also evidence for sub-clinical but schizophrenia-like social cognitive impairments, poor social functioning (reviewed in Claridge, 1997; Jahshan & Sergi, 2007), and disorganized communication (Docherty, Gordinier, Hall, & Dombrowski, 1998) in schizotypy.

Of note, among schizotypy researchers, differences exist regarding how to conceptualize and assess the schizotypy construct. Specifically, debate exists regarding whether the schizotypy construct is best represented dimensionally or as a discrete taxon. The dimensional model is employed largely in the UK, Europe, and Australia, while the taxon model, which was popularized by Meehl (Meehl, 1962), is widely used in North America (Kwapil, Barrantes-Vidal, & Silvia, 2008). As a result, schizotypy
measures typically used in North American research such as the Chapman Scales (Chapman, Chapman, & Raulin, 1976; Chapman, Chapman, & Raulin, 1978; Eckblad & Chapman, 1983) and Schizotypal Personality Questionnaire (Raine, 1991) include items that maximally distinguish the schizotypy taxon from the normal population. These items frequently tap into attenuated, but rather marked versions of schizophrenia symptomatology, and hence are infrequently endorsed in the general population (Mason, Claridge, & Jackson, 1995). In contrast, the dimensional approach posits that there is some continuity of psychotic experiences within the normal and clinical populations, that is, that psychotic traits are on a continuum with personality traits such as neuroticism (Mason & Claridge, 2006). As such, items included on dimensional measures of schizotypy tend to be milder, more trait-oriented rather than symptom-oriented, and are endorsed by a greater proportion of respondents (Mason & Claridge, 2006).

Regardless of the approach used, there is converging evidence that established schizotypy measures map onto the positive, negative, and disorganized dimensions of psychosis outlined by Liddle (Liddle, 1987; Mason, Claridge, & Williams, 1997). Indeed, Mason and colleagues (1995) conducted a factor analytic study of the Combined Schizotypal Trait Questionnaire, a large measure which amalgamates several established schizotypy measures, and derived a four-factor solution: Unusual Experiences (positive schizotypy), Introvertive Anhedonia (negative schizotypy), Cognitive Disorganization (disorganized and social anxiety aspects of schizotypy), and Impulsive Nonconformity (subclinical hypomanic and anti-social behaviour). Mason hypothesized that the fourth factor, Impulsive Nonconformity, may reflect continuity between schizophrenia and disorders of emotion regulation such as affective psychosis,
bipolar affective disorder, and borderline personality disorder. With the exception of Introvertive Anhedonia, which was associated only with Cognitive Disorganization, the dimensions of schizotypy were correlated with each other, suggesting that features of schizotypy are likely to co-occur to some degree within individuals.

Schizotypy and Theory of Mind

As discussed above, the presence of ToM impairments in schizophrenia is well-established. However, relatively few studies have examined ToM in schizotypy. Moreover, within these studies, the findings have been inconsistent and methodologically limited. Pickup (2006) found a non-significant trend for a high schizotypy group to show poor performance on ToM tasks. Regression analyses showed that ToM impairments were associated with specific aspects of schizotypy corresponding to attenuated positive symptoms. Limitations of the study included ceiling effects for the tasks assessing ToM and executive functioning. In addition, although Pickup conceptualized schizotypy as a dimensional construct, the analyses were conducted using median-split groups (i.e., high vs. low schizotypy), which may have reduced statistical power of the analyses. Using a regression approach, Meyer and Shean (2006) did find a relationship between non-realistic beliefs and ToM in a non-clinical, undergraduate sample. However the authors did not control for general cognitive functioning, ceiling effects were evident for one of the ToM tasks, and the range of schizotypy scores in the sample was not reported.
Langdon and Coltheart (1999) found that participants who endorsed schizotypal traits demonstrated poorer performance on a ToM task than low schizotypy participants. In a follow-up study, Langdon and Coltheart (2004) found endorsement of schizotypal traits to be associated with poor recognition of irony, which requires the reader to infer mental states, but not for recognition of metaphors, which does not require ToM. Versmissen and colleagues (2008) recently examined ToM ability among schizophrenia patients, non-psychotic first degree relatives, a psychometrically identified schizotypy group, and healthy controls. The findings were mixed; ToM was impaired for the patient and relative groups; however, the psychometrically identified schizotypy group did not differ from healthy controls. Versmissen et al. suggest that their findings support a continuum conceptualization of impairment associated with psychosis-proneness, where degree of impairment escalates with increased genetic vulnerability.

A recent study by Jahshan & Sergi (2007) compared extremely high & extremely low scorers on a schizotypy scale on measures of neurocognition, ToM and social functioning. The authors found no difference between groups for ToM or neurocognition, but the high schizotypy group did demonstrate poorer social functioning. There are several limitations to Jahshan and Sergi's study, which the present study aims to remedy. Specifically, Jahshan and Sergi used an executive functioning measure that is intended for use with grossly-impaired individuals, and may have been insensitive to the subtle impairments thought to be present in schizotypy. In addition, the use of a low schizotypy group as the comparison sample may have been inappropriate since it is conceivable that extremely low scorers on schizotypy measures are deviant. Finally, Jahshan and Sergi failed to consider the contribution of depressed mood to social
functioning. Considering the frequent co-occurrence between schizotypy and depression (Lewandowski et al., 2006; Verdoux et al., 1999), as well as the well-established relationship between depression and poor psychosocial functioning (Hirschfield et al., 2000), depressed mood should be considered as a potential third variable in the relationship between schizotypy and social functioning. Henry and colleagues (2008) included measures of negative affect in their examination of ToM and social functioning in schizotypy. The researchers found that negative schizotypy was associated with impaired social functioning after controlling for negative affect, and that ToM impairment partially mediated the relationship between schizotypy and poor social functioning.

Considering the mixed findings outlined above, the aim of the present study was to investigate whether ToM impairment mediates the relationship between schizotypal traits and social functioning impairments beyond any contribution of depression. Specifically, it was hypothesized that endorsement of schizotypal traits would be associated with poor social functioning, ToM impairments, neurocognitive impairments, and depressed mood. Furthermore, it was hypothesized that ToM impairments would partially mediate the relationship between schizotypal traits and social functioning beyond the contribution of depression.
Method

Participants

Because schizotypy was conceptualized as a normally-distributed dimensional construct in this study, participants from the Kent State University undergraduate General Psychology subject pool were invited to take part in a study of “personality and social cognition” on a first-come basis. Participation was open to those aged 18 and older. Exclusion criteria were minimal and included history of traumatic brain injury, history of head injury resulting in loss of consciousness, and seizure disorder.

Seventy-four participants completed the study. Of these, thirteen participants were screened out of the sample due to random responding on the schizotypy measure (i.e., Chapman Infrequency score > 2), and one participant was screened out due to reading comprehension difficulties (English as a second language). In addition, two participants were missing data for the Wisconsin Card Sort Task due to computer error, and three participants had not been in contact with their families in the two weeks prior to testing and thus were missing data for the family relationship portion of a social functioning measure. An additional five participants were excluded due to outlier status for age; these participants were significantly older than the remaining participants and were also outliers on the social functioning measures, suggesting that they were not part of the
intended sampling population. Thus, the final listwise sample consisted of 50 subjects. The study sample consisted of 30 females (60%) and 20 males. The age of participants ranged from 18-26 years (mean=20, s.d.=2). The majority of the sample were in their first year of college (n=37, 74%) and Caucasian (n=43, 86%).

Procedure

Participants were assessed individually in a single testing session approximately three hours in duration. Informed consent was obtained from each participant prior to testing. The study was approved by the Kent State University Institutional Review Board. The consent form can be found in Appendix A. Participants were offered short breaks before the neurocognitive and social cognitive test blocks to prevent fatigue. Demographic information, exclusion criteria, and social functioning were assessed via structured interview format. Participants completed all self-report measures (schizotypy, mood, quality of life, and general cognitive ability) in the presence of the experimenter to ensure participants completed the forms correctly and no items were left blank. Instructions and stimuli for the working memory task were read aloud to the participant by the experimenter from a script. The executive functioning task was administered on a Dell XPS dual-core laptop computer with Windows Vista operating system. The computer screen is 20 inches in size, and the participant sat approximately 1.5 ft from the screen and made selections using marked buttons on the keyboard. All social cognition stimuli were presented to the participant on the laptop computer by way of PowerPoint presentations. The experimenter recorded the participant’s oral response to items. In
addition, for one task (Strange Stories Task) answers were recorded using an Olympus VN-960PC digital recording device for later transcription and scoring.

Measures

Demographic Information. General demographic information was collected via structured interview for the purpose of describing the study sample and quantifying potential covariates (e.g., age, socio-economic status). The demographics questionnaire can be found in Appendix B.

Schizotypy. The O-LIFE (Mason et al., 1995; Appendix C) is a 104 yes/no item self-report multidimensional measure of schizotypal traits that was developed in the context of the 4 factor (positive, negative, disorganization, impulsivity/disinhibition) fully-dimensional model of schizotypy. The O-LIFE contains four subscales: Unusual Experiences (perceptual aberrations, magical ideation), Introvertive Anhedonia (social and physical anhedonia, social avoidance), Cognitive Disorganization (poor attention, concentration, and judgment), and Impulsive Nonconformity (impulsivity, anti-social behaviour). Items within each subscale are summed to obtain a scale score; higher scores are indicative of higher levels of schizotypy. The O-LIFE has demonstrated good reliability in previous research in Europe, with internal consistency for subscales ranging from $\alpha=0.77$ to $0.89$, and test-retest reliability greater than $r=0.70$ (Burch, Steel, & Hemsley, 1998; Mason & Claridge, 2006). In the current sample, internal consistency for O-LIFE total score was $\alpha=0.93$, $\alpha=0.96$ for Cognitive Disorganization, $\alpha=0.88$ for Unusual Experiences, $\alpha=0.74$ for Impulsive Nonconformity, and $\alpha=0.60$ for Introvertive
Anhedonia. The Chapman Infrequency Scale (Chapman & Chapman, 1987; Appendix D) was embedded in the O-LIFE in order to identify random or invalid responders.

**Depression.** Levels of depression over the two weeks prior to the testing session were assessed using a 21-item self-report scale, the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996; Appendix E). The BDI-II has evidenced high internal consistency across a variety of samples (Chronbach’s $\alpha = 0.89-0.94$) and test-retest reliability of $r=0.93$ over one-week intervals (Groth-Marnat, 2003). For the current sample, internal consistency for the BDI-II was $\alpha=0.89$.

**Neurocognition.** General cognitive ability was measured and considered as a potential covariate since cognition can be expected to impact both ToM ability and social functioning. General cognitive ability was assessed using the Shipley Institute of Living Scale (SILS; Shipley, 1940; Appendix F). The SILS contains two multiple-choice subtests: vocabulary (40-items) and abstract reasoning (20-items). WAIS-III IQ score was estimated using a regression formula (Zachary, 1986). Split-half reliabilities for the SILS subtests and total score range from 0.87 to 0.92 (Zachary, 1986). Test-retest reliability for the vocabulary subtest is approximately $r=0.60$, $r=0.66$ for the abstraction subtest, and $r=0.78$ for total score (Lezak, Howieson, & Loring, 2004).

Working memory, which is required for many of the ToM tasks, was assessed with the Letter-Number Sequencing Task from the Weschler Adult Intelligence Scale-III (WAIS-III; Weschler, 1997; Appendix G). Test-retest reliability for Letter-Number Sequencing ranges from $r=0.70-0.80$ (Groth-Marnat, 2003).
Executive functioning is frequently associated with performance on ToM tasks (Brüne, 2005); executive functioning was assessed using the computerized version of the Wisconsin Card Sort Task-64 Card Version (WCST-64; Kongs, Thompson, Iverson, & Heaton, 2000a; Appendix H). For this task, participants are presented with four stimulus cards (one red triangle, two green stars, three yellow crosses, four blue circles) and are asked to sort each of 64 response cards to the four stimulus cards based on one of three dimensions: colour (red, green, yellow, or blue), form (triangles, stars, crosses, or circles), or number (one, two, three, or four symbols). Participants are not told how the cards are to be sorted, but rather, the participant must identify the rewarded sorting dimension through trial and error, utilizing visual and auditory feedback given after each response (i.e., “RIGHT” or “WRONG” is displayed on the computer screen and said out loud to the participant after each choice). After 10 consecutive correct responses, the rewarded dimension shifts, requiring the participant to use feedback to identify the new sorting rule (e.g., rewarded dimension shifts from colour to form). The variables of interest for the WCST-64 are number of categories completed (overall success index, with a maximum of 6 sets of 10-consecutive correct responses), total number of errors, number of perseverative errors (persisting with a sorting rule which is no longer rewarded), and non-perseverative errors. Aside from number of categories completed, the WCST-64 variables are expressed as $T$-scores based on age-corrected data from the normative sample.

The WCST-64 task is a reliable and well-validated measure of executive functioning in adults (Kongs, Thompson, Iverson, & Heaton, 2000b). Moreover, the WCST task has been used in numerous investigations of cognition in schizotypy and schizophrenia and
is sensitive to impairments in set-shifting; negative symptoms in particular appear to be associated with perseveration, possibly due to hypoactivation of dorsolateral prefrontal regions (Gooding, Kwapi, & Tallent, 1999; Laurent et al., 2001; Lenzenweger & Korfine, 1994; but see Tallent & Gooding, 1999).

**Social Cognition.** Considering the mixed findings in previous investigations of ToM in schizotypy, multiple measures of ToM were used. ToM was assessed using 1) Strange Stories Task (Fletcher et al., 1995; Appendix I), 2) Langdon and Coltheart’s Irony Perception Task (2004; Appendix J), and 3) Baron-Cohen et al.’s Eyes Task (2001; Appendix K). For the Strange Stories Task, subjects read short, single paragraph stories and are asked to make inferences about story characters’ thoughts, feelings, or intentions. ToM stories involve deception, “white lies”, and misunderstandings between characters, all of which require the participant to attribute mental states to the primary story character and to story characters interacting with the primary character. The task also includes control stories requiring the subject to make physical cause-and-effect inferences. Eight stories of each type (i.e., ToM and physical control) were presented to participants via PowerPoint, and reading time for each story was timed using a digital stopwatch. Participants’ responses were digitally recorded, transcribed by undergraduate research assistants and scored by A.M. according to criteria supplied by Happé (included in Appendix I).

For the Irony Perception Task, participants are asked to decide whether statements made by characters in short vignettes make sense. Statements were either literal (e.g., “Now, there’s someone you would want on your side in a fight” upon seeing a muscular
man), metaphorical (e.g., “My goodness, look at the bag of bones” upon seeing a friend who recently lost a lot of weight), or ironic (e.g., “Don’t starve yourself” to a friend who took a large serving at a buffet). Nonsense items were also created by pairing literal, metaphorical, or ironic statements with unrelated stories (e.g., “Now, there’s someone you would want on your side in a fight” to a friend who took a large serving at a buffet).

The item pool contained ninety-six vignettes, each with a literal, metaphorical, ironic, and nonsense response, and six versions of the task were created in order to counterbalance story responses. Participants were assigned to one of the six versions in a pseudo-random fashion. Stories were presented to participants via PowerPoint and participants simply answered “yes” or “no” after reading each vignette. Responses were recorded by the experimenter and subjected to signal detection analysis (i.e., “yes” or “no” response, correct or incorrect response) where “hits” (i.e., correct “yes” response), “misses” (i.e., incorrect “no” response), “false alarms” (i.e., incorrect “yes” response), and “correct rejections” (i.e., correct “no” response) were used to calculate sensitivity ($A'$) and bias ($B''$) scores for each response type (i.e., literal, metaphor, ironic).

For the Eyes Task, participants are asked to identify what the individual in a picture is thinking or feeling based only on pictures of their eyes. Thirty-six pictures were presented to participants via PowerPoint. Each picture had four response options, and participants were asked to select which response best describes the photographed individual’s mental state. Definitions for each response option were available to participants (included in Appendix K).
Social Functioning. Social functioning was assessed using two measures. The Social Adjustment Scale – Self Report (SAS-SR; Weismann & Bothwell, 1976; Appendix L) measures functioning in academic performance and peer and family relationships over the past two weeks. Following the method of Jashan and Sergi (2006), data from items assessing peer relations, academic functioning, and family relationships were averaged to create three scale scores with higher scores indicative of worse social functioning. The SAS-SR has demonstrated high internal consistency (Chronbach’s $\alpha=0.74$) and test-retest reliability over a two-week period ($r=0.80$; Edwards, Yarvis, Mueller, Zingdale, & Wagman, 1978). Internal consistency for the SAS-SR peer, academic, and family items for the current sample was $\alpha=0.64$. Life satisfaction was assessed with the Quality of Life Inventory (QOLI; Frisch, 1994; Appendix M), a scale created for use with normal adults which measures satisfaction across 16 life areas and yields a total weighted satisfaction score. Participants rate the importance of each domain on a scale of 0 to 3, and their satisfaction with each domain on a scale of -3 to +3, where higher scores are indicative of greater importance and satisfaction. The QOLI has demonstrated good internal consistency ($\alpha=0.80-0.91$) and test-retest reliability ($r=0.80-0.91$; Frisch, Cornell, Villanueva, & Retzlaff, 1992). For the current sample, internal consistency for the QOLI total weighted satisfaction score was $\alpha=0.82$.

Data Analysis

Correlations were employed to examine the relationships among study variables, and hierarchical linear regressions were used to test these relationships. The impact of
demographic and cognitive factors was examined using $t$-tests and correlations, and these variables were considered in analyses as needed.
Results

Descriptive Analyses and Identification of Covariates

Distributions of all study variables met normality assumptions. However, one participant had an outlying score for Irony and Literal sensitivity scores (A'), a second participant had an outlying score for Metaphor sensitivity (A'), and a third participant had an outlying score for QOLI total weighted satisfaction. The outlying scores were taken-in to three standard deviations from the mean in order to reduce the impact of extreme scores on subsequent analyses. Gender effects were evident for the Cognitive Disorganization subscale of the O-LIFE ($t(48)=-2.86$, $p=0.01$), with females attaining higher scores than males. This difference was of the magnitude reported by Mason et al. (1995) in their normative sample. Gender differences were also evident for the peer relationships subscale of the SAS-SR ($x_{\text{males}}=1.62$, $s.d.=0.37$, $x_{\text{females}}=1.87$, $s.d.=0.34$, $t(48)=-2.48$, $p=.02$), where females achieved higher scores than males. As such, data for males and females were analyzed separately in subsequent regression analyses involving SAS-SR peer social functioning.
Total and subscale scores for the O-LIFE are presented in Table 1. With the exception of Introvertive Anhedonia, which had a somewhat restricted range, the full range of possible scores was represented and is similar to data presented by

Table 1. Schizotypy scale scores, $n=50$.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean ($s.d.$)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unusual Experiences</td>
<td>9.98 (6.30)</td>
<td>0-28</td>
</tr>
<tr>
<td>Introvertive Anhedonia</td>
<td>3.38 (2.62)</td>
<td>0-11</td>
</tr>
<tr>
<td>Cognitive Disorganization</td>
<td>10.66 (6.75)</td>
<td>0-22</td>
</tr>
<tr>
<td>Impulsive Nonconformity</td>
<td>8.54 (3.91)</td>
<td>1-18</td>
</tr>
<tr>
<td>O-LIFE Total Score</td>
<td>32.56 (15.37)</td>
<td>3-71</td>
</tr>
</tbody>
</table>

Note: Maximum possible scores for Unusual Experiences=30, Introvertive Anhedonia=27, Cognitive Disorganization=24, Impulsive Nonconformity=23, Total Score=104.

Pickup (2006). Mean BDI-II score for the sample was 8.32 ($s.d.$=6.95, range 0-29).

Neurocognitive data for the sample are presented in Table 2, and social cognition data are presented in Tables 3 and 4. Mean hit rates and sensitivity scores for metaphor and literal statements were similar to those reported by Langdon and Coltheart (2004); however, the present sample differed from Langdon and Coltheart’s sample in that the current sample demonstrated higher false alarm rates and a tendency toward a more liberal response bias (i.e., “yes” response set) across all conditions. Mean scores for the ToM stories were on the order of scores reported by Pickup (2006); however, contrary to Pickup, the current sample had significantly lower scores for the Physical control stories
Table 2. Neurocognitive data, n=50.

<table>
<thead>
<tr>
<th>Test</th>
<th>Mean (s.d.)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipley Institute of Living Scale Estimated IQ</td>
<td>103.94 (7.35)</td>
<td>87-117</td>
</tr>
<tr>
<td>Letter Number Sequencing Total (Raw Score)</td>
<td>11.72 (2.94)</td>
<td>5-19</td>
</tr>
<tr>
<td>WCST Number of Categories Completed</td>
<td>3.66 (1.51)</td>
<td>0-5</td>
</tr>
<tr>
<td>WCST Total Errors (T score)</td>
<td>52.46 (11.78)</td>
<td>25-73</td>
</tr>
<tr>
<td>WCST Perseverative Errors (T score)</td>
<td>52.34 (11.80)</td>
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<tr>
<td>WCST Nonperseverative Errors (T score)</td>
<td>51.88 (11.45)</td>
<td>23-77</td>
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</tbody>
</table>

compared to the ToM stories (t(49)=5.10, p<0.001). Similar to Pickup (2006) and Fletcher and colleagues (1995), ToM stories were read significantly faster than the Physical control stories (t(49)=-3.97, p<0.001). For the Eyes Task, the current sample mean of 25.68 (s.d.=4.21) was similar to data presented by Baron-Cohen et al. (2001) for undergraduate students (n=103, mean=28.0, s.d.=3.5) and community adult samples (n=88, mean=26.2, s.d.=3.6). Social functioning data are presented in Table 5.
Table 3. Irony Perception Task data, \( n=50 \).

<table>
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<tr>
<th></th>
<th>Mean (s.d.)</th>
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<tbody>
<tr>
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<tr>
<td>Irony</td>
<td>.78 (.20)</td>
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</tr>
<tr>
<td>Metaphors</td>
<td>.84 (.13)</td>
<td>.50-.96</td>
</tr>
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<td>Literal</td>
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<td>.83-.96</td>
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<td><strong>False Alarm Rate</strong></td>
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<td>.04-.58</td>
</tr>
<tr>
<td>Literal</td>
<td>.22 (.15)</td>
<td>.04-.75</td>
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<td><strong>Sensitivity (A')</strong></td>
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<td>Irony</td>
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<td>Literal</td>
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<td>.80-.98</td>
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<td><strong>Response Bias</strong> (B&quot;)</td>
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<tr>
<td>Irony</td>
<td>.02 (.62)</td>
<td>-.96-.98</td>
</tr>
<tr>
<td>Metaphors</td>
<td>-.21 (.53)</td>
<td>-.94-.92</td>
</tr>
<tr>
<td>Literal</td>
<td>-.50 (.33)</td>
<td>-.94-.41</td>
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Table 4. Strange Stories and Eyes Task data, n=50.

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<tr>
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<tr>
<td>ToM Stories Total</td>
<td>13.66 (1.60)</td>
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<td>Average Time to Read ToM Stories (seconds)</td>
<td>25.25 (5.22)</td>
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<tr>
<td>Physical Stories Total</td>
<td>11.88 (2.47)</td>
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<tr>
<td>Average Time to Read Physical Stories (seconds)</td>
<td>30.31 (6.85)</td>
<td>16.27-48.71</td>
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<tr>
<td>Eyes Task Total Score</td>
<td>25.68 (4.21)</td>
<td>15-33</td>
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Table 5. Social functioning data, n=50.

<table>
<thead>
<tr>
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<tr>
<td>SAS-SR: Peer Relationships</td>
<td>1.77 (.37)</td>
<td>1.00-2.50</td>
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<tr>
<td>SAS-SR: Academic Functioning</td>
<td>1.59 (.39)</td>
<td>1.00-2.83</td>
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<tr>
<td>SAS-SR: Family Relationships</td>
<td>1.70 (.40)</td>
<td>1.12-2.88</td>
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<tr>
<td>QOLI: Total Weighted Satisfaction</td>
<td>46.24 (22.35)</td>
<td>-14.78-91.00</td>
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</table>

Zero-order correlations between schizotypy and neurocognitive variables are presented in Table 6. Contrary to predictions, there was no statistically significant association between schizotypy total or subscale scores and performance on any of the neurocognitive tasks. Estimated IQ score was positively associated with performance on the executive functioning (WCST-64) and working memory (LN sequencing) tasks. Likewise, working memory and executive functioning were also positively correlated (p<0.05).
Relationships between schizotypy, neurocognition, and social cognition are presented in Table 6. Surprisingly, total schizotypy score and the Impulsive Nonconformity facet of schizotypy were associated with enhanced irony perception in this sample \( r=0.34 \) and 0.29 respectively, \( p=0.02 \) and 0.04 respectively); however, schizotypy was not associated with any other social cognition variables. Regarding the relationships between neurocognition and social cognition, Irony sensitivity and performance on the Eyes task were positively associated with estimated IQ score \( r=0.47 \) and 0.30 respectively, \( p=0.001 \) and 0.03 respectively), while average reading time for ToM stories was negatively associated with estimated IQ and working memory \( r=-0.31, p=0.03 \). There was a trend for an association between working memory and Irony sensitivity score \( r=0.26, p=0.07 \). Executive functioning (WCST-64 categories completed) was positively associated with ToM stories total score \( r=0.38, p=0.01 \). Results of subsequent correlational analyses controlling for the impact of cognitive variables on the relationships between schizotypy and ToM task performance did not differ substantially from those reported above.
Table 6. Zero-order correlations between schizotypy, neurocognition, and social
cognition variables, n=50.

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<tr>
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</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Note: UE=Unusual Experiences, IA=Impulsive Nonconformity, CD=Cognitive
Disorganization, IN=Impulsive Nonconformity, SILS=Shipley Institute of Living Scale IQ,
LN=Letter Number Sequencing, WCST PE=Perseverative errors, WCST CC=Categories
completed, ToM Total=ToM Stories total score, ToM Time=ToM Stories average reading
time, Eyes=Eyes total, Irony A'=Irony sensitivity, Irony B"=Irony response bias.
Table 6 continued. Zero-order correlations between schizotypy, neurocognition, and social cognition variables, n=50.

<table>
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<td>14. Irony B&quot;</td>
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<td>.03</td>
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<td>.11</td>
<td>.04</td>
<td>-.19</td>
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</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Note: UE=Unusual Experiences, IA=Impulsive Nonconformity, CD=Cognitive Disorganization, IN=Impulsive Nonconformity, SILS=Shipley Institute of Living Scale IQ, LN=Letter Number Sequencing, WCST PE=Perseverative errors, WCST CC=Categories completed, ToM Total=ToM Stories total score, ToM Time=ToM Stories average reading time, Eyes=Eyes total, Irony A'=Irony sensitivity, Irony B"=Irony response bias.
Surprisingly, the social cognition tasks showed minimal association with each other; irony sensitivity was negatively associated with average reading time for ToM stories \((r=-0.37, p=0.01)\), and there was a trend for the Eyes task to be negatively associated with ToM story reading time \((r=-0.27, p=0.06)\). Irony sensitivity and response bias for the task were not significantly associated \((r=-0.193, p=0.18)\).

Contrary to expectations, social cognition showed little association with social functioning in this sample (Table 7), although liberal response bias on the Irony task was associated with higher levels of life satisfaction \((r=-0.30, p=0.04)\). Response bias for all Irony task conditions were correlated with each other \((r's \text{ ranged from } 0.39 \text{ to } 0.51, p<0.01)\), and response bias for the metaphor condition was also negatively correlated with life satisfaction \((r=-0.30, p=0.04)\). Save for Introvertive Anhedonia, all facets of schizotypy were highly associated with depression and poor social functioning in all domains \((p<0.05; \text{ Table 8})\). Likewise, depression was strongly associated with poor social functioning \((p<0.05)\). Separate analyses were carried out by gender for peer social functioning; for both sexes, schizotypy and depression were strongly associated \((r_{\text{males}}=0.81, p<0.001; r_{\text{females}}=0.74, p<0.001)\). For males, impairments in peer social functioning was highly associated with schizotypy \((r=0.69, p=0.01)\) and depression \((r=0.76, p<0.001)\). For females, depression was not significantly associated with impairments in peer social functioning \((r=0.25, p=0.18)\), but a trend between schizotypy and peer social functioning problems was evident \((r=0.34, p=0.07)\).
Table 7. Zero-order correlations between social cognition and social functioning variables, $n=50$.

<table>
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<tr>
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** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

ToM Total=ToM Stories total score, ToM Time=ToM Stories average reading time, Eyes=Eyes Task score, Irony A'=Irony sensitivity, Irony B"=Irony response bias, SAS-P=SAS-SR Peer Relationships score, SAS-A=SAS-SR Academic Functioning score, SAS-F=SAS-SR Family Relationships score, TWS=QOLI total weighted satisfaction score.
Table 8. Zero-order correlations between schizotypy, depression, and social functioning variables, n=50.

<table>
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** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

UE=Unusual Experiences, IA=Introvertive Anhedonia, CD=Cognitive Disorganization, IN=Impulsive Nonconformity, BDI=Beck Depression Inventory total score, SAS-P=SAS-SR Peer Relationships score, SAS-A=SAS-SR Academic Functioning score, SAS-F=SAS-SR Family Relationships score, TWS=QOLI total weighted satisfaction score.
Table 8 continued. Zero-order correlations between schizotypy, depression, and social functioning variables, \( n=50 \).

<table>
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</table>

**  Correlation is significant at the 0.01 level (2-tailed).

*  Correlation is significant at the 0.05 level (2-tailed).

UE=Unusual Experiences, IA=Introvertive Anhedonia, CD=Cognitive Disorganization, IN=Impulsive Nonconformity, BDI=Beck Depression Inventory total score, SAS-P=SAS-SR Peer Relationships score, SAS-A=SAS-SR Academic Functioning score, SAS-F=SAS-SR Family Relationships score, TWS=QOLI total weighted satisfaction score.
In order to determine whether discrepancy between performance on ToM tasks and their respective control tasks varied as a function of schizotypy, additional correlational analyses were conducted using residual scores for 1) the Irony sensitivity task and 2) ToM stories task, where performance on the control tasks (i.e., sensitivity for Literal and Metaphor conditions for Irony task, Physical stories for ToM stories) was regressed out (Chapman & Chapman, 1973; Cronbach & Furby, 1970; Pike, 1992). The results of these analyses did not appreciably differ from the reported analyses which used raw scores.

Regression and Mediation Analyses

Since social cognition impairments were not related to schizotypy or social functioning in this sample, the planned mediation analysis was unwarranted (Baron & Kenny, 1986). However, the strong relationships between schizotypy, depression, and social functioning are theoretically relevant considering the aforementioned mixed findings in the literature. Therefore, exploratory mediation analyses were carried out to test whether depression mediated the relationship between schizotypal traits and poor social functioning. Separate analyses were carried out by gender for SAS-SR peer social functioning considering the aforementioned gender differences for this subscale of the SAS-SR. Regression analyses are presented in Tables 9-12 and Figures 1-2.

Results indicate that for males, depression mediated the relationship between schizotypal traits and peer social functioning problems (Sobel=2.01, p=0.04; Table 9a; Figure 1).
Table 9a. Mediation analysis: Schizotypy and depression on peer social functioning for males, $n=20$.

<table>
<thead>
<tr>
<th>Step</th>
<th>IV (O-LIFE Total) on DV (SAS-SR: Peer)</th>
<th>IV (O-LIFE Total) on Mediator (BDI)</th>
<th>Mediator (BDI) on DV (SAS-SR Peer)</th>
<th>IV (O-LIFE Total) on DV (SAS-SR Peer) in presence of Mediator (BDI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>$0.02$</td>
<td>$0.004$</td>
<td>$-0.69$</td>
<td>$4.08$</td>
</tr>
<tr>
<td>Step 2</td>
<td>$0.36$</td>
<td>$0.06$</td>
<td>$0.81$</td>
<td>$5.83$</td>
</tr>
<tr>
<td>Step 3</td>
<td>$0.03$</td>
<td>$0.01$</td>
<td>$0.56$</td>
<td>$2.13$</td>
</tr>
<tr>
<td>Step 4</td>
<td>$0.01$</td>
<td>$0.01$</td>
<td>$0.24$</td>
<td>$0.90$</td>
</tr>
</tbody>
</table>

$R^2 = 0.59$

$F = 12.25$ ($p=0.001$)

Sobel $= 2.01$ ($p=0.04$)
Figure 1: Mediation analysis for schizotypy and depression on peer social functioning for males, n=20.

Depression (BDI)

- $B = 0.36$ (S.E. $B = 0.06$), $\beta = 0.81$, $p < 0.001$
- $B = 0.03$ (S.E. $B = 0.01$), $\beta = 0.56$, $p = 0.05$

Schizotypy (O-LIFE total)

- $B = 0.02$ (S.E. $B = 0.004$), $\beta = -0.69$, $p = 0.001$

Peer Social Functioning (SAS-SR: Peer)

- After mediation:
  - $B = 0.01$ (S.E. $B = 0.01$), $\beta = 0.24$, $p = 0.38$
  - Sobel = 2.01, $p = 0.04$
For females, schizotypy and depression were not significantly associated with the outcome variable, peer social functioning ($r=0.34$, $p=0.07$, and $r=0.25$, $p=0.18$ respectively), so requirements for mediational analysis were not met (Baron & Kenny, 1986). When depression and schizotypy were considered simultaneously, the model did not fit the data well ($R^2=0.12$, adjusted $R^2=0.05$, $F(2, 27)=1.76$, $p=0.19$; Table 9b).

Table 9b. Regression analysis: Schizotypy and depression on peer social functioning for females, $n=30$.

<table>
<thead>
<tr>
<th></th>
<th>$B$</th>
<th>SE B</th>
<th>$B$</th>
<th>$t$ ($p$-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizotypy (O-LIFE total)</td>
<td>.01</td>
<td>.01</td>
<td>.34</td>
<td>1.27 ($p=0.21$)</td>
</tr>
<tr>
<td>Depression (BDI)</td>
<td>.00</td>
<td>.01</td>
<td>-.002</td>
<td>-.01 ($p=0.99$)</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td></td>
<td></td>
<td>.12</td>
</tr>
<tr>
<td>$F$</td>
<td></td>
<td></td>
<td></td>
<td>1.76 ($p=0.19$)</td>
</tr>
</tbody>
</table>

Likewise, the models for academic and family social functioning failed to meet the requirements for mediational analysis, as the potential mediator (i.e., depression) was not a significant predictor of the outcome variables in the presence of the independent variable, schizotypy (Baron & Kenny, 1986). The model for schizotypy and depression predicting family social functioning fit the data well ($R^2=0.24$, adjusted $R^2=0.21$, $F(2, 47)=7.48$, $p=0.002$; Table 10). When depression and schizotypy were considered simultaneously, there was a trend for depression to predict family functioning ($B=0.02$, $S.E. B=0.01$, $t=1.50$, $p=0.14$), while schizotypy did not contribute appreciable predictive power to the model ($B=0.01$, $S.E. B=0.01$, $t=1.50$, $p=0.14$).
Table 10. Regression Analysis: Schizotypy and depression on family social functioning, 
n=50.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>B</th>
<th>t (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizotypy (O-LIFE total)</td>
<td>.01</td>
<td>.01</td>
<td>.22</td>
<td>1.06 (p=0.29)</td>
</tr>
<tr>
<td>Depression (BDI)</td>
<td>.02</td>
<td>.01</td>
<td>.30</td>
<td>1.50 (p=0.14)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>7.48</td>
<td>(p=0.002)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

t=1.06, p=0.29). The model for schizotypy and depression predicting academic social 
functioning fit the data well ($R^2$=0.31, adjusted $R^2$=0.28, $F$(2,47)=10.61, $p<0.001$; Table 11). When considered simultaneously, there was a trend for schizotypy to predict 
academic functioning ($B=0.01$, S.E. $B=0.01$, $t=1.83$, $p=0.07$), while depression did not 
contribute appreciable predictive power to the model ($B=0.01$, S.E. $B=0.01$, $t=1.21$, 
$p=0.23$). For the total sample, the relationship between schizotypy and quality of life was 
mediated by depression (Table 12; Figure 2).
Table 11. Regression Analysis: Schizotypy and depression on academic social functioning, \( n=50 \).

<table>
<thead>
<tr>
<th></th>
<th>( B )</th>
<th>( SE ) ( B )</th>
<th>( \beta )</th>
<th>( t ) (( p )-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizotypy (O-LIFE total)</td>
<td>.01</td>
<td>.01</td>
<td>.36</td>
<td>1.83 (( p=0.07 ))</td>
</tr>
<tr>
<td>Depression (BDI)</td>
<td>.01</td>
<td>.01</td>
<td>.24</td>
<td>1.21 (( p=0.23 ))</td>
</tr>
<tr>
<td>( R^2 )</td>
<td></td>
<td></td>
<td>.31</td>
<td></td>
</tr>
<tr>
<td>( F )</td>
<td></td>
<td></td>
<td>10.61 (( p&lt;0.001 ))</td>
<td></td>
</tr>
</tbody>
</table>

Table 12. Mediation analysis: Schizotypy and depression on quality of life, \( n=50 \).

<table>
<thead>
<tr>
<th></th>
<th>( B )</th>
<th>( SE ) ( B )</th>
<th>( \beta )</th>
<th>( t ) (( p )-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1. IV (O-LIFE total) on DV (QOLI TWS)</td>
<td>-.75</td>
<td>.18</td>
<td>-.52</td>
<td>-4.19 (( p&lt;0.001 ))</td>
</tr>
<tr>
<td>Step 2. IV (O-LIFE total) on Mediator (BDI)</td>
<td>.35</td>
<td>.04</td>
<td>.78</td>
<td>8.64 (( p&lt;0.001 ))</td>
</tr>
<tr>
<td>Step 3. Mediator (BDI) on DV (QOLI TWS)</td>
<td>-1.37</td>
<td>.61</td>
<td>-.43</td>
<td>-2.24 (( p=0.03 ))</td>
</tr>
<tr>
<td>Step 4. IV (O-LIFE total) on DV (QOLI TWS) in presence of Mediator (BDI)</td>
<td>-.27</td>
<td>.28</td>
<td>-.19</td>
<td>-.98 (( p=0.33 ))</td>
</tr>
<tr>
<td>( R^2 )</td>
<td></td>
<td></td>
<td>.34</td>
<td></td>
</tr>
<tr>
<td>( F )</td>
<td></td>
<td></td>
<td>12.03 (( p&lt;0.001 ))</td>
<td></td>
</tr>
<tr>
<td>Sobel</td>
<td></td>
<td></td>
<td>-2.17 (( p=0.03 ))</td>
<td></td>
</tr>
</tbody>
</table>
Figure 2. Mediation analysis for schizotypy and depression on quality of life, n=50.

Depression (BDI)

$B= 0.35 \ (S.E. \ B=0.04), \ \beta=0.78, \ p<0.001$

$B= -1.37 \ (S.E. \ B=0.61), \ \beta=-0.43, \ p=0.03$

Schizotypy (O-LIFE total)

$B= -0.75 \ (S.E. \ B=0.18), \ \beta=-0.52, \ p<0.001$

Peer Social Functioning (QOLI TWS)

$B= -0.27 \ (S.E. \ B=0.28), \ \beta=-0.19, \ p=0.33$

Sobel=-2.17, \ p=0.03

After mediation:
Discussion

Utilizing the fully-dimensional approach to schizotypy proposed by Claridge and Beech (1995), the current study investigated the relationships between schizotypal traits, theory of mind, and social functioning while considering the contributions of depressed mood and neurocognition. The study hypotheses were partially supported; while schizotypy was associated with poor social functioning and depression, schizotypy was not associated with neurocognitive or social cognitive impairments in this sample. Contrary to expectations, individuals endorsing a greater number of schizotypal characteristics were more adept at detecting ironic statements. Moreover, unlike previous work with schizophrenia samples (Addington et al., 2006; Couture, Penn, & Roberts, 2006; Penn, Spaulding, Reed, & Sullivan, 1996; Sergi et al., 2006; Vauth, Rüsch, Wirtz, & Corrigan, 2004) social cognition and social functioning were essentially unrelated to each other in this sample. However, strong relationships were found between schizotypal traits, depression, and social functioning impairments.

The positive association between irony sensitivity and schizotypy in this sample was unexpected and intriguing. The relationship may reflect a chance finding resulting from multiple comparisons (i.e., Type I error); alternatively, the relationship may be indicative of vigilance towards social threat in schizotypy, as the ironic statements were often sarcastic slights against the story characters. Using a median split on the Schizotypal Personality Questionnaire, Langdon and Coltheart (2004) found that high schizotypal adults were significantly less sensitive to ironic statements than low schizotypal adults.
Despite the presence of significant group differences, correlations between individual facets of schizotypy and irony sensitivity were not significant in Langdon and Coltheart’s study; thus it is possible that the relationship between schizotypal traits and irony sensitivity was curvilinear, such that only extreme scorers on the schizotypy measure evidenced ToM impairment.

Considering the findings of the present study in the context of Langdon and Coltheart’s (2004) results, it is possible that a “threshold effect” may exist whereby schizotypal traits confer no detrimental effects, or even a slight advantage for some aspects of social cognition up to a point, and social cognition is negatively impacted only after surpassing a symptomatic threshold. Since the range of schizotypy scores was somewhat restricted in the current sample, in order to address this question in future research, we plan to recruit extreme scorers on the schizotypy scale and test whether the relationships between schizotypy, social cognition, and social functioning in these individuals are consistent with those identified in the larger sample. Moreover, we plan to include measures of social anxiety in order to investigate the potential role of fear of negative social evaluation on the relationship between schizotypy and irony sensitivity.

Previous studies of the relationship between neurocognition and schizotypy have yielded mixed findings (e.g., Gooding et al., 1999; Jahshan & Sergi, 2007; Lenzenweger & Korfine, 1994; Spitznagel & Suhr, 2002). In the current sample, no relationship between schizotypy and neurocognitive functioning was found. Neurocognitive dysfunction is often associated with negative aspects of schizotypy (Gooding et al., 1999); the null findings of the current study, in this regard may be attributable to the absence of extreme
scorers on the negative schizotypy component of the O-LIFE, the Introvertive Anhedonia subscale. Future studies which selectively recruit “negative schizotypes” could explore this hypothesis further. Performance on the ToM story task was associated with the expected neurocognitive domains, executive functioning and working memory. General cognitive ability was associated with all social cognition tasks, underscoring the importance of considering IQ and verbal ability when investigating ToM (Brüne, 2003; Happé, 1995).

The relationship between social cognition and social functioning impairment is well-established in the schizophrenia literature (Addington et al., 2006; Couture et al., 2006; Penn et al., 1996; Sergi et al., 2006; Vauth et al., 2004). The current study failed to find robust associations between performance on ToM tasks and functional outcome. One relationship which did emerge was that between life satisfaction and direction of response bias for the irony sensitivity task. Individuals who engaged in a more liberal response style (i.e., “yes” response set) in the irony and metaphor conditions demonstrated greater life satisfaction than individuals who engaged in a conservative response style (i.e., “no” response set). This relationship may reflect the tendency of individuals who engage in a conservative response set to have a greater tendency to dismiss ambiguous, yet potentially relevant social cues, possibly reducing their opportunity to engage in rewarding activities and hence impacting life satisfaction. Alternatively, perhaps the relationship reflects a tendency for those with a conservative, or “no” response set on the irony and metaphor tasks to engage in a more conservative rating style on the QOLI (i.e., to “down-rate” self-reported life satisfaction scores), and vice-versa for those with a liberal, or “yes” response set.
Because schizotypy was not associated with ToM impairments, the planned mediation analyses were not conducted. Instead, exploratory analyses examining the strong relationships between schizotypy, poor social functioning, and depressed mood were carried out. Results of these analyses underscore the importance of considering the impact of depression on various aspects of social functioning in schizotypy. Depression mediated the relationship between schizotypy and life satisfaction for the entire sample, indicating that schizotypal traits such as cognitive disorganization, unusual thoughts and perceptual experiences, social and physical anhedonia, and disinhibition exert their influence on life satisfaction via depression. Depression also mediated the relationship between schizotypy and peer social functioning for males, suggesting that social relationships for males with schizotypal traits suffer as a result of co-occurring depression. For females, depression and peer social functioning were not significantly associated, possibly because it is more socially acceptable for distressed females to seek out social support from their peers (Tamres, Janicki, & Helgeson, 2002). However, there was a non-significant trend for schizotypal traits to be associated with impairments in peer social functioning for females; it is unclear whether females with schizotypal traits withdraw from their peers of their own accord (e.g., due to social anhedonia), or if they are (or perceive that they are) not accepted by their peers due to factors such as eccentricity or social oddness.

Although schizotypal traits were associated with participants' ratings of family functioning, when considered simultaneously, depression emerged as the best predictor, with schizotypy adding little predictive power to the model. Items on the family functioning subscale of the SAS-SR were predominantly related to frequency of contact
with immediate family members, reliance on family members for practical needs and support, feeling as if the family has “let you down” or you have “let the family down”. On the face of it, these items appear to be more related to depressive symptomatology than to schizotypy. For example, a depressed young adult is likely to report reduced contact with their family, that their family is not supportive, that they have failed their family, or that their family has failed them. Indeed, research with schizophrenia samples suggests that rather than positive symptoms, it is the negative symptoms of schizophrenia, symptoms which are also often present in depression such as withdrawal, anhedonia, and poor motivation, that are predictive of family functioning and caregiver burden (Provencher & Mueser, 1997).

In contrast, the results for the academic functioning subscale of the SAS-SR indicate that schizotypal traits were a better predictor of academic functioning than depressive symptoms. Items on this subscale tapped into domains such as number of class sessions missed, ability to keep up with schoolwork demands, satisfaction with performance at school, and experience of conflicts with fellow students. These items appear to reflect the impact of the cognitive disorganization (e.g., difficulty keeping up with demands) and disinhibition (e.g., “skipping” classes, conflicts) aspects of schizotypy on academic functioning.

There were several limitations to the current study. First, no participants had extreme scores on the Introvertive Anhedonia subscale of the O-LIFE; hence the impact of “negative” schizotypy on neurocognition, social cognition, and social functioning could not be adequately evaluated in this sample. Likewise, the range of the total score for the
O-LIFE was somewhat restricted; thus it is unclear whether the relationships found in the current sample would remain consistent for individuals exhibiting higher levels of schizotypal traits. As noted above, selective recruitment of “high schizotypes” is planned to investigate this question. Moreover, given the mixed results of investigations of ToM and schizotypy in the literature, recruitment of extreme scorers on the schizotypy measure might elucidate potential reasons why some investigators have found robust relationships between schizotypy and ToM impairments, while others have not. Specifically, selective recruitment of high schizotypes could resolve whether a symptomatic threshold exists which must be surpassed in order to observe social cognitive deficits.

Another potential limitation of the study is related to the tasks used to assess ToM abilities. It is possible that aside from the Irony Perception task, which was associated with schizotypal traits (albeit in the opposite direction from that hypothesized), perhaps the Eyes task and ToM stories task were not sensitive enough to detect the subtle ToM impairments thought to be associated with schizotypy. Selecting tasks of sufficient sensitivity for use with a high-functioning, undergraduate sample was a concern for the author; the tasks used in the current study were selected because they have been successfully used with undergraduate samples in the literature (Langdon & Coltheart, 2004; Pickup, 2006). Moreover, scores for all the tasks showed sufficient variability and absence of ceiling effects. What is more, inclusion of reading time for the ToM stories allowed for the exploration of the relationship between processing speed for a ToM task and schizotypy, in addition to the gross measure of accuracy. Despite these considerations, a negative relationship between schizotypy and ToM ability failed to
emerge. Strengths of the current study include use of a diverse array of ToM measures, whereas many studies have employed a single social cognition measure. In addition, the current study included measures of general intellectual ability and assessment of relevant cognitive domains (i.e., working memory and executive functioning).

When considering the mixed findings in the schizotypy literature, one must consider the means by which researchers measure schizotypy. Some researchers adopt a categorical approach to identify extreme scorers on clinically-focused schizotypy measures which contain items selected in part because they are infrequently endorsed by the general population, or items that directly map onto DSM-IV criteria for schizotypal personality disorder (Claridge, 1997; Claridge & Beech, 1995). Often, the result of this approach is inclusion of individuals exhibiting attenuated symptoms of psychosis, or individuals who exhibit features of schizotypal personality disorder, and comparing these individuals to healthy control participants. In contrast, the fully-dimensional approach typically employs schizotypy measures that are less symptom-focused, and participants from the entire range of the continuum are included for study, rather than just individuals at the extreme end of the schizotypy distribution. The mixed findings in the literature may, in part, be related to differences in study samples related to these two approaches; studies, such as the present one, employing the dimensional approach may have an insufficient number of individuals at the upper tail of the schizotypy distribution for robust relationships to emerge. However, it is important to note that not all studies employing the dimensional approach to the investigation of ToM in schizotypy have found null results (e.g., Pickup, 2006), and not all studies employing the categorical approach have found differences between high and low schizotypes (e.g., Jahshan & Sergi, 2007).
related concern is the use of the O-LIFE questionnaire to assess schizotypal traits; although the measure is widely used in the United Kingdom, the scale has not yet been validated for use with North American samples. We are currently collecting normative data for a North American undergraduate sample. Early results suggest that the North American norms are similar to those reported by Claridge and colleagues for the UK normative sample (McCleery, St-Hilaire, Aakre, Seghers, & Docherty, 2007; Mason & Claridge, 2006; Mason et al., 1995). In addition, we plan to validate the measure in an undergraduate sample by comparing scores on the O-LIFE with scores from schizotypy measures widely used in North America such as the Schizotypal Personality Questionnaire (Raine, 1991), and the Chapman Perceptual Aberration, Magical Ideation, and Social Anhedonia scales (Chapman et al., 1976; Chapman et al., 1978; Eckblad & Chapman, 1983).

In sum, within a fully-dimensional framework, the present study explored the relationship between schizotypal traits, neurocognition, social cognition, and social functioning in a sample of undergraduate students from a mid-Western university. Contrary to predictions, no associations between schizotypy and neurocognition (i.e., executive functioning and working memory) were found. Likewise, schizotypal traits were not associated with impaired social cognition. Rather, schizotypal traits were associated with enhanced performance on one social cognitive task which involved detection of ironic statements. Social cognition and social functioning were essentially unrelated to each other in this sample; however schizotypy was strongly associated with both depression and social functioning impairments. Exploratory analyses revealed that depression mediated the relationship between schizotypy and quality of life for the entire sample, as
well as the relationship between schizotypy and peer social functioning in males. Depression emerged as a predictor of family functioning for the entire sample, while schizotypy was a predictor of academic functioning for the entire sample, and for peer social functioning in females. Since the range of schizotypy scores was somewhat restricted in the current sample, it is unclear whether the relationships described in the current study will apply also to a more symptomatic sample.
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Appendix A. Consent Form.

CONSENT FORM

Consent Form: Personality and Social Cognition

I want to do research about the relationship between certain personality traits and social functioning, social problem-solving, and communication. I want to do this because this study can help us learn more about (1) the underpinnings of certain aspects of social cognition, and 2) how social cognition is related to functioning in day-to-day life. In addition, the findings of this study can be helpful to researchers who work with clinical populations, since the underlying theory is that these personality traits are present to varying degrees in everyone. Approximately 100 individuals will be asked to participate, and I would like you to take part in this project. If you decide to do this, you will be asked to fill in several surveys about your thoughts, beliefs and perceptions, your ability to function in the different areas of your life and your satisfaction in these areas, your current mood and experience of emotions. In addition, you will complete tasks which look at your thinking, reasoning, memory, social perception, and social problem-solving. Finally, you will be asked to provide two short speech samples, which will be recorded, where you discuss what is happening in two photos that will be presented to you. The entire battery of tests will take approximately 3 hours to complete.

Although there are no serious risks involved in participating in this study, you may become tired from answering questions or you may feel uncomfortable answering some of the items on the questionnaires. Please be aware that your questionnaire will not contain any identifying information about you, so your responses will remain anonymous and confidential within the limits of the law. You may also become tired during the cognitive tests, but you will be permitted to take short breaks if you so choose.

If you take part in this project you will receive 6 General Psychology research credits. Your participation will help us learn more about how personality traits are related to social cognition, and how social cognition is related to day-to-day functioning. Taking part in this project is entirely up to you, and no one will hold it against you if you decide not to do it. If you do take part, you may stop at any time.

If you want to know more about this research project, please call me at 330-474-1706; or Dr. Docherty at 330-672-7670. The project has been approved by Kent State University. If you have questions about Kent State University’s rules for research, please call Dr. Peter C. Tandy, Acting Vice President and Dean, Division of Research and Graduate Studies (Tel. 330.672.2704).

You will get a copy of this consent form.

Sincerely,
Amanda McCleery, MA Candidate, Dept. Psychology, KSU
B. CONSENT STATEMENTS

I agree to take part in this project. I know what I will have to do and that I can stop at any time.

__________________________________________
Signature                                  Date

AUDIO/VIDEOTAPE CONSENT FORM

I agree to audio taping at Kent State University, Department of Psychology
on___________________________________________________.

__________________________________________
Signature                                  Date

I have been told that I have the right to hear the audio tapes before they are used. I have decided that I:

____do want to hear the tapes           ____do not want to hear the tapes

Sign now below if you do not want to hear the tapes. If you want to hear the tapes, you will be asked to sign after hearing them.

Amanda McCleery and other researchers approved by Kent State University may / may not use the tapes made of me. The original tapes or copies may be used for:

____this research project only  ____this and future research projects

____presentation at professional meetings

__________________________________________
Signature                                  Date

Address:
Appendix B. Demographics Form.

Demographics

1. Sex:  M   F

2. DOB (dd/mm/yy):_________________________________________________

3. Do you smoke cigarettes?  Y   N
   If yes, record approximate number of cigarettes per day:__________________

4. Ethnicity (please check):
   __A. Caucasian
   __B. African-American
   __C. Asian-American
   __D. Hispanic
   __E. Other (specify):

5. Year in school (please circle):
   __A. Freshman
   __B. Sophomore
   __C. Junior
   __D. Senior
   __E. Other (specify):

6. Mother’s Education:
   __A. Graduate Degree (e.g., Master’s, PhD, MD, LLB)
   __B. 4-year College
   __C. Part College, 2-Year College, Trade School or other Post-Secondary
   __D. High School
   __E. Part High School
   __F. 8th Grade or less

7. Father’s Education:
   __A. Graduate Degree (e.g., Master’s, PhD, MD, LLB)
   __B. 4-year College
   __C. Part College, 2-Year College, Trade School or other Post-Secondary
   __D. High School
   __E. Part High School
F. 8th Grade or less

8. History of traumatic brain injury: Y N
9. History of significant loss of consciousness (e.g., unconscious for several minutes, required treatment, lasting consequences of injury): Y N
10. History of seizure disorder: Y N
11. Past Psychiatric Hospitalizations: Y N
12. Current Psychiatric Diagnosis: Y N
   If yes, specify diagnosis and date received:

13. Current Medications: Y N
   If yes, specify name, dose and approximate date prescribed:

14. Substance Use in Previous Month:

<table>
<thead>
<tr>
<th>Substance</th>
<th>No use</th>
<th>Mild use/Social use</th>
<th>Abuse</th>
<th>Dependence</th>
<th>Frequency of use in last month</th>
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<tbody>
<tr>
<td>Alcohol</td>
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<td>Marijuana</td>
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<td>Cocaine</td>
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<td>MDMA/Ecstasy</td>
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<td>Hallucinogens</td>
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<tr>
<td>Other (specify)</td>
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Additional Notes:

EXCLUSION CRITERIA:

History of:
   a. Traumatic brain injury
b. Significant loss of consciousness requiring medical treatment or with lasting negative consequences

c. Seizure disorder

Does this participant meet exclusion criteria? Y N
Appendix C. Oxford-Liverpool Inventory of Feelings and Experiences.

O-LIFE

Unusual Experiences

1. Do you believe in telepathy?
2. Do you ever feel sure that something is about to happen, even though there does not seem to be any reason for you thinking that?
3. Do you ever suddenly feel distracted by distant sounds that you are not normally aware of?
4. Do you often have days when indoor lights seem so bright that they bother your eyes?
5. Does your sense of smell sometimes become unusually strong?
6. Have you felt as though your head or limbs were somehow not your own?
7. Have you sometimes sensed an evil presence around you, even though you could not see it?
8. Have you wondered whether the spirits of the dead can influence the living?
9. On occasions, have you seen a person’s face in front of you when no one was in fact there?
10. When in the dark do you often see shapes and forms even though there’s nothing there?
11. When you look in the mirror does your face sometimes seem quite different from usual?
12. Are your thoughts sometimes so strong that you can almost hear them?
13. Can some people make you aware of them just by thinking about you?
14. Do ideas and insights sometimes come to you so fast that you cannot express them all?
15. Do the people in your daydreams seem so true to life that you sometimes think they are real?
16. Do you sometimes feel that your accidents are caused by mysterious forces?
17. Do you think you could learn to read other’s minds if you wanted to?
18. Does it often happen that nearly every thought immediately and automatically suggests an enormous number of ideas?
19. Does a passing thought ever seem so real it frightens you?
20. Does your voice ever seem distant or faraway?
21. Have you ever felt that you have special, almost magical powers?
22. Is your hearing sometimes so sensitive that ordinary sounds become uncomfortable?
23. Do you ever have a sense of vague danger or sudden dread for reasons that you do not understand?
24. Do you feel so good at controlling others that it sometimes scares you?
25. Have you ever thought you heard people talking only to discover that it was in fact some nondescript noise?
26. Have you felt that you might cause something to happen just by thinking too much about it?
27. Have you occasionally felt as though your body did not exist? 
28. Have you sometimes had the feeling of gaining or losing energy when certain people look at you or touch you? 
29. Are the sounds you hear in your daydreams really clear and distinct? 
30. Do your thoughts sometimes seem as real as actual events in your life? 

Cognitive Disorganization 
1. Are you easily distracted when you read or talk to someone? 
2. Do you ever feel that your speech is difficult to understand because the words are all mixed up and don’t make sense? 
3. Do you often experience an overwhelming sense of emptiness? 
4. Do you often feel lonely? 
5. Is it hard for you to make decisions? 
6. Are you a person whose mood goes up and down easily? 
7. Are you easily hurt when people find fault with you or the work you do? 
8. Are you sometimes so nervous that you are blocked? 
9. Do you dread going into a room by yourself where other people have already gathered and are talking? 
10. Do you easily lose your courage when criticized or failing in something? 
11. Do you find it difficult to keep interested in the same thing for a long time? 
12. Do you frequently have difficulty in starting to do things? 
13. Do you often feel that there is no purpose to life? 
14. Do you often have difficulties in controlling your thoughts? 
15. Do you often worry about things you should not have done or said? 
16. Do you worry about awful things that might happen? 
17. No matter how hard you try to concentrate do unrelated thoughts creep into your mind? 
18. When in a crowded room, do you often have difficulty in following a conversation? 
19. Are you easily confused if too much happens at the same time? 
20. Are you easily distracted from work by daydreams? 
21. Do you often feel “fed up”? 
22. Do you worry too long after an embarrassing experience? 
23. Would you call yourself a nervous person? 
24. Do you often hesitate when you are going to say something in a group of people whom you more or less know? 

Introvertive Anhedonia 
1. Can you usually let yourself go and enjoy yourself at a lively party? (negative) 
2. Do people who try to get to know you better usually give up after a while? 
3. Do you feel that making new friends isn’t worth the energy it takes? 
4. Do you find the bright lights of a city exciting to look at? (negative) 
5. Do you like going out a lot? (negative) 
6. Do you prefer watching television to going out with other people? 
7. Do you usually have very little desire to buy new kinds of food? 
8. Is it fun to sing with other people? (negative) 
9. Are people usually better off if they stay aloof from emotional involvements with people?
10. Are there very few things that you have ever really enjoyed doing?
11. Are you much too independent to really get involved with other people?
12. Are you rather lively? (negative)
13. Can just being with friends make you feel really good? (negative)
14. Do you have many friends? (negative)
15. Do you like mixing with people? (negative)
16. Do you think having close friends is not as important as some people say?
17. Does it often feel good to massage your muscles when they are tired or sore? (negative)
18. Has dancing or the idea of it always seemed dull to you?
19. Have you often felt uncomfortable when your friends touch you?
20. Is trying new foods something you have always enjoyed? (negative)
21. On seeing a soft thick carpet have you sometimes had the impulse to take off your shoes and walk barefoot on it? (negative)
22. When things are bothering you do you like to talk to other people about it? (negative)
23. Do you feel very close to your friends? (negative)
24. Do you love having your back massaged? (negative)
25. Have you had very little fun from physical activities like walking, swimming, or sports?
26. Do you enjoy many different kinds of play and recreation? (negative)
27. Is it true that your relationships with other people never get very intense?

Impulsive Nonconformity
1. Do people who drive carefully annoy you?
2. Do you often feel like doing the opposite of what other people suggest, even though you know they are right?
3. Do you often feel the impulse to spend money which you know you can’t afford?
4. Do you often have an urge to hit someone?
5. Do you sometimes talk about things you know nothing about?
6. Are you usually in an average sort of mood, not too high and not too low? (negative)
7. Do you at times have an urge to do something harmful or shocking?
8. Do you ever have the urge to break or smash things?
9. Do you often change between intense liking and disliking of the same person?
10. Do you stop to think things over before doing anything? (negative)
11. Do you think people spend too much time safeguarding their future with savings and insurance?
12. Have you ever blamed someone for doing something you know was really your fault?
13. Have you ever cheated at a game?
14. Have you ever felt the urge to injure yourself?
15. When in a group of people do you usually prefer to let someone else be the centre of attention? (negative)
16. When you catch a train do you often arrive at the last minute?
17. Would being in debt worry you? (negative)
18. Would you take drugs which may have strange or dangerous effects?
19. Do you consider yourself to be pretty much an average kind of person? (negative)
20. Have you ever taken advantage of someone?
21. Would you like other people to be afraid of you?
22. Do you often overindulge in alcohol or food?
23. Would it make you nervous to play the clown in front of other people? (negative)

All items scored +1 for “yes”, 0 for “no” except negative items for which +1 for “no”, 0 for “yes”.
Appendix D. Chapman Infrequency Scale

Chapman Infrequency Scale

1. On some mornings, I didn’t get out of bed immediately when I first woke up. (False)
2. There have been a number of occasions when people I know have said hello to me. (False)
3. There have been times when I have dialed a telephone number only to find that the line was busy. (False)
4. At times when I feel ill or tired, I have felt like going to bed early. (False)
5. On some occasions I have noticed that some other people are better dressed than myself. (False)
6. Driving from New York to San Francisco is generally faster than flying between these cities. (True)
7. I believe that most light bulbs are powered by electricity. (False)
8. I go at least once every two years to visit either northern Scotland or some part of Scandinavia. (True)
9. I cannot remember a time when I talked to someone who wore glasses. (True)
10. Sometimes when walking down a sidewalk, I have seen children playing. (False)
11. I have never combed my hair before going out in the morning. (True)
12. I find that I often walk with a limp, which is the result of a skydiving accident. (True)
13. I cannot remember a single occasion when I have ridden a bus. (True)

Endorsement of 3 or more infrequency items suggests random or invalid response style.
Appendix E. Beck Depression Inventory Instructions.

BDI

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feelings during the **past two weeks, including today**. Circle the number beside each statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).
Appendix F. Shipley Institute of Living Scale Instructions.

**Instructions:** In the test below, the first word in each line is printed in capital letters. Opposite it are four other words. Circle the *one word* which means the *same thing*, or most nearly the same thing as the first word. If you don’t know, guess. Be sure to circle the *one word* in each line that means the same thing as the first word.

**Example:**

| LARGE | red | big | silent | wet |

**Instructions:** Complete the following by filling in either a number or a letter for each dash (___). Do the items in order, but don’t spend too much time on any one item.

**Example:**

A   B   C   D   ___
Appendix G. Letter-Number Sequencing Task Instructions.

Note: when administering the stimuli, make sure you say each letter or number with one second between each.

Script:

*I am going to say a list of numbers and letters. When I am through, I want you to first tell me the numbers in order from smallest to biggest. Then I want you to tell me the letters in alphabetical order.*

*So, for example, if I say A4, the answer is 4A. The number goes first, then the letter. If I say 8B2, you answer 28B, number first in order, then letters.*

Try these:

B9 (9B); 7C (7C); 2P9 (29P); Z9A (9AZ); 8MC (8CM)

Continue practice until the participant can do a three-symbol sequence. If unable to do so after four additional trials (L9U, 8P4, WN5, R47), begin the test.

Administer all four items at each level until all items are failed at a level. Items should be read to the subject at a rate of one letter or number per second. Circle failed items. Instructions may be repeated in the beginning during the 2-symbol sequence when subjects are especially likely to misinterpret the instructions. Correct answers are in parentheses.

WCST-64 Instructions

Administration

- Click on the WCST-64 icon on the desktop and ensure the speakers are turned on.

- Select “New Client File”
  - Enter subject’s information into the appropriate boxes – be sure to include the participant’s age – this is needed to generate the score report.

- Select “Add Protocol”
- Select “Administer” to start the task

Read these instructions to the participant:

If using the keyboard:
“This test is a little unusual because I am not allowed to tell you very much about how to do it. You will be asked to match each of the cards that appear here” (point to the first response card at the bottom center of the screen) “to one of these four key cards” (point to each of the stimulus cards at the top of the screen).

“On the keyboard in front of you are four symbols which resemble the key cards” (point to each of the Keytops on the keyboard followed by they stimulus card which it represents). “To make a match, simply press the key with the symbol that you believe matches the card at the bottom of the screen” (point to the first response card at the bottom center of the screen).

“The computer will place your card under the key card that you select, and a new card will appear at the bottom of the screen. If you wish to change your answer before the card stops moving, immediately press the Escape Key. The Escape Key is the default cancel command. You may elect to change this via View/Options. You will then be permitted to select again. However, you may not change your answer after the card stops moving. If this happens don’t try to hit another key, just go on to the next card.

“I cannot tell you how to match the cards, but the computer screen will show you each time whether you are right (correct) or wrong (incorrect). I will also say the same word the computer shows on the screen ‘right (correct)’ or ‘wrong (incorrect),’” or “The computer will also say the same word it shows on the screen, ‘right (correct)’ or ‘wrong (incorrect).’”
“If you were wrong, simply try to match the next card correctly, and then continue matching the cards correctly until the test is over. There is no time limit on this test. Are you ready? Let’s begin.”
Appendix I. Strange Stories Task.

Strange Stories Task

There are 2 conditions in this test, consisting of two sorts of materials;
Social - stories to do with mental states (numbered 21 - 28)
Physical - stories to do with physical behaviour (numbered 11 - 18)
There are 8 examples of each of these 2 sorts. All 8 passages of one type are given
together, but the order of the 2 conditions is to be counterbalanced (subject 1
gets Social then Physical; subject 2 gets Physical then Social, etc.).

Each passage is followed by a question, which should appear on a separate page (either
the next page or on the reverse of the story page). Subjects are given a practice
item first, and instructed, in words to this effect;
"On each page you will find a short story to read. After you've read and understood the
story, I want you to turn the page. There is a question after each story - and I'd
like you to tell me the answer to this question. I don't want you to look back at
the story, so make sure you've understood it before turning over for the
question."

The practice story should be given before the first Physical or Social story is given.

For each story, the subject should read the passage, and then answer the question. If
subjects cannot read, or are suspected of failing to pay attention to the whole of a
passage, they should be asked to read it aloud. If severe memory impairments
are suspected, the story may be left visible while the question is presented.
These, and any other, changes in administration should be noted.

Time to read the story, i.e. time from story presentation until subject turns the page, is to
be recorded. In addition, it may be useful to tape-record the test session for later
transcription. Score sheets for recording time and response are included.

References: The 8 social stories are taken from 24 developed by Happé, 1994 (An
advanced test of theory of mind: Understanding of story characters' thoughts and
feelings by able autistic, mentally handicapped and normal children and adults. Journal of Autism and Developmental Disorders, 24, 129-154.) The set of social
and nonsocial story materials, as here, have been used in scanning and
neuropsychological studies by the same author: Fletcher, et al (1995) Other
minds in the brain: A functional imaging study of "theory of mind" in story
comprehension. Cognition, 57, 109-128; Happé, F.G.E., Brownell, H. & Winner,
PET scan study of Asperger syndrome. NeuroReport, 8, 197-201; Happé,
Practice Story

On Christmas Eve Alice’s mother takes her to the big department store in town. They go to look in the toy department. In the toy department Mr. Brown, Alice’s next-door neighbour, is dressed up as Santa Claus, giving out sweets to all the children. Alice thinks she recognizes Mr. Brown, so she runs up to him and asks, “Who are you?” Mr. Brown answers, “I’m Santa Claus!”

Q: Why does he say this?

Physical Stories

11. Two enemy powers have been at war for a very long time. Each army has won several battles, but now the outcome could go either way. The forces are equally matched. However, the Blue army is stronger than the Yellow army in foot soldiers and artillery. But the Yellow army is stronger than the Blue Army in air power. On the day of the final battle, which will decide the outcome of the war, there is heavy fog over the mountains where the fighting is about to occur. Low-lying clouds hang above the soldiers. By the end of the day the Blue army has won.

Q: Why did the Blue army win?

12. A burglar is about to break into a jewelers’ shop. He skillfully picks the lock on the shop door. Carefully he crawls under the electronic detector beam. If he breaks this beam it will set off the alarm. Quietly he opens the door of the store-room and sees the gems glittering. As he reaches out, however, he steps on something soft. He hears a screech and something small and furry runs out past him, towards the shop door. Immediately the alarm sounds.

Q: Why did the alarm go off?

13. Mrs. Simpson, the librarian, receives a special book which she has to catalogue and find an appropriate place for. She has to decide which section to file it under. The library is very big, and has different sections on many different subjects. The new book is about plants and their medical uses, and is heavily illustrated. However, Mrs. Simpson does not put it on the shelf with the rest of the books on botany. Neither does she put it with the books on medicine. Instead, she carefully takes it into a separate
room. In this room all the books are kept in special cases, and the temperature is kept constant.

Q: Why did she do this?

14. Henry is preparing for a big dinner party. He is famous for his excellent mayonnaise. He has bought lots of fresh eggs. The recipe says, "Carefully separate the yolks of six eggs and add oil very gradually". He has already bought easily enough dessert to feed everyone. However, he now looks up the recipe for meringues. Henry will not waste anything.

Q: Why does Henry make meringues?

15. Paul is very rich, and today he is going to buy an expensive new car. He is considering whether to make a single payment, or whether to spread the cost over the year. If he pays in monthly installments, the dealer will charge five percent interest on the loan. His bank currently gives him eight percent interest on the money in his account. Even though he has easily enough money to pay the full amount, he decides to pay by monthly installments.

Q: Why does he do that?

16. Old Mrs. Robinson is very frail. One day she slips on her icy doorstep and falls on her side. She gets up right away, although she feels quite bruised and shaken. The next day her leg feels very stiff and she can scarcely walk. She makes her way to the doctors. As soon as the doctor hears about the fall, and sees her swollen side, he says, "Go immediately to casualty". At the casualty department they take an X-ray.

Q: Why did they take an X-ray?

17. Sarah is very long-sighted. She has only one pair of glasses, which she keeps losing. Today she has lost her glasses again and she needs to find them. She had them yesterday evening when she looked up the television programs. She must have left them somewhere that she has been today. She asks Ted to find her glasses. She
tells him that today she went to her regular early morning keep fit class, then to the post office, and last to the flower shop. Ted goes straight to the post office.

Q: Why is the post office the most likely place to look?

18. John is going shopping. He buys a nice new desk lamp, for his study. He needs a light bulb for his new lamp. He goes from the furniture department to the electrical department. In the electrical department he finds that there are two brands of light bulb of the right kind. Everbrite light bulbs cost less in single packs than Literite bulbs. However, only Literite bulbs come in multi-packs of six. John buys the multi-pack, even though he only needs one bulb.

Q: Why does John buy the Literite bulbs?

Theory of Mind Stories

21. Simon is a big liar. Simon's brother Jim knows this, he knows that Simon never tells the truth! Now yesterday Simon stole Jim's ping-pong bat, and Jim knows Simon has hidden it somewhere, though he can't find it. He's very cross. So he finds Simon and he says, "Where is my ping-pong bat? You must have hidden it either in the cupboard or under your bed, because I've looked everywhere else. Where is it, in the cupboard or under your bed?" Simon tells him the bat is under his bed.

Q: Why will Jim look in the cupboard for the bat?

22. During the war, the Red army captures a member of the Blue army. They want him to tell them where his army's tanks are; they know they are either by the sea or in the mountains. They know that the prisoner will not want to tell them, he will want to save his army, and so he will certainly lie to them. The prisoner is very brave and very clever, he will not let them find his tanks. The tanks are really in the mountains. Now when the other side asks him where his tanks are, he says, "They are in the mountains".

Q: Why did the prisoner say that?
23. Brian is always hungry. Today at school it is his favorite meal - sausages and beans. He is a very greedy boy, and he would like to have more sausages than anybody else, even though his mother will have made him a lovely meal when he gets home! But everyone is allowed two sausages and no more. When it is Brian's turn to be served, he says, "Oh, please can I have four sausages, because I won't be having any dinner when I get home!"

Q: Why does Brian say this?

24. Jill wanted to buy a kitten, so she went to see Mrs. Smith, who had lots of kittens she didn't want. Now Mrs. Smith loved the kittens, and she wouldn't do anything to harm them, though she couldn't keep them all herself. When Jill visited she wasn't sure she wanted one of Mrs. Smith's kittens, since they were all males and she had wanted a female. But Mrs. Smith said, "If no one buys the kittens I'll just have to drown them!"

Q: Why did Mrs. Smith say that?

25. One day Aunt Jane came to visit Peter. Now Peter loves his aunt very much, but today she is wearing a new hat; a new hat which Peter thinks is very ugly indeed. Peter thinks his aunt looks silly in it and much nicer in her old hat. But when Aunt Jane asks Peter, "How do you like my new hat?", Peter says, "Oh, its very nice".

Q: Why does he say that?

26. Helen waited all year for Christmas, because she knew at Christmas she could ask her parents for a rabbit. Helen wanted a rabbit more than anything in the world. At last Christmas Day arrived, and Helen ran to unwrap the big box her parents had given her. She felt sure it would contain a little rabbit in a cage. But when she opened it, with all the family standing round, she found her present was just a boring old set of encyclopedias, which Helen did not want at all! Still, when Helen's parents asked her how she liked her Christmas present, she said, "It's lovely, thank you. It's just what I wanted".

Q: Why did she say this?
27. Late one night old Mrs. Peabody is walking home. She doesn't like walking home alone in the dark because she is always afraid that someone will attack her and rob her. She really is a very nervous person! Suddenly, out of the shadows comes a man. He wants to ask Mrs. Peabody what time it is, so he walks towards her. When Mrs. Peabody sees the man coming towards her, she starts to tremble and says, "Take my purse, just don't hurt me please!"

Q: Why did she say that?

28. A burglar who has just robbed a shop is making his getaway. As he is running home, a policeman on his beat sees him drop his glove. He doesn't know the man is a burglar, he just wants to tell him he dropped his glove. But when the policeman shouts out to the burglar, "Hey, you! Stop!", the burglar turns round, sees the policeman and gives himself up. He puts his hands up and admits that he did the break-in at the local shop.

Q: Why did the burglar do that?

Strange Stories Task - Examples of scoring

- **Jim and the ping pong paddle**

  2 points ref to Jim knowing Simon lies.

  Because Simon has not told the truth.
  He knows Simon is a liar and will try to make him look in a different place.

  1 point ref to facts (e.g. that's where it really is), or Simon hiding it without ref to implications of lying.

  He thinks that Simon has hidden it in the cupboard.

  0 points ref to general nonspecific info.

  Because he looked everywhere else.
  Because Simon told him it was there.
  He knows it's either in the cupboard or under the bed.
  Because he normally kept the paddle there.
- **Blue and red armies – prisoner**

  2 points  ref to fact that other army will not believe and hence look in other place, to prisoner’s realisation that that’s what they’ll do or ref to double bluff.

  It’s a double bluff - because he knows that the enemy will think he’s lying. Because the other army will think he’s lied and look in the other place. He’s pretending to lie. He knows the others will know he’d lie so he had to tell the truth.

  1 point  ref to outcome (e.g. to save his army’s tanks) or to mislead them.

  0 points  ref to motivation that misses the point of double bluff.

  To lie to them.
  He was scared.
  He wanted to tell the truth.

- **Brian and the sausages**

  2 points  ref to fact that eliciting sympathy, being deceptive.

  So that the others will feel sorry for him and make sure he’ll not go hungry.
  He’s hoping to gain sympathy in order to get more food than allowed.

  1 point  ref to his state (greedy), outcome (to get more sausages) or factual

  So he gets more sausages.
  Because he is hungry.
  He’s greedy.

  0 points  ref to motivation that misses the point of sympathy elicitation/deception. Factually incorrect.

- **Mrs Smith and the kitten**

  2 points  ref to persuasion, manipulating feelings, trying to induce guilt/pity etc.

  She would make Jill feel sorry for the kittens and make her take one.
  To make Jill feel guilty and take one.
  To scare Jill into buying one.
  She wanted to emotionally blackmail Jill and force her to buy one.

  1 point  ref to outcome (to sell them or get rid of them in a way which implies not drowning), or simple motivation (to make Jill sad)

  So Jill buys a kitten anyway.
There are too many of them and she can’t keep them so she wants Jill to take one.
She wants the girl to take one.

0 points ref to general knowledge or dilemma without realization that the statement was not true

She’s a horrible woman / she hates cats/there are too many and she can’t keep them / Her house isn’t big enough.

She wants a female cat.

• Aunt and her hat

2 points ref to white lie or wanting to spare her feelings. Some implication that this is for aunt’s benefit rather than just for his, desire to avoid rudeness or insult.

He loves his aunt very much and he doesn’t want to hurt her feelings.

1 point ref to trait (he’s a nice boy), or relationship (he likes his aunt). Purely motivational (so she won’t shout at him) with no ref to aunt’s thoughts or feelings. Incomplete explanation (he’s lying, he’s pretending).

To not make his aunt sad.
He loves his aunt.
So his aunt doesn’t feel silly.

0 points ref to irrelevant or incorrect facts/feelings (he likes the hat, he wants to trick her).

• Helen and the Christmas present

2 points ref to white lie or wanting to spare their feelings. Some implication that this is for parent’s benefit rather than just for her, desire to avoid rudeness or insult.

She doesn’t want to hurt her parents’ feelings.
She didn’t want to upset her parents by telling them the truth.

1 point ref to trait (she’s a nice girl), or relationship (he likes his parents). Purely motivational (so they won’t shout at her) with no ref to parents’ thoughts or feelings. Incomplete explanation (she’s lying, she’s pretending).

To not disappoint her parents.
To not make her parents sad.
To make her parents happy.
0 points ref to irrelevant or incorrect facts/feelings (she likes the present, she wants to trick them).

For a quiet life.

- *Mrs Peabody and the man*

2 points ref to her belief that he was going to mug her, or her ignorance of his real intention.

She thinks that the man is intending to rob her.
Because she’s always scared so assumes the worst.
She thinks he’s going to mug her.

1 point ref to her trait (she’s nervous) or state (she’s scared) or intention (so he wouldn’t hurt her) without suggestion that fear was unnecessary.

She’d rather lose her purse than be hurt.
She’s very nervous/scared.
She’s afraid [she’ll get attacked/robbed].
To protect herself from the worst.
Pure fear.

0 points factually incorrect/irrelevant answers. Ref to the man actually intending to attack her.

- *Burglar and the policeman*

2 points Ref to belief that policeman knew that he’d burgled the shop.

He thought that the policeman knew that he’d broken into the shop and saw no point in trying to escape.

He thought he’d been caught.
He thinks the policeman knows he robbed the shop.

1 point Ref to something factually correct in story

0 points Factually incorrect/irrelevant answers.

Resigned to feeling unlucky.
He thought the policeman was following him.
He saw the policeman and thought he’d better give himself up.
Physical Stories - Examples of scoring

• *Leg and X-ray*

2 points  
ref to possibility that she has fractured/broken her hip/leg (e.g. they want to see if she’s broken anything). Ref to wanting to know or trying to find out (i.e. ‘it was broken’ is not enough). Must ref to fact that they know that x-rays are about broken things or bones.

To see if there’s any damage to the bone.
To see how bad the fracture could be.

1 point  
ref to general aim (e.g. to see what’s wrong. Because of her fall she might have damaged something).

Its bruised and stiff.
To see why its stiff.

0 points  
ref to irrelevant or incorrect factors (e.g. that’s what doctors do). Ref to X-rays being cures themselves (e.g. to mend her leg).

Because she fell.
To make it better.

• *Armies and fog*

2 points  
ref to both weather conditions and relative ground superiority or inability of other army’s planes to be useful in fog (names of armies unimportant).

It was foggy and so the planes couldn’t see the ground and so it was difficult for them to shoot the soldiers. So the foot soldiers had the advantage.

1 point  
ref either to weather or to relative superiority on ground versus air (e.g. because it was foggy). Nothing about why weather makes it especially difficult for planes or nothing about planes being affected more than tanks. Ref to fog to justify incorrect response (e.g. the aeroplanes won because the fog meant they could hide from the tanks).

It was foggy.
The army on the ground was stronger than the army in the air.

0 points  
ref to irrelevant or incorrect information (e.g. they won because they had better planes). Justifications for why tanks are better than planes.

Because that’s where they were after the war with the yellow army.
They had airplanes which can shoot tanks from the air.

80
The other soldiers lost. Foot soldiers and tanks can’t see when it’s really foggy but planes can fly through the air.

- **Post office and glasses**

  2 points ref to post office being place she would most likely use her glasses (to read/write/look at stamps etc). may talk about either putting glasses on or taking them off.

  You’d need your glasses there – she was probably getting her pension and she’d need them to look in her pension book.

  1 point plausible alternative reason for being in post office (e.g. there are lots of people there, you might have posted them by mistake, people take lost things there).

  Because of the letters that might need to be read and those sorts of things.

  0 points ref to irrelevant or incorrect factors (e.g. that was the last place she went, you can buy glasses at the post office, she needed the glasses to hear better). General factors, nonspecific to post offices.

  Because it has some money and she can pay.
  Because she posted her glasses.
  Because it was the last place.
  It has post in it.

- **Burglar and alarm**

  2 points ref to animal which the burglar disturbed setting off alarm by crossing beam (type of animal unimportant)

  Something passed the beam.

  1 point ref to burglar setting off alarm (e.g. being startled by animal and so crossing beam). Ref to animal setting off alarm without explaining it crossed the beam (e.g. he trod on a cat and it set off the alarm).

  Because of an animal.

  0 points ref to irrelevant or incorrect factors (e.g. animal’s screech set off alarm). Alternative reasons for alarm going off (e.g. security camera saw him).

  If the robbers come in the alarm will go off and police will come and chase them.
  Because there’s a burglar.
- **John and light bulbs**
  
  2 points ref to saving money.
  
  1 point ref to convenience of having more, or future need for more than one bulb. No mention of saving money.
  
  0 points ref to irrelevant or incorrect factors (e.g. light right bulbs are brighter).

- **Mayonnaise**
  
  2 points ref to egg whites and no waste.
  
  1 point ref to either egg whites or waste.
  
  0 points ref to irrelevant or incorrect factors, or 'he's got a party'.

- **Car**
  
  2 points ref to saving money and giving a reason.
  
  1 point ref to saving money but no reason.
  
  0 points ref to irrelevant or incorrect factors.

- **Librarian**
  
  2 points ref to special book and/or why.
  
  1 point ref to special or unrelated reason to being special.
  
  0 points ref to irrelevant or incorrect factors.
Appendix J. Irony Perception Task.

Ironic Perception Task

The original task was designed for use with non-clinical adults and results were reported in Langdon & Coltheart (2004). This version of the task comprised 12 practice stories (6 ‘yes’/6 ‘no’) followed by 96 experimental stories.

Reference:

‘Yes’ Practice Trials:
1y. Helen has gone to watch a football game with her boyfriend Jim. Helen does not like football very much. The crowd behind Helen and Jim are noisy and someone spills a drink all over Helen. Jim has not seen what has happened. He asks Helen if she is having a good time. Helen replies
   “Can't you see I’m having a great time.” (sarcasm)

2y. Jim goes over to Clare’s house. He wants to see Clare’s new dog. When he arrives, the dog jumps up to greet him and licks him all over the face. Jim laughs loudly and says
   “Wow, what a ferocious animal you've gotten yourself.” (banter)

3y. Jason is helping his mother set the table. She asks him to carry the dinner plates over to the table. Unfortunately, he trips and drops all the plates. Jason's mother is annoyed and says
   “You've got two left feet.” (figure of speech)

4y. Kate’s mother has had a serious operation. Kate’s going to look after her mother at her own house for a few weeks. When they get home from the hospital, Kate helps her mother have a bath and get ready for bed. When Kate’s mother is lying comfortably in bed, she says to Kate
   “Thanks for being a lamb.” (figure of speech)

5y. Kathy has just been for her driving test. Unfortunately, poor Kathy failed her test. Kathy is very disappointed. Kathy’s mother tries to cheer her up. She says to Kathy
   “Better luck next time.” (literally appropriate)

6y. Michael is very disappointed. His girlfriend has just broken off their engagement. He tells his friend Jim what has happened. Jim sympathises with poor Michael and says
   “I'm sorry to hear that.” (literally appropriate)

‘No’ Practice Trials.
1n. During a fierce army battle, a group of soldiers have become trapped. Luckily, their sergeant has thought of a plan of escape. After explaining his plan to his men, one of the soldiers replies
"What bad manners!"

2n. A nurse is talking to her patient. The poor patient is frightened because he has to have a serious heart operation. The nurse says
"You're such a liar."

3n. As Mary rushes through the house, she knocks over and breaks a vase. It's her mother's favourite vase. When Mary's mother comes home, she sees the broken vase. She asks Mary 'What happened?' Mary answers
"You're a vulture."

4n. Mr. Smith has just arrived home. He's had a bad day at work. He slams the front door and then yells at his children. His wife says
"I've lost the thread."

5n. Mark wants a dog for a pet. On his way home, he sees a puppy in the pet shop window. He tells his mother all about the puppy. But Mark's mother does not want a dog. The family already has two cats. She explains to Mark why he cannot have the dog. She says
"It's a perfect day."

6n. Michael and Trevor are playing. They have turned the kitchen table upside down and they are paddling along with rolled-up newspapers. Their mother comes into the kitchen. When she sees the boys playing, she laughs. Michael calls out to his mother
"Well, you're late"

The original 96 experimental stories used for the story comprehension task are presented below in pairs with the ironic comment in one story of a pair being the literally appropriate statement in the other story of the pair. Ironic comments are labelled as sarcasm, if there is any intention to criticise or to be derogatory, and are otherwise labelled as banter. The three comments listed with each story are the appropriate ironic comment, the appropriate figure of speech and the literally appropriate statement, respectively. Most story pairs comprise one story with a comment classified as sarcasm and one story with a comment classified as banter. However, that is not always the case.

1.1. Tim has pestered his older sister to let him help her make a cake. She asks him to add eggs to the flour and sugar. Instead of breaking the eggs first, Tim puts the eggs in, shells and all! When his sister sees what he has done, she gets angry and says
"How clever!" (sarcasm)
"You're a goose."
"I always knew you were really stupid!"
1.2. Sally rushes home from school. She has some exciting news to tell her family. Sally tells her brother that the headmaster picked her to be on a television quiz because she was the smartest in her class. Sally’s brother says
   “I always knew you were really stupid!” (banter)
   “You’ve got a head on your shoulders.”
   “How clever!”

2.1. John should be getting ready for school. It is already 8.30am and he has to catch the bus at 9am. He keeps playing with his toys and watching television instead of getting dressed. John’s mother is worried that he will miss the bus. She says
   “You don’t need to be in such a rush.” (sarcasm)
   “Better put your skates on.”
   “Dear me, you’re bound to be late at this rate.”

2.2. Peter has a date with Jane, a new girl at his high school. It’s their first date. He’s not supposed to meet Jane until 7pm. But he’s so excited. He’s already dressed and completely ready and it’s only 5pm. He rushes down the stairs to grab his keys and nearly trips over the cat. His mother calls out
   “You’re bound to be late at this rate!” (banter)
   “Hey put the brakes on!”
   “You don’t need to be in such a rush!”

3.1. A maths teacher is explaining how to solve a maths problem. He tells his students to listen carefully as they have not studied this problem before. After writing out several examples on the board, the teacher turns around from the board. He sees all the confused faces of his students and says
   “Going too slow for you, am I?” (sarcasm)
   “Dear me, are you all in a fog?”
   “Going too fast for you, am I?”

3.2. Kevin and his father are walking to the skating rink. Kevin has just been given new roller skates for his birthday. He is impatient to try them out and so he runs ahead of his father. Then he rushes back and starts to pull his father along by the arm. His father says
   “Going too fast for you, am I?” (banter)
   “Have I got lead in my shoes?”
   “Going too slow for you, am I?”

4.1. A Company is in trouble. The company manager is trying to keep these problems a secret in the hope that business will improve. One morning he opens his newspaper to read headlines about his company going bankrupt. He rings the newspaper editor to complain about the story being published and says
   “This is so much what I wanted to happen!” (sarcasm)
   “The balloon’s gone up now!”
   “Well that’s the worst news I could have had!”
4.2. Harry gives his friend Nick a tip for the stock market. He tells Nick to buy shares in the local insurance company. One week later, Harry rings Nick to tell him that they have made a huge profit. Nick says

“Well that’s the worst news I could have had!” (banter)
“You weren’t just flying a kite.”
“This is so much what I wanted to happen!”

5.1. A nurse is visiting the local school to immunise the children against measles. She asks the children to line up so that she can give them an injection. Laura is scared of needles. She is hiding behind the cabinet. The teacher comes up to Laura and says

“So, want to be first, do you?” (banter)
“So, have you got cold feet?”
“So, plan to be last, do you?”

5.2. An instructor has been teaching a class of learners how to parachute. Today is the first time that they will jump out of a plane. The plane has reached the right height. The instructor opens the door and asks the jumpers to line up. Bill is very keen and rushes to the front. The instructor says

“So, plan to be last, do you?” (banter)
“My, you are chaffing at the bit.”
“So, want to be first, do you?”

6.1. Angela has an exam tomorrow. Angela’s mother tells her to go to her bedroom to study. Two hours later, Angela’s mother pokes her head around the corner. Angela is lying on her bed listening to music. She hasn’t even opened a schoolbook yet. Angela’s mother says

“Well, you have been working hard.” (sarcasm)
“Well, you have been dragging your feet.”
“Well, I can see you’ve been taking it easy.”

6.2. John arrives home from school. He has lots of homework to do. He walks straight into his bedroom and starts working on his homework. Two hours later, his mother opens the door of his bedroom and says

“Well, I can see you’ve been taking it easy.” (banter)
“Well, you are a beaver.”
“Well, you have been working hard.”

7.1. Dave is going out to a party tonight. He comes downstairs to ask his mother if he can borrow the car. Dave’s mother is angry about the way he’s dressed. Dave hasn’t combed his hair. He’s wearing a dirty t-shirt and ripped jeans. She says to Dave’s father

“My, he’s going to attract all the girls.” (sarcasm)
“My, look at the dog’s breakfast.”
“My, he’s going to frighten all the girls away.”

7.2. Jane is going to her first formal dance. She has a new dress and new shoes and she’s been to the hairdresser. She spends two hours putting on her make-up and getting ready. When she walks down the stairs, her parents are so proud of how beautiful she looks. Her father says to her mother
“My, she’s going to frighten all the boys away.” (banter)
“My, look at the princess.”
“My, she’s going to attract all the boys.”

8.1. A businessman finishes his meal at an expensive restaurant. The waiter who had been serving him is expecting a big tip. After all, the waiter had spent a lot of time making sure that the businessman had good service. But the businessman leaves no tip at all. The waiter says
“How generous!” (sarcasm)
“How tight!”
“What a miser!”

8.2. Mr. Jones is a very generous man. He has just donated $10,000 to the local hospital. When he tells his friend, Peter, what he has done, Peter says
“What a miser!” (banter)
“What big pockets!”
“How generous!”

9.1. Tom is very disappointed. Tom’s boss has just told him that he will not get the promotion that he wanted. His boss gave the job to someone else instead. Poor Tom walks over to tell his friend Joe what has happened. Tom says
“Guess what, I’ve just had some great news.” (sarcasm)
“Guess what, I’ve got a bitter pill to swallow.”
“Guess what, I’ve just had some terrible news.”

9.2. Paul has just found out that he has won $10,000 in a lottery. He rushes home to tell his family. He is very excited and bursts through the front door shouting
“Guess what, I’ve just had some terrible news.” (banter)
“Guess what, we’re in green clover.”
“Guess what, I’ve just had some great news.”

10.1. Jill has won a part in a new play and tonight is opening night. This will be the first time that Jill has ever been on stage. She is very nervous. She paces up and down and breathes deeply to try to relax. One of the other actors says to the director
“She’s very calm about it all, isn’t she?” (banter)
“Her heart is in her mouth, isn’t it?”
“She’s so anxious about it all, isn’t she?”

10.2. Karen has just finished her Higher School Certificate. Today the postman will deliver her results. Karen’s parents keep looking out the window to see if the postman has been. They are more nervous than Karen is. Karen is still in bed. She really doesn’t care one way or the other. Karen’s mother says to her husband
“She’s so anxious about it all, isn’t she?” (banter)
“She’s a cool cucumber, isn’t she?”
“She’s very calm about it all, isn’t she?”
11.1. Brenda meets her new neighbour Steve and tries to start a conversation so that she can get to know him better. But Steve is very shy. He hardly says a word. Brenda is getting frustrated and says
“Goodness, you’re a great talker.” (sarcasm)
“Goodness, you do keep pulling the shutters down.”
“Goodness, you don’t like talking about yourself.”

11.2. Carolyn sits next to an old lady on the bus. The old lady chats away for the whole trip and tells Carolyn all the details of her life - about being a nurse in the war, about having three husbands and about spending time in jail. Carolyn is fascinated by the old lady’s story and says
“Goodness, you don’t like talking about yourself.” (banter)
“Goodness, you are an open book.”
“Goodness, you’re a great talker.”

12.1. Mary and Betty are at their highschool reunion. It has been 20 years since they have all seen each other. Mary and Betty see Fay arriving. They are both shocked. Fay is huge. She has put on so much weight since when they were all at school together. Mary says
“My goodness, she’s such a tiny thing now.” (sarcasm)
“My goodness, look at the whale.”
“My goodness, she’s sure to split that dress.

12.2. Kate has been on a diet for two months and has lost a lot of weight - 10 kilos! Today she is meeting her friends Jane and Alice for lunch. Jane and Alice have not seen Kate for months. When Jane sees Kate arrive, she is worried to see how much weight Kate has lost. Jane says to Alice
“My goodness, she’s sure to split that dress.” (sarcasm)
“My goodness, look at the bag of bones.”
“My goodness, she’s such a tiny thing now.”

13.1. Jenny has been shopping in town. She has bought herself a new dress. She likes it very much and rushes home to show her husband. When her husband sees her in the dress, he says “That looks terrible on you!” Jenny replies
“Thanks so much!” (sarcasm)
“You’re a goat.”
“So, trying to ruin my day!”

13.2. It’s Helen’s birthday but it does not look like it’s going to be a good day. Her flatmates have forgotten. Nobody has said happy birthday. But then her boyfriend arrives, carrying a huge bunch of flowers and a gift. He tells her that he is taking her out to an expensive restaurant. Helen gives him a hug and says
“So, trying to ruin my day!” (banter)
“You’re a prince.”
“Thanks so much!”

14.1. Robyn has spent hours cooking a new recipe for the family dinner. She hopes everyone will appreciate the trouble that she has gone to. However, Robyn’s son
Thomas takes a very small serve and then hardly touches the food on his plate. Robyn is says to Thomas
   “Do leave some for the others.” (sarcasm)
   “You are a sparrow.”
   “Don't starve yourself.”

14.2. Mark and Janice are at their friends’ wedding reception. The food has been organised as a buffet so that all the guests can help themselves. Mark is enjoying the food. He is eating a lot. After his third trip to the buffet table, Janice looks at the big serve of food on his plate and says
   “Don't starve yourself.” (sarcasm)
   “Are your legs hollow?”
   “Do leave some for the others.”

15.1. A young man has been convicted of theft. His lawyer has pleaded with the judge for mercy. The lawyer asked the judge to take into account that the young man was very poor and that this was his first crime. The judge sentences the young man to 10 years. The lawyer is shocked by the harsh sentence and says
   “There’s someone who really cares about people.” (sarcasm)
   “There’s someone with cold blood.”
   “There’s someone who obviously doesn’t give a damn about people.

15.2. An elderly man has fallen over in the shopping centre. A kind woman goes over to help him. She helps him get up and then takes him over to her car so that she can take him to the local doctor. Two bystanders are watching. One says to the other
   “There’s someone who obviously doesn’t give a damn about people.” (banter)
   “There’s someone with a warm heart.”
   “There’s someone who cares about people.”

16.1. It’s Greg’s birthday. He will be five. His grandmother is coming over to give him a gift. Greg hopes that it will be a toy truck. When his grandmother arrives, Greg opens the present. It’s a jumper, not a toy truck! Greg throws the jumper on the floor and runs out of the room. Greg’s grandmother says to Greg’s mother
   “Well, he likes it a lot, doesn’t he?” (sarcasm)
   “Well, he got out of the wrong side of the bed.”
   “Well, he doesn’t like it very much, does he?”

16.2. It is Christmas morning. Terry unwraps the big present that his parents have given him. It is a train set. He is so excited. It is just what he wanted. Terry’s parents watch him as he happily plays with the train set. Terry’s father says
   “Well, he doesn’t like it very much, does he?” (banter)
   “Well, look at the bear in the honey pot.”
   “Well, he likes it a lot, doesn’t he?”

17.1. Colin has just started University. His father is getting quite annoyed about how little work Colin does. Colin rarely goes to lectures. He is always out at parties. It is 11am on Monday morning and Colin has just gotten out of bed. Colin’s father says
   Dear me, what a busy life you have. (sarcasm)
Dear me, you don’t have much on your plate.
Dear me, what an easy life you have.

17.2. Janet is telling her friend Sarah about all the work she has to do. Sarah thinks that Janet is trying to do too much. Janet has four young children, a full-time job and she is also president of the Parents’ and Citizens’ Association. Sarah says
“Dear me, what an easy life you have.” (banter)
“Dear me, you have too many balls in the air.”
“Dear me, what a busy life you have.”

18.1. Mark and Karen are out on their first date. Karen is very quiet. Mark is trying to make her relax so that they can have a conversation. He asks her if there is anything she wants to know about him. Karen shakes her head and turns away. Mark says
“You’re full of questions.” (banter)
“Did the cat bite your tongue?”
“You’re the shy type, aren’t you?”

18.2. Anna wants to know more about her new flatmate Paul. She starts to ask him some very personal questions. She asks him whether he has a girlfriend and what he does for a job. Paul answers her questions and says
“You’re the shy type, aren’t you?” (banter)
“I’m an open book.”
“You’re full of questions.”

19.1. Jane has invited her friend Bill to a dance at the Golf Club. The dance is very formal. All the women are wearing evening gowns and all the men are wearing suits. Jane and her friend Jenny see Bill arrive. Instead of a suit, Bill is wearing torn jeans and a t-shirt. Jenny says
“My, he wants to impress.” (sarcasm)
“My, look at the fish out of water.”
“My, he doesn’t care what he looks like.”

19.2. Joe has a new job and wants to make a good impression with his boss. He is wearing a new suit. While walking to work, Joe stops outside a shop and looks at his reflection in the window. Two friends, Peter and Tom, walk by and see Joe combing his hair and staring at his reflection for ages. They are surprised by how vain he is. Peter says to Tom
“My, he doesn’t care what he looks like.” (sarcasm)
“My, look at the peacock.”
“My, he wants to impress.”

20.1. A computer salesman is trying to talk Jim and Keith into buying a new computer. Jim and Keith know a lot about computers and so they are not fooled by the stories the salesman is making up. Finally the salesman gives up and walks away. Jim says to Frank
“Well, he sure knew what he was talking about.” (sarcasm)
“Well, that was all hot air.”
“Well, he didn’t know what he was talking about.”
20.2. A famous scientist is visiting a University and gives a lecture to the students. The students are fascinated by what the scientist has to tell them. They ask many questions and the scientist is able to answer every one. After the lecture, one of the students says “Well, he didn’t know what he was talking about.” (banter) “Well, he was a full bottle.” “Well, he sure knew what he was talking about.”

21.1. It is the first day of school holidays. Luke has been up since the crack of dawn and has already been out skateboarding. His mother is in the kitchen making breakfast when he arrives home again. He is singing loudly as he comes in the door. Luke’s mother says “Dear me, who dragged you out of your sick bed?” (banter) “Dear me, you’re full of beans” “Dear me, you sure sound fit and healthy.”

21.2. Emma is not feeling very well. She came home from school early and spent the afternoon resting in bed. When dinner is ready she comes downstairs to eat with the family. But all through dinner she sneezes and coughs and coughs. Her father is concerned and says “Dear me, you sure sound fit and healthy.” (banter) “Dear me, you have a frog in your throat.” “Dear me, who dragged you out of your sick bed?”

22.1. Janet has talked her husband Bill into coming to the Parents’ and Citizens’ meeting at their children’s school. Bill hates these meetings. He gets bored because he is so tired in the evenings and he finds it hard to follow the discussions. When they arrive at the school, Bill says “Bet this will a fascinating meeting.” (sarcasm) “This is not my cup of tea.” “Bet this will be a boring meeting.”

22.2. The new owner of a company calls a staff meeting to tell his workers about the big changes he is planning. The workers are anxious to find out how their jobs will be affected. Before the meeting, Greg and Frank are anxiously waiting outside the staffroom. Frank sees the new owner coming down the corridor and says “Bet this will be a boring meeting.” (banter) “Here’s the new broom.” “Bet this will be a fascinating meeting.”

23.1. Wendy is complaining to her friend Jane about her ex-boyfriend. When Wendy’s ex-boyfriend broke up with her, he told Wendy that she was no fun any more and that he had found somebody much better looking. Jane says “So, you think a lot of him then.” (sarcasm) “He’s a snake.” “So, you don’t think much of him then.”

23.2. Rick is reading a newspaper article about a young mountain climber who has just reached the top of Mount Everest. Rick is telling Ted how much he admires this young
climber. The climber has faced many dangers and survived a near fatal fall. Ted says to Rick

“So, you don’t think much of him then.” (banter)
“He has a lion’s heart.”
“So, you think a lot of him then.”

24.1. Jason is in his final year of highschool. He has just done his mid-year exams. Jason brings his report card home to show his father. Jason has failed every subject. Jason’s father is angry because he knows that Jason has not been studying or doing any homework. Jason’s father says

“So, top of the class!” (sarcasm)
“You have half a brain.”
“Well, you’ll just have to do better next time.”

24.2. Karen is very proud of herself. She came top of her class and got 100% on her History exam. When she tells her mother how well she did, her mother says

“Well, you’ll just have to do better next time.” (banter)
“You are a bright spark.”
“So, top of the class!”

25.1. Two women are sitting on a bench in the local park while their children play. They hear a lot of noise and look across to see what’s happening. Their two sons are screaming at each other and rolling around on the grass fighting. One of the women says

“They get on well together.” (sarcasm)
“Look at those fireworks.”
“They don’t like each other much, do they?”

25.2. Fred and Dave are having a drink in a nightclub. They hear laughing and look across to the bar. They see their friend Steve with his arms around a woman they have never seen before. Steve and the woman are talking non-stop and staring lovingly into each others’ eyes. Fred says

“They don’t like each other much, do they?” (banter)
“Looks like a fire starting over there.”
“They get on well together.”

26.1. Brian and his younger brother Peter are at a party. Brian is supposed to be looking after Peter. He is getting a little worried. Peter has been drinking a lot. He is a little wobbly on his feet and trips over a chair. Brian picks him up off the floor and says

“I can tell you’re having a dreadful time.” (sarcasm)
“I’ll give you some stick when we get home.”
“I can tell you’re really enjoying yourself.”

26.2. Tom and his son David are driving in the country. Unfortunately their car breaks down miles from anywhere. They have to walk back along the highway to find a garage. After hours of walking, David starts to complain about how tired and thirsty he is. Tom says

“I can tell you’re really enjoying yourself.” (banter)
“Come on, you’re a soldier.”
“I can tell you’re having a dreadful time.”

27.1. Fred is telling Tim how fed up he is with his job. Fred thinks that the work he does is boring and dumb and he doesn’t like any of his co-workers. Fred asked his boss if he could move to another section but his boss said no! Fred complains a lot to Tim. Tim listens to all of Fred’s complaining and says
“I can see you just love your job.” (sarcasm)
“Your job is a jail.”
“So, I guess you’re planning to resign.”

27.2. Paul has just started his first job after finishing a law degree. Peter is working as a law clerk in a famous law firm. He is talking to his father after his first week of work. Paul tells his father how exciting the work is and how he plans to become a partner in the firm one day. Peter’s father says
“So, I guess you’re planning to resign.” (banter)
“There’s always room at the top.”
“I can see you just love your job.”

28.1. Jill has a new boyfriend. She is looking forward to telling Ruth all about him. But when she sees Ruth, Ruth starts to complain about everything. Ruth complains about the weather, about having a cold and then about sore feet. Poor Jill finally interrupts and says
“Being with you is a laugh a minute.” (sarcasm)
“You’re a wet blanket.”
“You’d spoil anyone’s day.”

28.2. Cheryl has had a lousy day at work. Her boyfriend Dave decides to cheer her up. He takes her roller-skating and makes her laugh at his silly tricks. Then he takes her to her favourite restaurant. All night he keeps Cheryl amused with funny stories. At the end of the night, Cheryl gives him a kiss and says
“You’d spoil anyone’s day.” (banter)
“You’re a live wire.”
“Being with you is a laugh a minute.”

29.1. Barry is a computer programmer. He is very frustrated because the program he is trying to write will not run properly. Barry’s boss has been keeping an eye on Barry’s progress. He can see that Barry has run out of ideas and comes across to see if he can help. Barry says to his boss
“Well, this looks like a simple problem.” (banter)
“Well, I’ve hit a wall?”
“Well, this is quite a challenge.”

29.2. Ken is a very experienced motor mechanic. When he comes home from work, his son gives him a toy truck to fix. All that has to be done is tighten a loose screw. Ken takes the truck from his son. He smiles at his wife who has been watching and says
“Well, this is quite a challenge.” (banter)
“Well, this is a piece of cake.”
“Well, this looks like a simple problem.”

30.1. Harry is having a great time at a party and so he decides to entertain everyone with a song. He jumps up on a table so that everyone can see him, puts a lampshade on his head and then sings at the top of his voice. When he finishes the song, Sharon comes up to him and says
  “Have you always been this quiet?” (sarcasm)
  “Your head is made of wood.”
  “Have you always been the life of a party?”

30.2. Mark is hosting a party at his place. He wants all the guests to have a good time. But it doesn’t look like Greg is enjoying himself or trying to have much fun. Greg has been sitting in a corner by himself all evening. He has not said a word to anyone else at the party. Mark goes over to Greg and says
  “Have you always been the life of a party?” (sarcasm)
  “No one’s going to eat you.”
  “Have you always been this quiet?”

31.1. A group of scouts are climbing a steep hill. About halfway up the hill, the scout leaders stop to check on the progress of the other scouts. They see that a new scout is not keeping up with the others. He is falling far behind and climbing very slowly. One of the leaders says
  “He's sure to beat us to the top at this rate.” (sarcasm)
  “He's got lead feet.”
  “Do you think he'll ever reach the top at the rate he's going?”

31.2. Keith is an experienced rock-climber. Today he is climbing with Tom and Peter. Tom and Peter have only just started rock-climbing. They are going very slowly. Keith is much faster. Tom looks up to see that Keith is about 20 metres ahead of them. Tom says to Peter
  “Do you think he'll ever reach the top at the rate he's going?” (banter)
  “He has wings on his heels.”
  “He’s sure to beat us to the top at this rate.”

32.1. Joe and Paul are having a party at their flat tonight. So much has to be done - the flat has to be cleaned, friends need to be invited, and someone has to buy the food and drinks. After discussing what needs to be done, Joe just goes off to the movies. Paul is left to do all the work alone. When Joe comes home again, Paul says
  “You were such a great help.” (sarcasm)
  “Well, I was left with the baby.”
  “You're not much of a helper, are you?”

32.2. A group of scouts have been camping but now it's time to pack up and go home. All the scouts but Will rush off to have their last swim. Will stays behind to help the scout leader. Will takes down the tents, packs the equipment and tidies up the grounds. The scout leader is impressed and says
  “You're not much of a helper, are you?” (banter)
  “Thanks for lending a hand.”
“You were such a great help.”

33.1. Jim and Bill have gone to watch their favourite band play. Unfortunately they weren’t able to get in. The tickets were all sold out. However, they might still be able to see something through a window. Jim climbs up onto Bill’s shoulders to try to reach the window. But Jim is huge. Poor Bill nearly collapses under Jim’s weight. He says
   “What a light-weight!” (sarcasm)
   “You’re a lump of lead.”
   “What a heavy-weight!”

33.2. A father is playing with his little one year-old daughter. She is very tiny for her age. To make her laugh, he lifts her high up over his head and twirls her around. He laughs and says
   “What a heavy-weight!” (banter)
   “You’re a feather.”
   “What a light-weight!”

34.1. Kate and Betty see a gang of men standing on the other side of the road. A man and woman walk by and the woman accidentally brushes against one of the gang members. He gets angry and swears at her and pushes her over. The man who is with her gets scared and runs away. Kate says
   “Now there’s someone you’d want on your side in a fight.” (sarcasm)
   “Look at the jellyfish.”
   “What do you think of that weakling?”

34.2. Graham and Peter are watching the weight-lifting competition at the Olympics. The Russian contestant has just walked onto the stage. He is enormous with huge bulging muscles. Graham says
   “What do you think of that weakling?” (banter)
   “Look at the ox.”
   “Now there’s someone you’d want on your side in a fight.”

35.1. Len has invited his girlfriend Dianne over for a meal. When Dianne arrives she is disgusted by the state of the flat. Len hasn’t vacuumed. There are no curtains on the windows. Len has magazines and clothes all over the floor. The kitchen sink is full of dirty dishes. Dianne says
   “You keep such a tidy place.” (sarcasm)
   “This is a pig-sty.”
   “What a hovel.”

35.2. Jane has invited her friend Gail to stay with her in her new house. Gail is looking forward to seeing Jane and the new house that Jane has told her so much about. Jane spends the week sewing new curtains and cleaning. When Gail arrives, she looks around the sparkling clean house and says
   “What a hovel.” (banter)
   “This is a picture.”
   “You keep such a tidy place.”
36.1. Brett is planning his holiday to Queensland. He is comparing how much it would cost to travel by plane or by train. His friend, Harry, sees all the travel brochures and asks Brett “How will you travel?” Brett answers
   “Well, I’m still planning to walk.” (banter)
   “Well, I’m in two minds.”
   “Well, I’m thinking of going by plane or train.”

36.2. Gary and Jim go to the same school. Each morning, Gary walks around to Jim’s place and they go to school together. Today Gary is running late. When Gary finally does arrive at Jim’s place, he says “How will we get to school? We’re running late.” Jim says
   “Well, I’m thinking of going by plane or train.” (banter)
   “My, you’ve been dragging the chain.”
   “Well, I’m still planning to walk.”

37.1. Dianne and Jane have met for lunch. Dianne is in a talkative mood and gossips for over an hour. Jane doesn’t get a chance to say anything. Jane is getting very cross. She has some important news to tell Dianne but Dianne just keeps talking and talking. Finally, Jane interrupts Dianne and says
   “Well, you don’t have much to say.” (sarcasm)
   “My, you’re such a babbling brook.”
   “Well, you really like to gossip.”

37.2. A new salesman has joined the firm where Julie works. He’s young and good-looking. Julie wants to know more about him. He’s a friend of the firm’s secretary, Anne. Julie makes Anne a coffee and tries to get some information out of her. Anne can tell what Julie’s up to and avoids all of Julie’s questions. Julie sighs and says
   “Well, you really like to gossip.” (banter)
   “Well, your tongue doesn’t wag.”
   “Well, you don’t have much to say.”

38.1. Frank has invited his boss home for dinner. During dinner, Lynn notices that Frank agrees with everything that his boss says. Frank also laughs loudly at every joke that his boss makes. Lynn does not like the way that Frank is behaving. When Frank’s boss leaves, she says
   “Well, you didn’t care what he thought of you.” (sarcasm)
   “Well, you were walking on eggshells around him.”
   “Well, you were trying to create a good impression.”

38.2. Jane has invited her boyfriend, Brad, home for dinner. Jane really likes Brad. She hopes that Brad will get on with her family. Unfortunately Jane’s father is not in a good mood. During dinner, Jane’s father ignores Brad and then leaves the table without saying a word to Brad. When Brad leaves, Jane says to her father
   “Well, you were trying to create a good impression.” (sarcasm)
   “Well, you didn’t roll out the red carpet.”
   “Well, you didn’t care what he thought of you.”
39.1. Jim and Bill are traffic policemen. They have been invited to a Boy's Highschool to talk about road safety. Jim is trying to convince the boys that speeding is dangerous. Unfortunately, the boys are being rude. They talk amongst themselves and ignore what Jim has to say. After the talk, Bill says to Jim

“They were hanging on every word.” (sarcasm)
“You were feeding hay to a dead horse.”
“Bet they found that boring.”

39.2. Two teachers are taking their Grade 1 classes on an excursion to the museum. A guide is showing the children the dinosaur exhibition. All the children are fascinated. They listen carefully as the guide tells stories about what it was like when dinosaurs roamed the earth. After the talk, one of the teachers says

“Bet they found that boring.” (banter)
“They were sponges.”
“They were hanging on every word.”

40.1. Kate, Jane and Anne are at the movies. Two rows in front of them, Kate spots her ex-boyfriend with another woman. Kate is still very angry with her ex-boyfriend because he had been cheating on her with other women. All through the movie Kate glares at the back of her boyfriend's head. Jane says to Anne

“She obviously thinks the world of him.” (sarcasm)
“Her eyes are daggers.”
“It's obvious that she hates him.”

40.2. Three friends are watching a football game. Peter and Steve are there because they like football. Their other friend, Cheryl, is there to watch her boyfriend play. Cheryl isn't really following the game. All Cheryl wants to do is watch everything that her boyfriend does. Peter says to Steve

“It's obvious that she hates him.” (banter)
“Her eyes are glued on him.”
“She obviously thinks the world of him.”

41.1. An accountant has just prepared a report on the future of the company. The company has many debts and may go bankrupt. The accountant gives his report to his boss. After reading the report, the boss says

“Well, our future does looks rosy.” (sarcasm)
“It looks like black clouds ahead.”
“My, what a gloomy forecast.”

41.2. Jack owns a business and is planning to start exporting goods overseas. He has invested a lot of money advertising in Asia. Jack rings his head salesman in Asia. His head salesman tells Jack that their company has already won five big contracts and it looks like the business will have a big future in exporting. Jack says

“My, what a gloomy forecast.” (banter)
“So it's plain sailing ahead.”
“Well, our future does looks rosy.”
42.1. A teacher leaves his classroom to answer a phone call. While he is away his students decide to have some fun. The principal hears loud laughing and shouting and walks towards the classroom to see what’s wrong. One of the students sees the principal coming and says

“Just the person we needed to see.” (sarcasm)
“Here comes a cold wind.”
“He’s the last person we wanted to see.”

42.2. Paul and Ken are at a party. It’s a very boring party. There are no interesting people. Paul sees their friend Bill arrive. Paul and Ken weren’t expecting Bill but they’re very glad to see him arrive. The party should pick up now. Bill is great fun to have around. Paul says

“He’s the last person we wanted to see.” (banter)
“Here comes a breath of fresh air.”
“Just the person we needed to see.”

43.1. Paul’s parents have planned a big surprise for his 21st. They’ve bought him a new car. Paul’s brother, Joe, knows all about the surprise. Joe has promised not to say anything, but two days before the birthday, Joe gives in and shows Paul a brochure about the new car. Paul’s mother says to Paul’s father

“He sure knows how to keep a secret.” (sarcasm)
“He let the cat out of the bag.”
“He doesn’t know how to keep a secret, does he?”

43.2. Two reporters are investigating a World War II soldier who they suspect killed one of his own men. Frank is the only person alive who knows what really happened and he has not spoken about it for 50 years. The reporters interview Frank but Frank refuses to say anything about the incident. One reporter says to the other

“He doesn’t know how to keep a secret, does he?” (banter)
“He’s been keeping a lid on it for years.”
“He sure knows how to keep a secret.”

44.1. Jason is telling Ken about his plans for the future. Jason has decided to quit his job and move to another state. Jason plans to invest his life savings in a new business. Ken is worried that Jason is being too hasty and says

“You’re really playing it safe.” (sarcasm)
“You’re heading into a minefield.”
“You’re a great risk-taker.”

44.2. Tom is setting up a new real estate business. He is trying to talk his friend Keith into investing money in his business. Keith says no! He doesn’t think Tom has enough business experience. Tom thinks Keith is being too cautious and so he says

“You’re a great risk-taker.” (sarcasm)
“Do you always wear braces as well as a belt?”
“You’re really playing it safe.”

45.1. Bill and his older brother Luke are discussing politics. They have very different views and they disagree strongly. Bill is annoyed because Luke keeps butting in and
speaking over the top of him. Luke has gotten louder and louder until he is shouting. Bill interrupts and says

“You can stop whispering any time now.” (sarcasm)
“You’re a foghorn”
“You can stop shouting any time now.”

45.2. Angela needs to ask her university lecturer some questions. She is nervous about speaking to him. He has a bad reputation for being rude to students. When Angela does go to see him, she is very timid and speaks so quietly that the lecturer can hardly hear her. He gets irritated and says

“You can stop shouting any time now.” (sarcasm)
“You’re a mouse.”
“You can stop whispering now.”

46.1. Jill and her friend Gail are listening to music in Jill’s bedroom. The music is quite loud and Jill’s brother is trying to study. Jill’s brother knocks on Jill’s bedroom door and asks her politely to turn the music down. Jill screams at him to go away and throws a pillow at him. Gail is shocked by Jill’s behaviour and says

“My, it takes a lot to upset you.” (sarcasm)
“My, your blood is quick to boil.”
“My, what a quick temper you have.”

46.2. Barbara works in the complaints section of a department store. She has learned how to handle difficult customers without getting angry. Today an unhappy customer is being very rude and shouts insults at Barbara. Barbara stays calm and treats the customer very politely. After the customer leaves, Barbara’s friend says

“My, what a quick temper you have.” (banter)
“My, you have the skin of a rhinoceros.”
“My, it takes a lot to upset you.”

47.1. While Will and Greg are walking home, they see a woman standing beside her car. The car has a flat tyre. Will offers to help change the tyre. The woman is very rude and tells Will to leave her alone. Poor Will walks back to Greg. Greg says

“She took a real liking to you.” (banter)
“You got your wrist slapped.”
“She didn’t take to you much.”

47.2. This is Brad’s first day working at a new firm. He meets his boss Jane. Jane spends the morning showing Brad around the office and introducing him to everyone. Then she takes him to lunch as a welcoming gesture. After they return from lunch, one of the other workers says to Brad

“She didn’t take to you much.” (banter)
“She’s taken you under her wing.”
“She took a real liking to you.”

48.1. Frank is over at Jim’s place. He is trying to assemble new speakers for Jim’s stereo. Frank cannot follow the instructions. He has pieces of equipment all over the floor. Jim looks at the mess and says to Frank
“You’ve got this well under control.” (sarcasm)
“You can’t see daylight, can you?”
“You’re obviously a complete amateur at this.”

48.2. John is filling in his tax-return form. Unfortunately John is not very good at figures. He is confused and he’s making lots of mistakes. Luckily his friend Bill arrives. Bill is an experienced accountant. Bill grabs a pen and starts filling in the form for John. With Bill’s help, they’ve nearly finished. John says
“You’re obviously a complete amateur at this.” (banter)
“You’re head’s screwed on.”
“You’ve got this well under control.”
Appendix K. Eyes Task.

Eyes Task Instructions

“For each set of eyes, choose which word best describes what the person in the picture is thinking or feeling. Please indicate your response by saying it out loud. You may feel that more than one word is applicable but please choose just one word, the word which you consider to be most suitable. Before making your choice, make sure that you have read all 4 words. You should try to do the task as quickly as possible but you will not be timed. If you really don’t know what a word means you can look it up in the definition handout. Do you have any questions?”

Start the PowerPoint presentation. The first slide is a practice slide (Panicked) – you can give them feedback on this slide only. After the examinee gives their response to the first item and you have recorded it, move on to the next slide, and so on. Do not provide feedback to the examinee about their responses. The examinee may not return to slides they have already seen or skip slides. If the examinee does not know which emotion is being expressed, encourage them to guess by saying “it’s very important that you answer all the items so that the test will be valid. Would you like to guess?”

WORD DEFINITIONS

ACCUSING blaming
The policeman was accusing the man of stealing a wallet.

AFFECTIONATE showing fondness towards someone
Most mothers are affectionate to their babies by giving them lots of kisses and cuddles.

AGHAST horrified, astonished, alarmed
Jane was aghast when she discovered her house had been burgled.

ALARMED fearful, worried, filled with anxiety
Claire was alarmed when she thought she was being followed home.

AMUSED finding something funny
I was amused by a funny joke someone told me.

ANNOYED irritated, displeased
Jack was annoyed when he found out he had missed the last bus home.
ANTICIPATING  expecting
At the start of the football match, the fans were anticipating a quick goal.

ANXIOUS  worried, tense, uneasy
The student was feeling anxious before taking her final exams.

APOLOGETIC feeling sorry
The waiter was very apologetic when he spilt soup all over the customer.

ARROGANT  conceited, self-important, having a big opinion of oneself
The arrogant man thought he knew more about politics than everyone else in the room.

ASHAMED  overcome with shame or guilt
The boy felt ashamed when his mother discovered him stealing money from her purse.

ASSERTIVE  confident, dominant, sure of oneself
The assertive woman demanded that the shop give her a refund.

BAFFLED  confused, puzzled, dumbfounded
The detectives were completely baffled by the murder case.

BEWILDERED  utterly confused, puzzled, dazed
The child was bewildered when visiting the big city for the first time.

CAUTIOUS  careful, wary
Sarah was always a bit cautious when talking to someone she did not know.

COMFORTING  consoling, compassionate
The nurse was comforting the wounded soldier.

CONCERNED  worried, troubled
The doctor was concerned when his patient took a turn for the worse.

CONFIDENT  self-assured, believing in oneself
The tennis player was feeling very confident about winning his match.

CONFUSED  puzzled, perplexed
Lizzie was so confused by the directions given to her, she got lost.
<table>
<thead>
<tr>
<th>Adjective</th>
<th>Synonyms</th>
<th>Example</th>
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</thead>
<tbody>
<tr>
<td>CONTEMPLATIVE</td>
<td>reflective, thoughtful, considering</td>
<td>John was in a contemplative mood on the eve of his 60th birthday.</td>
</tr>
<tr>
<td>CONTENTED</td>
<td>satisfied</td>
<td>After a nice walk and a good meal, David felt very contented.</td>
</tr>
<tr>
<td>CONVINCED</td>
<td>certain, absolutely positive</td>
<td>Richard was convinced he had come to the right decision.</td>
</tr>
<tr>
<td>CURIOUS</td>
<td>inquisitive, inquiring, prying</td>
<td>Louise was curious about the strange shaped parcel.</td>
</tr>
<tr>
<td>DECIDING</td>
<td>making your mind up</td>
<td>The man was deciding whom to vote for in the election.</td>
</tr>
<tr>
<td>DECISIVE</td>
<td>already made your mind up</td>
<td>Jane looked very decisive as she walked into the polling station.</td>
</tr>
<tr>
<td>DEFIANT</td>
<td>insolent, bold, don’t care what anyone else thinks</td>
<td>The animal protester remained defiant even after being sent to prison.</td>
</tr>
<tr>
<td>DEPRESSED</td>
<td>miserable</td>
<td>George was depressed when he didn’t receive any birthday cards.</td>
</tr>
<tr>
<td>DESIRE</td>
<td>passion, lust, longing for</td>
<td>Kate had a strong desire for chocolate.</td>
</tr>
<tr>
<td>DESPONDENT</td>
<td>gloomy, despairing, without hope</td>
<td>Gary was despondent when he did not get the job he wanted.</td>
</tr>
<tr>
<td>DISAPPOINTED</td>
<td>displeased, disgruntled</td>
<td>Manchester United fans were disappointed not to win the Championship.</td>
</tr>
<tr>
<td>DISPIRITED</td>
<td>glum, miserable, low</td>
<td>Adam was dispirited when he failed his exams.</td>
</tr>
<tr>
<td>DISTRUSTFUL</td>
<td>suspicious, doubtful, wary</td>
<td>The old woman was distrustful of the stranger at her door.</td>
</tr>
<tr>
<td>DOMINANT</td>
<td>commanding, bossy</td>
<td>The sergeant major looked dominant as he inspected the new recruits.</td>
</tr>
<tr>
<td>DOUBTFUL</td>
<td>dubious, suspicious, not really believing</td>
<td>Mary was doubtful that her son was telling the truth.</td>
</tr>
</tbody>
</table>
DUBIOUS  doubtful, suspicious
Peter was dubious when offered a surprisingly cheap television in a pub.

EAGER  keen
On Christmas morning, the children were eager to open their presents.

EARNEST  having a serious intention
Harry was very earnest about his religious beliefs.

EMBARRASSED  ashamed
After forgetting a colleague's name, Jenny felt very embarrassed.

ENCOURAGING  hopeful, heartening, supporting
All the parents were encouraging their children in the school sports day.

ENTERTAINED  absorbed and amused or pleased by something
I was very entertained by the magician.

ENTHUSIASTIC  very eager, keen
Susan felt very enthusiastic about her new fitness plan.

FANTASIZING  daydreaming
Emma was fantasizing about being a film star.

FASCINATED  captivated, really interested
At the seaside, the children were fascinated by the creatures in the rock pools.

FEARFUL  terrified, worried
In the dark streets, the women felt fearful.

FLIRTATIOUS  brazen, saucy, teasing, playful
Connie was accused of being flirtatious when she winked at a stranger at a party.

FLUSTERED  confused, nervous and upset
Sarah felt a bit flustered when she realised how late she was for the meeting and that she had forgotten an important document.

FRIENDLY  sociable, amiable
The friendly girl showed the tourists the way to the town centre.

GRATEFUL  thankful
Kelly was very grateful for the kindness shown by the stranger.

GUILTY  feeling sorry for doing something wrong
Charlie felt guilty about having an affair.

**HATEFUL** showing intense dislike
The two sisters were hateful to each other and always fighting.

**HOPEFUL** optimistic
Larry was hopeful that the post would bring good news.

**HORRIFIED** terrified, appalled
The man was horrified to discover that his new wife was already married.

**HOSTILE** unfriendly
The two neighbours were hostile towards each other because of an argument about loud music.

**IMPATIENT** restless, wanting something to happen soon
Jane grew increasingly impatient as she waited for her friend who was already 20 minutes late.

**IMPLORING** begging, pleading
Nicola looked imploring as she tried to persuade her dad to lend her the car.

**INCREDOUS** not believing
Simon was incredulous when he heard that he had won the lottery.

**INDECISIVE** unsure, hesitant, unable to make your mind up
Tammy was so indecisive that she couldn't even decide what to have for lunch.

**INDIFFERENT** disinterested, unresponsive, don't care
Terry was completely indifferent as to whether they went to the cinema or the pub.

**INSISTING** demanding, persisting, maintaining
After a work outing, Frank was insisting he paid the bill for everyone.

**INSULTING** rude, offensive
The football crowd was insulting the referee after he gave a penalty.

**INTERESTED** inquiring, curious
After seeing Jurassic Park, Hugh grew very interested in dinosaurs.
<table>
<thead>
<tr>
<th>ADJECTIVE</th>
<th>MEANING</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRIGUED</td>
<td>very curious, very interested</td>
<td>A mystery phone call intrigued Zoe.</td>
</tr>
<tr>
<td>IRRITATED</td>
<td>exasperated, annoyed</td>
<td>Frances was irritated by all the junk mail she received.</td>
</tr>
<tr>
<td>JEALOUS</td>
<td>envious</td>
<td>Tony was jealous of all the taller, better-looking boys in his class.</td>
</tr>
<tr>
<td>JOKING</td>
<td>being funny, playful</td>
<td>Gary was always joking with his friends.</td>
</tr>
<tr>
<td>NERVOUS</td>
<td>apprehensive, tense, worried</td>
<td>Just before her job interview, Alice felt very nervous.</td>
</tr>
<tr>
<td>OFFENDED</td>
<td>insulted, wounded, having hurt feelings</td>
<td>When someone made a joke about her weight, Martha felt very offended.</td>
</tr>
<tr>
<td>PANICKED</td>
<td>distraught, feeling of terror or anxiety</td>
<td>On waking to find the house on fire, the whole family was panicked.</td>
</tr>
<tr>
<td>PENSIVE</td>
<td>thinking about something slightly worrying</td>
<td>Susie looked pensive on the way to meeting her boyfriend’s parents for the first time.</td>
</tr>
<tr>
<td>PERPLEXED</td>
<td>bewildered, puzzled, confused</td>
<td>Frank was perplexed by the disappearance of his garden gnomes.</td>
</tr>
<tr>
<td>PLAYFUL</td>
<td>full of high spirits and fun</td>
<td>Neil was feeling playful at his birthday party.</td>
</tr>
<tr>
<td>PREOCCUPIED</td>
<td>absorbed, engrossed in one’s own thoughts</td>
<td>Worrying about her mother’s illness made Debbie preoccupied at work</td>
</tr>
<tr>
<td>PUZZLED</td>
<td>perplexed, bewildered, confused</td>
<td>After doing the crossword for an hour, June was still puzzled by one clue.</td>
</tr>
<tr>
<td>REASSURING</td>
<td>supporting, encouraging, giving someone confidence</td>
<td>Andy tried to look reassuring as he told his wife that her new dress did suit her.</td>
</tr>
<tr>
<td>REFLECTIVE</td>
<td>contemplative, thoughtful</td>
<td>George was in a reflective mood as he thought about what he’d done with his life.</td>
</tr>
</tbody>
</table>
REGRETFUL  
sorry  
Lee was always regretful that he had never travelled when he was younger.

RELAXED  
taking it easy, calm, carefree  
On holiday, Pam felt happy and relaxed.

RELIEVED  
freed from worry or anxiety  
At the restaurant, Ray was relieved to find that he had not forgotten his wallet.

RESENTFUL  
bitter, hostile  
The businessman felt very resentful towards his younger colleague who had been promoted above him.

SARCASTIC  
cynical, mocking, scornful  
The comedian made a sarcastic comment when someone came into the theatre late.

SATISFIED  
content, fulfilled  
Steve felt very satisfied after he had got his new flat just how he wanted it.

SCEPTICAL  
doubtful, suspicious, mistrusting  
Patrick looked sceptical as someone read out his horoscope to him.

SERIOUS  
solemn, grave  
The bank manager looked serious as he refused Nigel an overdraft.

STERN  
severe, strict, firm  
The teacher looked very stern as he told the class off.

SUSPICIOUS  
disbelieving, suspecting, doubting  
After Sam had lost his wallet for the second time at work, he grew suspicious of one of his colleagues.

SYMPATHETIC  
kind, compassionate  
The nurse looked sympathetic as she told the patient the bad news.

TENTATIVE  
hesitant, uncertain, cautious  
Andrew felt a bit tentative as he went into the room full of strangers.

TERRIFIED  
alarmed, fearful  
The boy was terrified when he thought he saw a ghost.
<table>
<thead>
<tr>
<th>Emotion</th>
<th>Definition</th>
<th>Example</th>
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<tbody>
<tr>
<td>THOUGHTFUL</td>
<td>thinking about something</td>
<td>Phil looked thoughtful as he sat waiting for the girlfriend he was about to finish with.</td>
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<tr>
<td>THREATENING</td>
<td>menacing, intimidating</td>
<td>The large, drunken man was acting in a very threatening way.</td>
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<tr>
<td>UNEASY</td>
<td>unsettled, apprehensive, troubled</td>
<td>Karen felt slightly uneasy about accepting a lift from the man she had only met that day.</td>
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<tr>
<td>UPSET</td>
<td>agitated, worried, uneasy</td>
<td>The man was very upset when his mother died.</td>
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<tr>
<td>WORRIED</td>
<td>anxious, fretful, troubled</td>
<td>When her cat went missing, the girl was very worried.</td>
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Record Sheet

Date of Birth:....................................... Today’s date:....................................... 
Degree subject/occupation:.................................................................

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<th>State</th>
<th>Quality</th>
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</tbody>
</table>
practice
jealous    panicked
arrogant   hateful

1
playful    comforting
irritated  bored
2
terrified upset
arrogant annoyed

3
joking flustered
desire convinced
4
joking  insisting
amused  relaxed

5
irritated  sarcastic
worried  friendly
6
aghast, impatient
fantasizing, alarmed

7
apologetic, uneasy
friendly, dispirited
8
despondent  relieved
shy  excited

9
annoyed  hostile
horrified  preoccupied
10 cautious insisting bored aghast

11 terrified amused regretful flirtatious
indifferent
sceptical
embarrassed
dispirited

decisive
threatening
anticipating
shy
14
irritated
depressed

disappointed
accusing

15
contemplative
encouraging

flustered
amused
irritated  thoughtful
encouraging  sympathetic

doubtful  affectionate
playful  aghast
decisive    amused
aghast      bored

arrogant    grateful
sarcastic   tentative
dominant    friendly
guilty      horrified

embarrassed fantasizing
confused    panicked
22
preoccupied
insisting
grateful
imploring

23
contented
defiant
apogetic
curious
24
pensive irritated
excited hostile

25
panicked incredulous
despondent interested
26
alarmed   shy
hostile   anxious

27
joking   cautious
arrogant   reassuring
28
interested  affectionate  joking  contented

29
impatient  irritated  aghast  reflective
30
grateful
hostile
flirtatious
disappointed

31
ashamed
joking
confident
dispirited
32
serious  ashamed
bewildered  alarmed

33
embarrassed  guilty
fantasizing  concerned
34
aghastr  baffled
distrustful  terrified

35
puzzled  nervous
insisting  contemplative
36

ashamed    nervous
suspicious  indecisive
Appendix L. Social Adjustment Scale – Self Report Instructions.

SAS-SR

We are interested in finding out how you have been doing in the last two weeks. We would like you to answer some questions about your work, spare time and family life. There are no right or wrong answers to these questions. Check the answers that best describe how you have been in the last two weeks.
Appendix M. Quality of Life Inventory Instructions. 

**QOLI** (1994)

**DIRECTIONS:**

This survey asks how satisfied you are with parts of your life such as your work and your health. It also asks how important these things are to your happiness. Special definitions are used for words like “money”, “work,” and “play.” Keep these definitions in mind as you answer the questions. Answer every question, even if it does not seem to apply to you. It is your feelings and opinions that are important, so there are no right or wrong answers. Just give the answers that best describe you.

The survey asks you to describe how **important** and how **satisfied** you are with parts of your life such as work and health:

**Important** means how much this part of your life adds to your overall happiness. You can say how important something is by picking one of three choices: “Not Important” (0), “Important” (1), or “Extremely Important” (2).

**Satisfied** means how well your needs, goals, and wishes are being met in this area of life. You can say how satisfied you are by picking one of six choices from “Very Dissatisfied” (-3) to “Very Satisfied” (+3).

For each question, fill in the numbered bubble that best describes you.

**EXAMPLE:**

This is how you would answer if WORK was “Important” for your overall happiness:

<table>
<thead>
<tr>
<th>Important (0)</th>
<th>Important (1)</th>
<th>Extremely Important (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>

You would answer this way if you were “Somewhat Satisfied” with your WORK:

<table>
<thead>
<tr>
<th>Dissatisfied</th>
<th>Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-3)</td>
<td>(+3)</td>
</tr>
<tr>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
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</table>