ABSTRACT

Title of Thesis: THE BEHAVIORAL SIGNATURE OF PERMAGS:
                            EXAMINING THE BEHAVIORAL CHARACTERISTICS
                            OF PSYCHOMETRICALLY IDENTIFIED PUTATIVE
                            SCHIZOTYPES

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Perceptual aberrations and magical ideation have been found to be indicators of Meehl's construct of schizotypy and, more generally, psychosis. Research on social anhedonia (Collins, 2002) indicates that those putatively at-risk for developing schizophrenia spectrum disorders are different from controls on behavioral observations. Extending recent research (Collins, 2002) and determining its replicability in individuals with perceptual aberrations and magical ideation (PerMags), the utility of behavioral sign ratings in the identification of putative schizotypes was examined. Subjects (N = 117) drawn from a diverse community sample were selected based on responses on the Perceptual Aberration and Magical Ideation Scales and were then videotaped. Group differences on dimensions of behavioral schizotypal characteristics between the PerMag and control groups were examined, under the assumption that putatively high-risk individuals would demonstrate elevated levels of behavioral schizotypal characteristics. Results revealed no significant differences between groups. Possible explanations for these findings, including sampling differences, are discussed.

THE BEHAVIORAL SIGNATURE OF PERMAGS: EXAMINING THE
BEHAVIORAL CHARACTERISTICS OF PSYCHOMETRICALLY IDENTIFIED
PUTATIVE SCHIZOTYPES

by

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Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Master of Arts
2005

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Introduction:

MEEHL'S THEORY OF SCHIZOTYPY

Meehl's (1962, 1990) etiological theory of schizophrenia defines the construct of schizotaxia as a heritable vulnerability. In this genetic model, schizotaxia is a genetically based neural defect which, when combined with environmental factors, can result in the development of schizophrenia. Meehl's theory of schizotaxia (1962) is a "specific etiology" of schizophrenia which begins with an inherited genetic mutation. Meehl noted that "clinical schizophrenia" cannot be inherited due to its behavioral and phenomenal contents which are learned. However, he proposed that a "genetically determined functional parameter" may be capable of producing the heterogeneous outcomes seen in schizophrenia. He argued that the central nervous system, throughout development, is impacted by the "heritable parametric aberration" and leaves the schizotaxic individual prone to acquiring schizotypy. Meehl argues that any theory for such a heterogeneous phenomena must include a core deficit capable of producing the wide variety of outcomes seen in schizotypy and schizophrenia. Meehl termed this core deficit schizotaxia.

Social environmental factors are believed to impact the schizotaxic individual in a particular way that leads to the development of a constellation of personality characteristics referred to as schizotypy (Meehl, 1962, 1990). The personality organization of schizotypy is characterized by four traits: cognitive slippage (mild thought disorder), anhedonia (pleasure deficit), ambivalence, and interpersonal aversiveness. The schizotaxia genotype carries a defect which interferes with

development and Meehl speculated about the possible ways that an inherited genetic aberration could interact with developmental and environmental demands to result in schizotypy. One possible instance of an interaction, Meehl suggested, is through positive and negative reward systems in the limbic system during social interactions. In this interaction "aversive drift" occurs; "aversive drift" refers to a deterioration in the limbic system that explains both withdrawn negative symptoms and positive symptoms related to hypersensitivity to environmental stimuli. Meehl summarizes this process by stating that "Roughly speaking, [the schizotype] has learned that to want anything interpersonally is to be endangered" (p.834). Although the schizogene is the inherited component, it is not the same as schizotypy, Meehl noted. The interaction of the environment and the schizogene (social stressors) may be buffered by chance developments in the schizotypes personality, thus allowing for less severe outcomes. The interaction leading to schizotypy, as Meehl stated, relies upon luck or, more specifically, bad luck.

Although most schizotypes will never experience any mental illness symptoms, Meehl (1990) proposes that 10% of schizotypes will develop clinical schizophrenia. The majority will experience a range of outcomes and many may not be clinically notable. Meehl's etiology of schizophrenia provides the basis for research aimed at identifying those individuals at risk for developing schizophrenia. If those believed to be heading toward decompensation can be identified, interventions could be implemented to lessen or prevent the development of clinical schizophrenia and related disorders. Additionally, if the schizotype can be identified then we can learn about the intricate process of liability and stress that leads to schizophrenia.

Supporting the Heritability of Schizotypy

Both family studies and adoption studies have supported a genetic relationship consistent with Meehl's (1962, 1989) theory (Kendler et al., 1993; Kendler, Gruenberg & Strauss, 1981). Generally, research has shown that those individuals sharing genes with schizophrenia patients have higher rates of a variety of schizophrenia related symptomatology (spectrum personality disorders) compared to control groups who have no genetic relationship with schizophrenic individuals (Gottesman, 1991; Kendler, 1988; Lowing, Mirsky, & Pereira, 1983). The relationship between clinical schizophrenia and schizotypal personality disorder has also been shown (lending some support to the DSM classification). When comparing groups with schizotypal personality disorder to controls, there are higher rates of schizophrenia in the relatives of those diagnosed with schizotypal personality disorder (Battaglia, Gasperini, Sciuto, Scherillo & Bellodi, 1991; Thacker, Adami, Moran, Lahti & Cassidy, 1993). The data presented here are supportive of the genetic component of Meehl's theory in that they demonstrate a range of phenotypic expressions of presumably schizotaxic genes.

Meehl's theory not only suggests the heritability of schizotaxia, it posits that there is an interaction between the genotype and environmental stressors (Meehl, 1962, 1989). The diathesis-stress model finds support by research that shows in schizophrenic individuals there are increased rates of various environmental insults. Those with a genetic risk for schizophrenia that have developed the disorder, compared to genetically at-risk individuals who *have not* developed the disorder, have been shown to have higher rates of neo-natal complications or general instability in the family (e.g., separation from parents; Cannon & Mednick, 1993; Cannon, Mednick, & Parnas, 1990). Thus, without

the genetic liability posited by Meehl, these kinds of environmental insults and stressors do not lead to schizophrenia. The important role of an interaction is supported with twin studies. Far from 100% concordance, Gottesman (1991) shows that concordance rates are only as high as 50%. This lends intuitive support for the diathesis-stress etiology in Meehl's theory.

Meehl's Schizotypy and Schizotypy in the DSM

Schizotypy, as it relates to Meehl's schizotaxia, is readily confused with certain personality disorders. Meehl's schizotypy is a theorized personality organization developed because of a genetic liability and it would not necessarily warrant an Axis-II diagnosis. This is due to the subtle markers that are fallible indicators of the schizotaxia liability. Early studies of relatives of schizophrenics showed that these family members showed some symptoms that were similar to but less severe than clinical schizophrenia symptoms. This concept is found in the Diagnostic and Statistical Manual, fourth edition, (DSM-IV; APA, 1994) under schizoid and schizotypal personality disorders. Schizotypal personality disorder (SPD) was added in 1980 and includes "social and interpersonal deficits…cognitive or perceptual distortions and eccentricities of behavior" (APA, 1994, p. 645). SPD resembles most closely the positive symptoms of clinical schizophrenia and was based on schizophrenia-like syndromes. The other similar category is Schizoid Personality Disorder (SZD). The DSM lists features that resemble some negative symptoms of schizophrenia: "detachment from social relationships and a restricted range of expression of emotions in interpersonal settings" (APA, 1994, p. 638). In sum, Meehl's theoretical construct of schizotypy is not isomorphic with DSM disorders,

although the two are related. Meehl's schizotypy might be present in the absence of DSM clinical diagnoses.

Measuring Meehl's Schizotypy

Identifying those at risk for developing schizophrenia can be difficult. According to Meehl, only a small number (10%) of the individuals with this genetic liability will go on to develop schizophrenia, the rest will never show symptoms of mental illness. One strategy might be to use the Diagnostic and Statistical Manual (DSM; American Psychiatric Association, 1994) criterion for schizophrenia spectrum disorders. However, some issues and limitations need to be considered with this approach. First, not all schizophrenia spectrum disorders are linked to schizotaxia. Second, although some schizotypes will meet DSM criteria for schizotypal personality disorder, the diagnosis is independent of a genetic liability for schizophrenia and may be linked to genetic transmission of non-spectrum disorders (Torgersen, 1985; Faraone et al., 2001), which is unlike Meehl's schizotype.

Another way to identify schizotypic individuals is to examine those with known genetic risk (i.e., relatives of those with schizophrenia). As described earlier, myriad studies of those with shared genes lend substantial support for the latent genetic liability for schizophrenia. Studies show that family member of individuals with schizophrenia have higher rates of schizophrenia and schizophrenia spectrum disorders (Kendler, 1998; Asarnow et al., 2001); greater levels of shared genes are associated with greater risk for schizophrenia and concordance rates for schizophrenia in monozygotic twins raised apart were found to be 50% (Gottesman, 1991). Although it is clear that genes play a role in

the etiology of schizophrenia, identifying schizotypes with this approach is less than ideal. Using familial identification does not take into account the fact that not all those prone to developing schizophrenia will have a positive family history for the disorder.

A third strategy is the psychometric high risk paradigm. This approach uses self-report questionnaires to tap personality characteristics believed to serve as fallible indicators of the latent genetic liability for schizophrenia. As noted above, these traits are: cognitive slippage, interpersonal aversiveness, anhedonia, and ambivalence to environmental cues and stimuli.

The psychometric high risk paradigm has potential advantages. This approach is efficient and easily lends itself to mass screening. Mass screening is needed for detecting a phenomenon with a low-base rate in the general population. The measures can purportedly detect liability in absence of active symptoms. Because this approach is theoretically derived and not based on DSM criteria for related disorders, a schizotype with subthreshold diagnostic features maintains a strong chance of being identified.

Scales for Identifying Schizotypes

Loren and Jean Chapman have been the primary developers of measures of psychosis proneness based on Meehl's (1962, 1989) diathesis-stress model for schizophrenia (Chapman, Chapman & Raulin, 1976; Chapman, Chapman, & Raulin, 1978; Eckblad & Chapman, 1983). These scales were the first to mirror Meehl's theory. Of the original measures, the three described in this paper have been empirically supported.

The Perceptual Aberration and Magical Ideation Scales

Two scales are designed to directly tap experiences related to body image and perceptual distortions (presumed schizotypal markers). The Perceptual Aberration Scale (PAS; Chapman, Chapman, & Roulin, 1976) is a 35-item true-false measure of perceptual distortions related to one's body and other external stimuli. It includes items like "occasionally it has seemed as if my body had taken on the appearance of another person's body" (keyed true) and "my hands and feet have never seemed far away" (keyed false). The Magical Ideation Scale (MIS; Eckblad & Chapman, 1983) is a 30-item true-false scale measuring invalid causal beliefs, including items such as "I have sometimes had the momentary feeling that someone's place has been taken by a look-alike" (keyed true) and "I have sometimes felt that strangers were reading my mind" (keyed true).

These scales have been shown to have good convergent and discriminant validity (Bailey, West, Widiger, & Freiman, 1993) and support for the scales' construct validity is evident when considering that individuals with schizophrenia are elevated on these scales (Chapman et al., 1978; Laurent et al., 2000). These two scales are highly correlated ($r =$ .65; Edell, 1995) and consistently load on the same schizotypal factor "positive schizotypy" (Vollema & van den Bosch, 1995). The combined use of these scales represents one of two main ways to identify groups of schizotypes (Gooding, 2000). In addition to convergent and discriminant validity, the clinical relevance of these measures has been examined to further establish the scales' validity.

Many studies have established validity for the scales by demonstrating a correlation between these measures and cognitive and psychophysiological characteristics, as well as clinical symptoms associated with schizophrenia.

Somatosensory processing deficits in schizophrenia, including body awareness, are found in individuals identified by these psychometric measures. Lenzenweger (2000) found that in putative schizotypes two-point discrimination tasks revealed impairment in somatosensory processing similar to those present in schizophrenia. This impairment in somatosensory processing has also been identified in first degree relatives of schizophrenics (Chang & Lenzenweger, 2001).

Motor performance, as indexed by root-mean-square error (logRMS) on a line drawing task (Maher Line Drawing Task), is impaired in individuals with schizophrenia when compared to controls (Blyler et al., 1997). This same impairment has been found in putative schizotypes. Lenzenweger and Maher (2002) identified schizotypes using the PAS and MIS and compared them to controls on the Maher Line Drawing Task. Those scoring high on the PAS demonstrated performance deficits on a line drawing task. For the combined sample the PAS and MIS were significantly correlated with logRMS. Thus, higher levels of schizotypy were associated with greater amounts of error in the line drawing task.

Sustained-attention deficits along with positive symptoms of perceptual aberrations, odd beliefs, and ideas of reference have been documented in schizophrenic populations. These are also found, to some degree, in first-degree relatives of schizophrenics. Lenzenweger (2001) examined these features in a group of schizotypes psychometrically identified by the PAS. Specifically, reaction time (RT) during a high-load sustained attention task (Continuous Performance Test-Identical Pairs) was compared across groups. Unexplained by general intellectual ability or mental state was

a significantly longer RT performance in the group with high PAS scores compared to controls.

The above research supports the PAS/MIS sensitivity to cognitive and psychophysiological performances similar to clinical schizophrenia. Additional cross-sectional and longitudinal data lend further support to the measures' relationship with clinical symptoms.

Coleman, et. al. (1996) conducted a cross-sectional study exploring schizotypy, identified by the PAS and thought disorder in an undergraduate sample. Those scoring more than 2.0 standard deviations above the group mean on the PAS were compared to those who scored no more than .05 above the group mean (high PerAb/low PerAb). On measures of thought disorder, those scoring high on the PAS were found to have cognitive slippage similar to that in schizophrenia.

Some mixed support for the link between schizophrenia proneness and the Perceptual Aberration Scale comes from the MMPI "2-7-8" point code similarities. This point code configuration is common in individuals with schizophrenia and in one study, those with elevated PAS scores were more than five times as likely to display it; their profiles were also similar to those of a group of individuals with schizophrenia (Lenzenweger, 1991). Yet another study found no differences between individuals with elevated PAS/MIS scores (PerMags) and those scoring the 2-7-8 profile on psychotic like experiences; differences were found as the PerMag group scored high on hypomania and the 2-7-8 group did not (Fujioka & Chapman, 1984). As will be discussed later, the Perceptual Aberration and Magical Ideation scales show some promise in the prediction of schizophrenia and psychosis in general.

Cross-sectional studies indicate that elevations on both PerMag scales (the PAS and the MIS) are associated with more frequent psychotic like experiences (Kwapil, Chapman, & Chapman, 1999; Tallent & Gooding, 1999). However, findings are mixed for the predictive validity of these scales (Chapman et al., 1994). High-scorers on the PAS, MIS, or the combined scales were shown to demonstrate more psychosis (both mood and non-mood related), more psychotic-like experiences, have higher schizotypal dimensional scores, and have more psychotic relatives than control subjects. Psychotic outcomes were especially elevated in those individuals with high scores on these two scales who also reported moderate levels of psychotic-like experiences at the initial interview (Chapman et al., 1994). As the above findings suggest, the PAS and the MIS can be useful in predicting schizotypy and psychosis. Developed by the Chapman's, they tap features hypothesized by Meehl.

The Revised Social Anhedonia Scale

A third measure was developed to tap another of Meehl's traits- lowered hedonic capacity, specifically social anhedonia. Social anhedonia is a promising identifier of a particular group of at risk individuals. The Revised Social Anhedonia Scale (RSAS; Eckblad, Chapman, Chapman, & Mishlove, 1982) is a 40-item self-report questionnaire and includes items such as "having close friends is not as important as many people say" (keyed true) and "although I know I should have affection for certain people, I don't really feel it" (keyed true). This scale taps an element of Meehl's schizotypy reflecting a schizoid lack of interest in social interaction. Research indicates that the presence of

social anhedonia is one of the most promising core features of schizotypy (Kwapil, 1998).

Cognitive abnormalities similar to those found in a schizophrenic population have also been associated with social anhedonia. Impairments in aberrant smooth pursuit tracking (Gooding, Miller & Kwapil, 2000), antisaccade performance (Gooding, 1999) executive functioning (Gooding, Kwapil & Tallent, 1999; Tallent & Gooding, 1999), and deficits in working memory (Tallent & Gooding, 1999) have all been associated with elevated social anhedonia scores.

Chapman's (1994) landmark longitudinal study examined the use of perceptual aberrations, magical ideation, and social anhedonia scales for identifying schizophrenia proneness. Longitudinal data obtained over a 10-year follow-up has been used to examine the specificity of the Chapman measures of psychosis proneness. PerMags, individuals with elevated PAS/MIS scores, were shown to be at increased risk for a range of psychotic disorders including schizophrenia, bipolar disorder with psychotic features, delusional disorder, and psychosis not otherwise specified, but not schizophrenia-spectrum disorders exclusively (Chapman et al., 1994). However, those individuals who had high magical ideation scores, and also had elevated social anhedonia scores, were at a heightened risk for developing schizophrenia-spectrum disorders. Although this research did not originally use the RSAS to identify a deviant social anhedonic group, high social anhedonia scores on the RSAS within this sample appear to have affected the follow-up results. These results indicate that social anhedonia may be an even better indicator of schizotypy than perceptual aberrations or magical ideation alone.

Kwapil (1998) later re-analyzed the same longitudinal data to examine the utility of social anhedonia as an indicator of risk for schizophrenia-spectrum disorders. The group of high scorers on the RSAS from the previous study by the Chapmans was reassessed after statistically controlling for the effects of the other psychosis proneness measures. At 10-year follow-up, 24% of this social anhedonic group had been diagnosed with schizophrenia-spectrum disorders, as compared to only 1% of the control group. The RSAS was the only measure that predicted schizophrenia-spectrum personality disorders: paranoid, schizotypal, and schizoid. These results further support the predictive validity of the psychometric approach using the Chapman scales and, specifically, the RSAS (social anhedonia) as a specific predictor of schizophrenia-spectrum disorders. In contrast, the PerMag scales have been shown to predict development of general psychosis-not specifically schizophrenia or other related disorders.

The Chapman scales have been strongly related to the schizophrenia-spectrum outcomes as well as psychosis via assessment of current psychotic-like symptoms (less severe psychotic symptoms related to perception, sensation, beliefs, and behavior). However, it has been widely accepted that the three Chapman scales for social anhedonia, perceptual aberration, and magical ideation (RSAS/PAS/MIS) are all measuring the same construct: schizotypy. The differential outcomes in the longitudinal Chapman (1994) study combined with Kwapil's (1998) reexamination challenge that notion. These differential predictive powers may reflect the possibility that these instruments are measuring different aspects of schizotypy, possibly positive and negative dimensions. Thus, it is urgent that the apparent different "types" of schizotypy be elucidated.

Differential Prediction within Schizotypy

The structure of schizotypy (Kendler et al., 1991, 1995) and the heterogeneous performance related to schizophrenia (Lenzenweger, Jensen, & Rubin, 2003) has long been known issues in this literature. Additionally, recent has research examined the taxonic structure generated by the three leading Chapman scales believed to measure a unitary construct (Horan, Blanchard, Gangestad, & Kwapil, 2004). The RSAS identified a latent taxon independent of the construct identified by the PerMag measures (PAS/MIS). This suggests that PerMag and social anhedonia scales tap two aspects of schizotypy likely to be related to positive and negative symptomatology (Horan et al., 2004).

The above data suggests that the measures used to assess schizotypy, the RSAS and PAS/MIS, are identifying different groups of people. Meehl's theory states that a genetic neural defect (schizotaxia) leads to a personality organization (schizotypy) and many of these schizotypes decompensate into clinical schizophrenia. Incongruent with Meehl's theory are these psychometric data that suggest that there are more than one distinct schizotype. The issue of subtypes (social anhedonic; PerMag), symptoms, and behaviors (positive, negative) within schizotypy must be addressed in order to elucidate the etiology of schizophrenia. A plethora of research has focused on symptom report ratings. The knowledge from this literature may be complemented by examining another source of data. One approach to strengthen the predictive powers of schizotypy scales is to consider behavioral signs in addition to self-report measures. It may be that the

multidimensional nature of schizotypy is best measured when behavioral signs are assessed in addition to symptoms.

Disentangling Possible Schizotypy Subtypes

When assessing schizotypy, Kendler (1988) demonstrated that self-report data is less than comprehensive and that the observation of behavior may be critical in assessing schizotypy. Traditional diagnostic assessments make use of self-report to rate symptoms of schizotypy. Whereas symptoms assess experiences reported by an individual, signs focus on an interviewer's observation of the respondent's behavior. Signs may reveal information not gathered by ratings of symptoms. Ratings of signs, when made by trained interviewers, have been found to be more powerful than ratings of symptoms at identifying relatives of individuals with schizophrenia (Kendler et al., 1995).

Considering that there is support in the literature for the use of sign ratings (Kendler et al., 1995) and that there are some promising scales for rating the schizotypal traits that Meehl proposed, it seems logical and intuitive to consider *behavioral observations* of putative schizotypes. Given the importance of behavioral indicators, Collins (2002) sought to examine behavioral characteristics, using the Interpersonal Measure of Schizoidia and Schizotypy (IM-SS; Kosson & Byrnes, 1999), of anhedonics in a study of social anhedonic (putative schizotypes) and control groups gathered from a community sample.

The IM-SS (Kosson & Byrnes, 1999) is designed to improve the assessment of schizoid and schizotypal personality traits. This measure is composed entirely of ratings of behavioral signs based on observations made during a professional interaction with an

individual. The Schizoidia Scale of the IM-SS is comprised of 14 items representing characteristics of schizoid personality disorder, such as "constricted facial affect" and "detachment (lack of engagement)." The Schizotypy Scale of the IM-SS is composed of 9 items assessing characteristics of schizotypal personality disorder, including "odd behavior" and "thought disorder."

The purpose of the Collins (2002) research was to test if behavioral observations would uniquely contribute to the accurate identification of schizotypes (those individuals elevated social anhedonia scores). Compared to controls, Collins found elevated IM-SS ratings in the social anhedonia group. The elevated IM-SS ratings suggest that social anhedonics exhibit distinct behaviors not observed in the normal control group. Another purpose of the Collins research was to explore the incremental validity of the IM-SS in predicting schizotypy in social anhedonics. In addition to identifying group differences on schizotypal behavior, the International Personality Disorders Examination (IPDE; Loranger et al., 1995; described below) and the IM-SS were used together to predict group membership. As predicted, after controlling for the IPDE, the behavioral scale (IM-SS) uniquely accounted for nearly 7% of the variance in group status (schizotype or control), above and beyond other data.

These findings are particularly noteworthy considering that the IPDE contains some behavioral items. The IPDE incorporates behavioral observation through 5 items involved in the assessment of schizotypal and schizoid personality disorders. These items consist of ratings of "odd thinking and speech," "odd behavior and appearance," "emotional coldness, detachment, or flattened affectivity," "inappropriate or constricted affect," and "suspiciousness or paranoid ideation." In comparison, the IM-SS is entirely

behavioral and was designed to elicit a thorough assessment of the entire spectrum of behaviors related to positive (schizotypy) and negative (schizoid) schizotypy.

The use of behavioral observations supported previous findings showing that self-report and behavioral ratings tap two distinct domains (Kendler et al., 1995). Behavioral ratings provided incremental validity in the identification of social anhedonics from controls. In sum, social anhedonics exhibited increased schizoid behaviors when compared to controls and these behavioral observations accounted for unique variance when considered with self-report data (the IPDE) in the prediction of group membership (social anhedonic or control).

The research described above is a promising step toward more accurate identification of schizotypes, however there are more questions to be answered. Collins found that the explanatory power, with a sample of social anhedonics, came from the Schizoidia Scale. It has yet to be explored if Schizoidia Scale elevations are unique to social anhedonics or if they are associated with all putative schizotypes. Specifically, it is unclear if these behavioral manifestations are unique to social anhedonia or are evident in other putative schizotypes, such as those identified through magical ideation or perceptual aberration. Social anhedonia is more of a negative symptom and is expected to be tapped by the schizoid items, and so Collins' use of social anhedonics provided little data from the schizotypy scale. It is likely that the positive behaviors rated by the Schizotypy Scale are more apparent in a sample of PerMags. The present study sought to extend prior research to explore behavior in a different sample of putative schizotypes while employing the same behavioral measure, the IM-SS.

As past research indicates, behavioral observations are sensitive to characteristics that self-report can miss (Kendler, 1988; Kendler et al., 1995). Recent research has found incremental validity for behavioral observations in one group identified as schizotypes (social anhedonics; Collins, 2002). The logical direction for this line of research is to determine if there are different behavioral characteristics for another group of identified schizotypes (PerMags) who may be more likely to display positive symptoms.

PRESENT STUDY:

Rationale

Perceptual aberrations, magical ideation, and social anhedonia have been found to be indicators of Meehl's construct of schizotypy and, more generally, psychosis. However, studies to date have raised the issue of whether social anhedonia measures a different construct than that tapped by perceptual aberration and magical ideation. One approach to better understanding individuals with these traits is to examine their behavior. This study extended the findings obtained in social anhedonics (Collins, 2002) and determined their replicability in individuals with perceptual aberrations and magical ideation.

DETAILS OF THE CURRENT STUDY

This study sought to examine the utility of behavioral sign ratings in the identification of putative schizotypes. Additionally, the inter-rater reliability and discriminant validity of the IM-SS was evaluated. This examination involved studying a large community sample of 18 year-olds. Subjects were recruited based on results of a self-report survey, including the PerMag scales (PAS/MIS) and the RSAS, and were then videotaped. These archived videotaped interactions are the source of behavioral observations that were rated for the current study. Group differences on dimensions of schizotypal characteristics between the PerMag and control groups were examined, under the assumption that putatively high-risk individuals (PerMags) would demonstrate elevated levels of schizotypal characteristics.

This study examined the following hypotheses:

1. The IM-SS can be used reliably to measure schizoid and schizotypal behaviors in
   individuals elevated on perceptual aberration and magical ideation scales.

2. When compared to controls, PerMags, as putative schizotypes, will demonstrate
   elevated schizoid and schizotypal behavior as measured by the IM-SS.

3. As indicators of schizotypy, the IM-SS Schizotypy Scale and IPDE Schizotypal
   Personality Disorder items will be related in the experimental group.
   Correlational analyses were used to examine this hypothesis.

4. Although we expect the IM-SS and IPDE to be related, each measure will address
   unique aspects of schizotypy. It was hypothesized that the IM-SS will
   differentiate between risk groups after controlling for the IPDE. Regression
   analyses were used to test this hypothesis.

CHAPTER 3. METHODOLOGY

Subjects were recruited from the local community as part of an ongoing grant-funded study conducted at the University of Maryland, College Park (UMCP), by Dr. Jack Blanchard. The ongoing grant study is a five-year longitudinal study examining the traits of those believed to be at risk for developing schizophrenia and their family members. Normal controls and PerMags (elevated scored on either the PAS or MIS) were recruited from the UMCP area. These participants were administered diagnostic interviews (Structured Clinical Interview for DSM-IV Axis I Disorders; International Personality Disorders Examination), symptom ratings (Schedule for Deficit Syndrome), family ratings (Family Interview for Genetic Studies), and cognitive and neuropsychological measures (Wechsler Adult Intelligence Scale; Wechsler Memory Scale; Continuous Performance Task). Participants are scheduled to be reassessed at 3-year follow-up. The grant study received approval from the Institutional Review Board at UMCP in February, 2001, and was re-approved in April, 2004. The proposed study will extend recent findings regarding behavioral signs and thus contribute to the grant study through its examination of behavioral ratings in the assessment of schizophrenia-spectrum disorders. This study received approval from the Human Subjects Review Board and IRB at UMCP (HSR#: 104-23).

PARTICIPANTS

Subjects were a subset of 2,226 18 year-olds recruited by the University of

Maryland Survey Research Center (SRC) using random digit dial methods. Subjects

came from households within a 15-mile radius of the university, including Washington,

D.C., Prince George's, and Montgomery counties. Subjects were mailed a consent form

and screening questionnaire including the PerMag scales. Upon completion of the initial

screening questionnaire, subjects received $15.

Selection and recruitment for this study was based on individuals' responses to

the two PerMag scales. Individuals with extreme scores on either the Perceptual

Aberration Scale or the Magical Ideation Scales (i.e., the PerMag scales), falling at least

1.85 standard deviations above the mean, were selected as the PerMag group (n = 30).

Subjects whose scores fall no more than 0.5 standard deviations above the mean were

selected as the control group (n = 87). These selection methods have been established

through use in previous studies (e.g., Chapman et al., 1994; Kwapil, 1998). A validity

scale was used to exclude invalid responses, which will be discussed further in the

following section. An additional inclusion criterion specified for the grant study required

that control subjects not score higher than 0.5 standard deviations above the mean on the

social anhedonia scale (RSAS). This criterion was specified in order to allow for the

attainment of pure PerMag and control groups throughout the study.

Subjects assigned to PerMag or control groups were contacted and invited to

participate in the present study. Participation in the study involved completion of several

questionnaires, a diagnostic interview, a computerized test of attention, and several

neuropsychological tests of memory. Participants were asked to refrain from the use of

alcohol and drugs in the 24 hours preceding their appointment. Written and oral consent

was obtained when subjects arrived at the site of the study. Participants were informed in

the consent form that the interview section of their session will be videotaped using an

unconcealed camera. Additionally, this information was reiterated orally by the

interviewer. Following completion of the study tasks, participants were fully debriefed as

to the nature of the study and provided any relevant diagnostic feedback. This

information was relayed as a tentative diagnosis based on minimal assessment and

requiring further evaluation. If necessary, referrals for local mental health services were

provided. Each subject received $100 for their participation.

PROCEDURES AND MEASURES

Assessment of Diagnostic Status, SCID Interview

Subjects were not screened for diagnostic status prior to inclusion in the study.

As part of the grant study, psychiatric diagnoses were determined using the Structured

Clinical Interview for DSM-IV Axis I Disorders, Patient Edition – Research Version

(SCID-I; First, Gibbon, Spitzer & Williams, 1996). The SCID is a semi-structured

interview that has been widely used in studies of psychosis proneness (e.g., Asarnow et

al., 2001; Gooding & Tallent, 2001) and provides thorough coverage of current psychotic

disorders and past psychiatric history. The SCID begins with an overview section which

was one source of videotaped interview used to make ratings with the IM-SS. The SCID

was administered by doctoral students in clinical psychology who were trained by a

Ph.D.-level clinician with extensive research experience.

Assessment of Social Anhedonia

   The Revised Social Anhedonia Scale (RSAS; Eckblad, Chapman, Chapman, &

Mishlove, 1982) is a 40-item self-report questionnaire and includes items such as "having

close friends is not as important as many people say" (keyed true) and "although I know I

should have affection for certain people, I don't really feel it" (keyed true). This scale

taps an element of Meehl's schizotypy reflecting a schizoid lack of interest in social

interaction. The RSAS has demonstrated good internal consistency and discriminant

validity (Chapman, Chapman & Miller, 1982; Mishlove & Chapman, 1985).

Additionally, the RSAS has been shown to have high test-retest reliability over a 90-day

period (Blanchard et al., 1998).

   The Infrequency Scale was designed by the Chapmans for use with the anhedonia

scales (Chapman et al., 1976) and was intermixed with the RSAS as part of the initial

screening survey for the purpose of identifying invalid responses. This scale is composed

of items which are almost universally answered in one direction. An example of an item

from this 17-item scale is "I visited Easter Island last year" (keyed true). Individuals who

endorsed 3 or more items in the unexpected direction were excluded from the study due

to evidence that this criterion suggests invalid responding in general (Chapman et al.,

1976).

<u>Assessment of Perceptual Aberrations and Magical Ideation</u>

The Perceptual Aberration Scale (PAS; Chapman, Chapman, & Roulin, 1976) is a 35-item true-false measure of perceptual distortions related to one's body and other external stimuli. It includes items like "occasionally it has seemed as if my body had taken on the appearance of another person's body" (keyed true) and "my hands and feet have never seemed far away" (keyed false). The Magical Ideation Scale (MIS; Eckblad & Chapman, 1983) is a 30-item true-false scale measuring invalid causal beliefs, including items such as "I have sometimes had the momentary feeling that someone's place has been taken by a look-alike" (keyed true) and "I have sometimes felt that strangers were reading my mind" (keyed true). These scales have been shown to have good convergent and discriminant validity (Bailey, West, Widiger, & Freiman, 1993) and support for the scales' construct validity is evident when considering that individuals with schizophrenia are elevated on these scales (Chapman et al., 1978; Laurent et al., 2000).

The PAS and the MIS are frequently combined in schizotypy research. These two scales have been found to load on the same schizotypal factor: positive schizotypy (Vollema & van den Bosch, 1995). In addition to tapping the same factor of the schizotypal construct, these two scales share a correlation of .65 (Edell, 1995) and represent one of two main ways to identify groups of schizotypes (Gooding, 2000).

<u>Assessment of Symptoms of Schizotypy, IPDE Interview</u>

The International Personality Disorders Examination (IPDE; Loranger et al., 1995) is a semi-structured interview designed to assess Axis II disorders. In addition to the SCID overview, videotaped portions of this interview comprised the remainder of the

videotaped behavior used to make ratings with the IM-SS. This was administered to assess schizotypal, schizoid, and paranoid personality disorders, reflecting the schizophrenia-spectrum personality disorders. The IPDE has demonstrated inter-rater reliability with an overall kappa of 0.57 for the DSM-III-R and 0.65 for the ICD-10. Ratings were made by the same group of doctoral students conducting the SCID interview.

Individuals with high PAS/MIS scores (PerMag group) have demonstrated elevated frequency of schizotypal and schizoid personality disorder, as measured by the IPDE (Kwapil, 1998). In the current study, the PerMag group was expected to score higher than the control group on schizoid and schizotypal personality dimensions. IM-SS scores were evaluated against IPDE scores to investigate hypotheses (3): the relationship of scores between the IM-SS and IPDE.

Assessment of Signs of Schizotypy

The IM-SS (Kosson & Byrnes, 1999, unpublished scale; see Appendix C) is an assessment measure for behaviors related to schizoid and schizotypal personality disorders. The IM-SS is based only on observations of interpersonal behavior during professional interactions of substantial length (30 minutes maximum). With two subscales, the IM-SS yields separate dimensional scores, one measuring schizoid traits (14 items) and one measuring schizotypal traits (9 items). IM-SS ratings are based on the frequency and severity of specific kinds of behaviors observed over the course of a single session. The IM-SS is scored based on a four-point ordinal scale rating how well each item characterizes an individual. An item may characterize an individual not at all,

somewhat, very well, or perfectly (highly). Examples of behaviors representative of an item are listed below each item and serve as anchors for specific items. For example, "rarely if ever smiles," anchors the item "constricted facial affect." The developers of the IM-SS (Kosson & Byrnes, 1999, unpublished manual) note that IM-SS ratings based on videotaped sessions should be completed immediately following the viewing of the videotaped session. Of note, as described above, the IPDE contains behavioral items. However, the IM-SS is believed to be a more thorough assessment of schizotypal behaviors.

In the current study, interpersonal behavior was assessed using videotapes of interviews conducted as part of the grant study. Coders viewed the overview section of the SCID-I and the IPDE for each subject (typically providing approximately 20-30 minutes of behavior to rate). A 30-minute cut-off was imposed to ensure that subject ratings are based on equivalent amounts of observed behavior. These measures were selected based on suggestions by the IM-SS developers that ratings be based on partially standardized interactions and their use in recent research (Collins, 2002). A significant time gap exists between the two portions of videotape used to make IM-SS ratings. This gap allows for ratings of behavior across a range of time. The overview section of the SCID provides open and closed questions that gather background information and allow the interviewer to establish rapport with the interviewee before inquiring about more detailed diagnostic symptoms. Information on demographics, work history, medical history, psychiatric history, current stressors, substance use, and the interviewee's report of current and past problems is obtained during the overview. The IPDE examines behavior typical over the interviewee's lifetime. The IM-SS ratings are based on a

significant amount of interview time conducted in a professional setting and thus the results are believed to generalize to typical interactions.

The primary coders were two graduate students and two advanced undergraduate students trained by an advanced graduate student (Lindsay Collins, M.A.). Training procedures were supervised by Dr. Jack Blanchard, Ph.D. During training, the criterion for agreement between pairs of coders and experts' ratings was established. Coders are blind to SCID-I and IPDE data so that subjects' responses to items assessing their own symptomatology will not bias coders' ratings.

Validity and reliability data of IM-SS ratings is sparse. However, Collins (2002) was able to establish adequate inter-rater reliability coefficients across groups (ICCs for IM-SS in control and social anhedonia group were .90 and .77, respectively). Internal consistency for the Schizoidia Scale, α = .79, was adequate. However, due to limited endorsement of the items on the Schizotypy Scale, adequate internal consistency was not established, α = .57. The sample in the current study was hypothesized to exhibit more schizotypal signs than the Collins sample, thus adequate internal consistency was believed to be attainable. Validity data from the Collins study is promising. The IM-SS was found to discriminate between controls and putative schizotypes. A significant amount of variance in group status (4.7%) was accounted for by the IM-SS Schizoidia Scale establishing incremental predictive validity when used with symptom ratings.

Coder Training for the IM-SS

Four coders were used in this study. Two advanced undergraduate students and one graduate student were trained by a graduate student with expertise in making IM-SS

ratings; this expert trainer was also a coder. Agreement between pairs of coders was monitored during the training period using a set of videotapes containing similar participants (adolescent community sample) to the ones used in the current study. Ratings were based on observation of the same type of interviews that were used in the present study (the overview section of the SCID-I and the IPDE). During this training period, coders began by discussing how to make ratings, using examples from the training tapes. Once both coders had an understanding of how to make the behavioral ratings, they began rating tapes individually. Following review of approximately 10 tapes each, adequate reliability was established.

Once inter-rater reliability was established, the coders began to rate tapes for the present study. The two coders each rated tapes for all subjects independently. Periodic checks of their agreement were conducted to prevent coder drift. Following conclusion of the study, intra-class correlations (ICCs; Shrout & Fleiss, 1979) were calculated to measure agreement and consistency between the two raters. Previous studies have shown ICCs to be high for both control subjects and subjects with schizophrenia, typically averaging 0.8 and above (Kring, Kerr, Smith & Neale, 1993; Kring & Earnst, 1999). In an effort to minimize the effect of individual coder error, IM-SS ratings for each subject consisted of an average rating between the two coders.

CHAPTER 4: RESULTS

OVERVIEW

This study examined the incremental validity of behavioral sign ratings in the assessment of schizotypy and the utility of the IM-SS as a measure of schizoid and schizotypal personality disorders. First, the inter-rater reliability of the IM-SS was evaluated. Second, relationships among the behavioral (IM-SS) and symptom (IPDE) scales were examined in correlational analyses. Finally, group differences between putative schizotypes and controls were assessed.

ANALYSES

Group Demographic

Differences between PerMag and control groups in gender and race were assessed using Chi square analyses. No significant differences were found between the groups in gender, χ^2 (1, N=118) = 0.240, p > .05, or race, χ^2 (3, N=118) = 2.696, p > .05 (see table 1).

IM-SS Inter-Rater Reliability

In this study, the IM-SS scores were computed using the ratings from two raters. Intra-class correlations (ICCs) were used to examine inter-rater agreement on the two scales of the IM-SS, the Schizoid Scale and the Schizotypy Scale. For rater pairs with 8 or more cases, ICCs revealed that the IM-SS is a reliable measure overall. When examining the entire sample, ICCs were mixed for the IM-SS subscales. Across both

groups the Schizoidia Scale ICC = .78 and the Schizotypy Scale ICC = .59. Adequate

reliability was also observed within controls and PerMag groups. In the control group

Schizoid Scale ICC =.90 and Schizotypy Scale ICC = .84 and for the PerMag group

Schizoid Scale ICC = .96 and Schizotypy Scale ICC = .81 (see table 2). These data

suggest that the IM-SS is a reliable measure when used by averaging across rater pairs.

Cronbach's alpha was calculated as a measure of internal consistency to

determine the extent to which each scale's items group together to measure a

unidimensional construct. When examining the IM-SS Schizoidia Scale across the entire

sample, α = .78 (see table 2). With the alpha value approaching .80 the IM-SS Schizoidia

Scale can be considered to have adequate internal consistency. However, when

examining the IM-SS Schizotypy Scale, across the entire sample, internal consistency

was lower (IM-SS Schizotypy Scale, $\underline{\alpha}$ = .59; see table 2). The alpha coefficient for this

scale is lower than expected and may reflect only moderate inter-item correlation. The

lower than expected alpha value may be due to infrequent endorsement of the items on

this scale throughout the entire sample. Previous research with the IM-SS, in this

population (Collins, 2002), has reported lower than expected alpha coefficients when

items on the Schizotypy Scale were endorsed with less frequency. In summary, the IM-

SS has demonstrated adequate reliability as used in this study.

The IPDE Schizotypy and Schizoid Scales

The IPDE ratings were confirmed by consensus (not pairs) and thus ICCs were

not calculated, however inter-rater reliability has been shown to be excellent (Loranger et

al., 1994). The IPDE was designed to capture criteria related to personality disorders

and, in this study, the Schizotypal and Schizoid scales that were used focus on symptoms related to schizophrenia-spectrum disorders. Cronbach's alpha was used to determine inter-item consistency to establish how well each scale's items cling together to measure one construct. For the entire sample, the IPDE Schizoid Scale, α = .55 and the Schizotypal Scale, α = .44. These alpha values indicate only moderate inter-item correlations and may reflect low variability and a restricted range in this non-clinical sample.

Correlations within and between the IM-SS and IPDE

Both instruments, the IM-SS and the IPDE, have a scale related to schizoidia and a scale related to schizotypy. We first looked within each instrument to examine the relationship between the scales in each group (PerMag and control). We then looked across instruments and compared the scales for schizotypy and schizoidia with each other in each group.

The two scales of the IM-SS were predicted to correlate due to the similarity of the constructs they measure (schizotypy and schizoidia). The correlation between the IM-SS Schizoidia Scale and the IM-SS Schizotypy Scale in the control group was non-significant (r = .14 p > .05; see table 3). Within the PerMag group, the correlation between the IM-SS Schizoidia Scale and the IM-SS Schizotypy Scale was significant (r = .40 p < .05).

Next we looked within the IPDE and compared its two scales. The Schizoid Scale and the Schizotypal Scale were significantly correlated in the control group (r = .33 p < .001). However, they were not significantly correlated in the PerMag group (r =

.29 $\underline{p}$ > .05), but the magnitude of the correlation was comparable to that obtained in the control groups (see table 3).

Then we compared across instruments, comparing each scale of the IM-SS to its counterpart on the IPDE (see table 3). Pearson's product-moment correlation ($\underline{r}$) was used to determine the relationship between the IM-SS Schizoidia Scale and IPDE Schizoid Scale. In the control group, the IM-SS Schizoidia Scale and the IPDE Schizoid Scale were not significantly correlated ($\underline{r}$ = .02, $\underline{p}$ > .05). Similarly, within the PerMag group, these two scales were not significantly correlated ($\underline{r}$ = -.06, $\underline{p}$ > .05).

In the control group, the IM-SS Schizotypy Scale and the IPDE Schizotypal Scale were not significantly correlated ($\underline{r}$ = .09, $\underline{p}$ > .05). When considering the PerMag group, dimensional scores on the IM-SS Schizotypy Scale and the IPDE Schizotypal Scale were significantly correlated ($\underline{r}$ = .40, $\underline{p}$ < .05). This may be indicative of some shared variance (16%) between these two measures within the PerMag group. However, the IPDE Schizotypal Scale contains four items (of the five total) that focus on behavior (signs). When using the IPDE Schizotypal ratings that only reflect signs, the correlation was more robust ($\underline{r}$ = .88, $\underline{p}$ < .01).

Group differences

One-way analyses of variance (ANOVAs) were conducted to examine group differences on the IM-SS and IPDE scales. Controls did not differ from PerMags on either the IM-SS Schizoidia Scale, $\underline{F}$ (1, 115) = 2.709, $\underline{p}$ > .05, or the IM-SS Schizotypy Scale, $\underline{F}$ (1, 115) = 2.449, $\underline{p}$ > .05). Similarly, the two groups did not differ on the IPDE Schizoid Scale, $\underline{F}$ (1, 115) = .521, $\underline{p}$ > .05, or the IPDE Schizotypal Scale, $\underline{F}$ (1, 115) =

1.025, $\underline{p} > .05$). Given the above null finding, additional comparisons to examine the incremental validity of the IM-SS were not conducted.

Effect sizes

      Given that the sample of PerMags was small (n = 30), effect sizes for group comparisons on the different scales from each measure were calculated. Cohen (1998) defined d as the difference between the means, $M_1 - M_2$, divided by standard deviation, σ, of either group and also defined effect sizes as "small, $d = .2$," "medium, $d = .5$," and "large, $d = .8$" (p.28). The two scales of the IM-SS had small effect sizes (see figure 1).

CHAPTER 5: DISCUSSION

OVERVIEW

Prior research has suggested that measuring behavioral signs provides more accurate identification in the assessment of schizotypy. Kendler et al. (1995) found that behavioral signs were more sensitive than clinical symptoms in differentiating biological relatives of schizophrenics from comparison groups. Additionally, Collins (2002) examined the utility of behavioral signs versus symptom ratings in a putative at risk sample of social anhedonics. Consistent with research by Kendler et al. (1995), Collins found sign ratings to contribute uniquely to the identification of schizotypes (social anhedonics) controlling for symptom ratings. The aim of the present study was to examine behaviors in a different group of schizotypes (PerMags) using the same behavioral measure used by Collins.

First, the reliability of the IM-SS was examined. This measure was used by rater pairs and scores were averaged between raters. The current study demonstrated that the IM-SS ratings can be reliably generalized from independent raters' ratings to a mean rating. This replicates the findings from Collins (2002).

The alpha coefficient indicates the level of internal consistency within each scale and is an indicator that the scale's items represent a single construct or trait (e.g., schizoidia, schizotypy). Results were mixed for the internal consistency of the IM-SS scales. While the Schizoidia Scale revealed adequate inter-item reliability, the Schizotypy Scale demonstrated only moderate inter-item reliability. The lower alpha value for the Schizotypy Scale may be due to infrequent ratings of the items on that scale.

It may be that those behaviors were not present or that they are not captured well by the measure. The lower inter-rater reliability and inter-item reliability of the Schizotypy Scale indicate that data from this scale should be interpreted cautiously.

The two scales of the IM-SS, designed to measure similar constructs related to the schizophrenia spectrum, were significantly correlated in the PerMag group, but not in controls. Thus, the two scales appear to measure somewhat similar schizophrenia-spectrum characteristics. Looking across measures, one of the IM-SS scales (Schizotypy Scale) was significantly correlated with the IPDE Schizotypal Scale in the PerMag group. These significant correlations across scales and measures were only modest and suggest that the schizophrenia spectrum characteristics may be related but are not redundant across domains of signs and symptoms. The contribution of the IM-SS Schizotypy Scale remains in question when considering that the IPDE Schizotypal Scale has four behaviorally focused items that had a strong correlation with the IM-SS Schizotypy Scale. This suggests that the IM-SS Schizotypy Scale overlaps significantly with the IPDE Schizotypal Scale, because of its behaviorally focused items.

The scales used in this study failed to differentiate between the PerMag group and the control group. While PerMags have been shown to be deviant in clinical characteristics (Coleman, 1996; Kwapil, Chapman, & Chapman, 1999; Tallent & Gooding, 1999), we did not find a difference. The present data do not support previous findings of elevated schizotypal personality characteristics in a PerMag group (Kwapil, Chapman, & Chapman, 1999; Tallent & Gooding, 1999). The data from the present study indicate that PerMags may not be clinically different than controls. The reasons for the present null finding are unclear given prior research demonstrating clinical

differences in PerMag populations cross-sectionally and longitudinally (e.g., Coleman, 1996; Kwapil, Chapman, & Chapman, 1999; Tallent & Gooding, 1999). Several possible explanations may help explain the present null findings.

Sample differences may be a reason for the present null finding. Prior studies focused on perceptual aberrations and magical ideation with the presence of social anhedonia (Chapman et al., 1994; Kwapil, 1998). The present study used a "pure" PerMag sample to see if perceptual aberrations and magical ideation alone would reveal clinical deviations. The present findings suggest that elevations on the PAS and MIS, by themselves, may not identify an at-risk population as is identified by the RSAS (social anhedonics). This may be consistent with Kwapil (1998) who examined social anhedonics and found that those social anhedonics who developed psychosis (n=2) at 10-year follow-up had deviantly high perceptual aberration and magical ideation scores. Also, Chapman et al. (1994) reported findings on magical ideation with social anhedonia. In their sample, those with elevated social anhedonia and magical ideation had the worst outcomes (21% psychosis rate compared to 5% for only PerMag; Chapman et al., 1994). The present study was unique in its use of a "pure" sample; selected only if they were not elevated on social anhedonia scores. Thus, the present null findings may be consistent with the PerMag literature given that our sample was low on social anhedonia was not different from the control group. These data suggest that social anhedonia may interact with perceptual aberrations and magical ideation in schizotypes to yield greater clinical deviance. This conjecture requires empirical examination to see if the null findings are replicable and, if so, what role social anhedonia will play.

Another sample difference is this study's use of a non-college community sample. Although the PAS and MIS have been used in community psychiatric settings (Lenzenweger, 1989; Katsansis, Iacono, & Beiser, 1990) most research in this area has used undergraduate samples. Coleman (1996) examined thought disorder and the PAS but did so in an undergraduate sample from Cornell University. Lenzenweger and Maher (2002) used the PAS in a sample of Harvard and Cornell students to examine psychomotor performance. Chang and Lenzenweger (2001) also used Harvard undergraduates for their PerMag sample. Gooding's research (e.g., 1999, 2000, 2005) has drawn heavily on university students and has reported average IQ scores of 120, substantially higher than the average population.

Undergraduate samples are convenient but do not necessarily represent the general population. Generally, college students are higher functioning than their non-college peers (Newman, Moffitt, Caspi, & Silva, 1998). Additionally, if those that go on to develop schizophrenia show signs of cognitive dysfunction as early as elementary school (Fuller et al., 2002) than they would seem less likely to earn admission to the kinds of undergraduate institutions referred to above. So it seems possible that self-report schizotypes in college may be different than those not entering college.

A further consideration of sample differences in the explanation of present null findings is that the present sample was ethnically diverse (40-50% minority). Prior studies have relied primarily on Caucasian samples. There is little data exploring the differences between an ethnically diverse, adolescent, community sample and a mainly white college sample. However, the scales used in this study were examined across racial groups. Kwapil (2002) found concurrent validity for the PerMag scales in both an

African-American and Caucasian sample. While the sample from Kwapil (2002) was

ethnically diverse, they were undergraduates. It remains possible that ethnically diverse

samples are different when in college and not.

A final possibility for the explanation of the present null findings may be self-

selection. More severe adolescent PerMags in the community may not have responded to

the recruitment methods used in the present study (community mailings). It may be that

only less severe PerMags participated in the study. However, the same recruitment

methods from the same community sample did attract those social anhedonics. These

social anhedonics had significantly elevated clinical symptomatology, differed on Axis-I

and II diagnoses, and had lower GAF scores. Thus, it seems unlikely that this study

systematically failed to recruit more sever PerMags.

Limitations

The lack of strong correlations between self-report symptom scales (IPDE) and

behavioral observation scales (IM-SS) indicates that IM-SS raters are not likely to be

biased by listening to subjects' speech content while rating their behavior. Thus, it seems

unlikely that the ratings in this study were biased by the verbal content on the videotapes

used to make IM-SS ratings. However, the potential exists for rater bias due to subject

pathology. The IM-SS ratings were based on up to 30 minutes of a professional

interaction. While making ratings, some items require the rater to monitor the way a

subject is talking (e.g., little elaboration) and some speech content (e.g., tangential

speech). It is possible that listening to the content of the subject's speech indicated

higher or lower levels of pathological symptoms and subsequently biased the ratings.

However, it is important to note that level of pathology would not denote group status per se in this study. Of note, the groups were not differentiated by the ratings that could have been subject to bias, thus it seems unlikely that rater bias was present in the ratings.

Another potential limitation may come from the length of interaction used to make behavioral ratings. Issues of practicality led to a 30 minute maximum of interview time. It may be that this led to inadequate variability in sign ratings. The lack of group differences on the scales used in this study may be a direct result of limited variability due to only a 30 minute sample of behavior.

As others have noted (Collins, 2002), the IM-SS is a behavioral rating scale which may be lacking in its depth and detail for the scale items and, thus, discriminative power for both scales. The IM-SS uses a 4 point Likert-type rating scale to rate how much each item resembles the subject (i.e., 0 - not at all, 1 - somewhat, 2 - very well, 3 – perfectly). The scale makes use of listing some sample behaviors for some items (e.g., seems lethargic); however the measure lacks objective anchors for each item. Greater operationalization of each item with objective anchors would likely improve the rating process with improved construct validity and inter-rater reliability.

Directions for Future Research

This study examined a group of adolescent putative schizotypes who endorsed self-report items related to perceptual aberration and magical ideation. These individuals were compared to controls on behavioral ratings based on a 30 minute videotaped interview. The videotapes included beginning portions of the interview as well as portions occurring about a half an hour later. Future studies may manipulate the duration

and type of interviews. As measures of schizotypal behaviors undergo research, it may be that certain types of behaviors are evident through different lengths and types of interviews (e.g., withdrawn behaviors may be evident at the beginning of an interaction and throughout; disorganized behaviors may be evident after a lengthy interview). It may be that PerMags' behaviors, as a group endorsing perceptual aberrations and magical ideation, are not accurately delineated by current measures. If PerMags are schizotypes, then both self-report and observer rating measures need to capture those characteristics that predict the development of schizophrenia-spectrum disorders.

The present study examined a non-college, ethnically diverse, "pure" sample of adolescent PerMags. Given the present null findings, the role of sample differences in the clinical symptomatology of PerMags must be examined. It is necessary to directly compare community and college PerMags in order to understand the possible different nature of the samples. The research of Kendler (1995) and Collins (2002) indicate that behavioral observations hold promise in the accurate identification of Meehl's schizotypy.

Table 1.

Demographic Characteristics for PerMags (n=30) and Controls (n=87)

	PerMags n (%)	Controls n (%)
<u>Gender</u>		
Female	15 (50.0)	48 (55.2)
<u>Race</u>		
Caucasian	18 (60.0)	39 (44.8)
African American	8 (26.7)	37 (42.5)
Hispanic	3 (10.0)	7 (8.0)
Other	1 (3.3)	4 (4.6)

Table 2.

Inter-rater reliability of the IM-SS

Scale	ICC	α
Total sample (n = 117)		
Schizoidia Scale	.78	.78
Schizotypy Scale	.59	.59
Total IM-SS		.77
PerMags (n = 30)		
Schizoidia Scale	.96	
Schizotypy Scale	.81	
Controls (n = 87)		
Schizoidia Scale	.90	
Schizotypy Scale	.84	

Table 3.

Relationship between IM-SS scales and IPDE scales

Scale	1	2	3	4
Controls (n=87)				
1. IM-SS Schizoidia	---			
2. IM-SS Schizotypy	.14	---		
3. IPDE Schizoid	.02	.30**	---	
4. IPDE Schizotypal	.05	.09	.33**	---
PerMags (n=30)				
1. IM-SS Schizoidia	---			
2. IM-SS Schizotypy	.40*	---		
3. IPDE Schizoid	-.06	-.11	---	
4. IPDE Schizotypal	.19	.40*	.29	---

*$p < .05$. ** $p < .01$.

Table 4.

IM-SS and IPDE Scales Descriptive Data

	Control	PerMag
	Mean (SD)	Mean (SD)
IM-SS Schizotypy Scale	.08 (.35)	.21 (.60)
IPDE Schizotypy Scale	.51 (1.0)	.73 (1.2)
IM-SS Schizoidia Scale	1.1 (1.9)	1.78 (2.4)
IPDE Schizoidia Scale	.34 (.80)	.47 (.78) .

Figure 1.

Mean scale scores by scale and group.
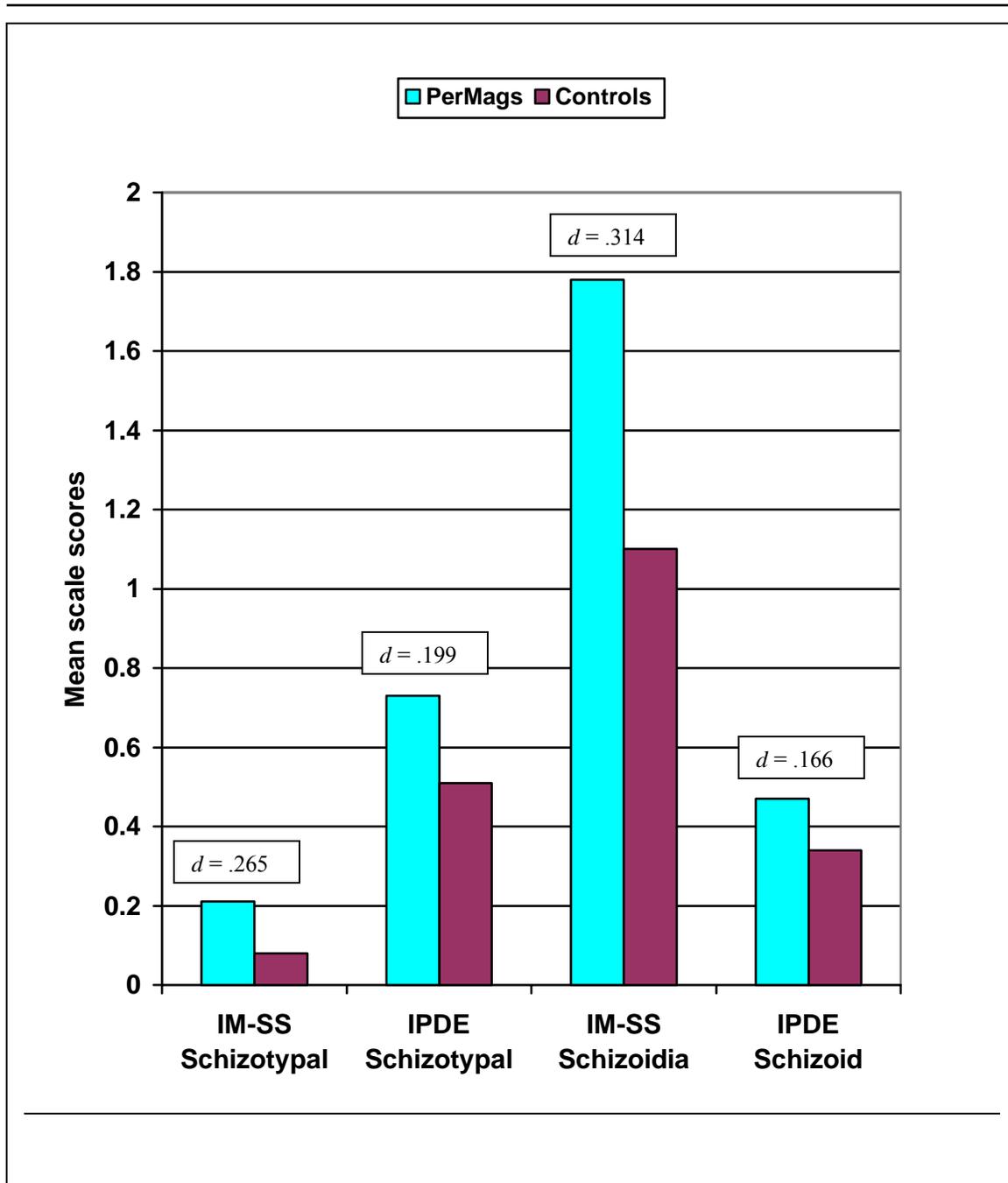
APPENDIX A: IRB AND HSR APPROVAL FORMS

104-23
INV

DEPARTMENT OF PSYCHOLOGY   (Rev. 11/2003)
APPLICATION FOR HUMAN SUBJECTS
Please type all information.
                                SUBMIT ALL APPLICATIONS IN TRIPLICATE
1. Title of Research Project: <u>Behavioral Rating of Putative Schizotypes</u>

2. Faculty Member Responsible: <u>Blanchard, Jack, Ph.D</u>   Phone: <u>301-405-8438</u>
        e-mail: <u>jblanchard@psyc.umd.edu</u>

3. Project Director: <u>Chamberlin, Clifton</u> Phone: <u>301-405-4808</u>
        e-mail: <u>cchamberlin@psyc.umd.edu</u>

Check One: ☐ Faculty ☐ Graduate Student RA **X Graduate Student (Thesis)**

☐ Post-doctoral Fellow ☐ Visiting Scientist ☐ Staff ☐ Undergraduate Honors Thesis

☐ Other (specify)_____

4. Names of all others who have any contact with participants:

NAME	PHONE	POSITION AT UMCP
<u>Caitlin Noone</u>	<u>301-405-1531</u>	<u>Undergraduate Honors Student/ Research Assistant</u>

5. Location: <u>Hornbake Room 0212</u>

6. Subject Pool requested ☐ YES <u>**X NO**</u>

# APPENDIX A: IRB AND HSR APPROVAL FORMS

7. Project Summary:

The ability to accurately identify those individuals prone to developing schizophrenia is necessary for a complete understanding of the etiology of the disorder. "PerMags" with elevated scores on measures of perceptual aberration and magical ideation are a group believed to be at risk for developing schizophrenia and, more generally, psychosis. Currently, self-report measures are used to identify and classify those at risk for schizophrenia. However, recent research has demonstrated the incremental validity of a behavioral rating scale in the identification of a group of known putative schizotypes (socially anhedonic). However, it is not known if these data are specific to one group of putative schizotypes. The current study will use behavioral ratings with "PerMags" to further understand the behavioral signature of putative schizotypes.

Data used from this study will come from subjects recruited as part of a grant study conducted by Dr. Jack Blanchard entitled "Family Study of Traits and Psychological Functioning." The study received IRB approval at the University of Maryland, College Park (UMCP) (IRB Number 00848). Selection and recruitment was based on individuals' responses to the Perceptual Aberration Scale (PAS) and the Magical Ideation Scale (MIS), which was completed by mail by 3,000 18 year-olds in the community who were each compensated $15. Normal controls and individuals with high PAS/MIS scores were recruited. Participation in the study involved completion of several questionnaires, a diagnostic interview, a computerized test of attention, and several neuropsychological tests of memory, for which participants were compensated $100. Written and oral consent was obtained when subjects arrived at the study site. Participants were informed in the consent form that the interviews were to be audio-video recorded using an unconcealed camera; this information was repeated orally to each participant during the interview. After completion of all tasks subjects debriefed as to the nature of the study and were provided with any relevant diagnostic feedback.

The present study will involve the coding of the above-described videotapes using a behavioral rating scale for the assessment of schizotypy (Interpersonal Measure of Schizoidia and Schizotypy; IM-SS; see attached). There are no new tasks or additional questioning involved for the study participants, therefore, the videotaped interviews are sufficient for data coding. Trained coders will watch the "Overview" portion of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) and the beginning of the International Personality Disorder Examination (IPDE) until 30 minutes of behavior has been viewed. The coders will be the Project Director and Research Assistant. The present study will require no further participation beyond the grant study and is not believed to have any associated risks. The present study will ensure the same high standard of confidentiality as the grant study. Because participants have consented to having the interview portion of the grant study videotaped and have agreed that the researchers may utilize the information obtained for the purpose of examining social behavior, traits, and psychological functioning, we propose that no further consent will be required to conduct the present study while maintaining the rights of the study participants.

APPENDIX A: IRB AND HSR APPROVAL FORMS

8. Signature: The Department of Psychology requires that all individuals involved in conducting this research be cognizant of the ethical principles set forth by the American Psychological Association. The APA document, "Ethical Principles of Psychologists and Code of Conduct," may be viewed on the website: http://www.apa.org/ethics. See especially Standard #8. Your signature below affirms your commitment to abide by this policy by ensuring all who participate as investigators or experimenters will read Standard #8.
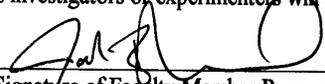
_____   _3/9/04_____
(Signature of Faculty Member Responsible)   (Date)
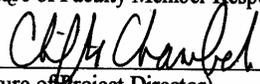
_____   _3/8/04_____
(Signature of Project Director)   (Date)

Actions taken by the Committee: Date: _3/11/04_

_____Approved, no more than minimal risk.

Date approval expires:_____3/10/05_____

HSR Reference No._____104-23_____

_____
(For the Committee)

APPENDIX A: IRB AND HSR APPROVAL FORMS

UNIVERSITY OF MARYLAND

INSTITUTIONAL REVIEW BOARD

2100 Lee Building
College Park, Maryland 20742-5121
301.405.4212 TEL 301.314.1475 FAX

Reference: IRB HSR Identification Number 04-0147

March 24, 2004

MEMORANDUM

Notice of Results of Final Review by IRB on HSR Application

TO: Dr. Jack Blanchard
           Mr. Clifton Chamberlin
           Department of Psychology

FROM: Dr. Phylis Moser-Veillon, Co-Chairperson
           Dr. Marc Rogers, Co-Chairperson
           Institutional Review Board

PROJECT ENTITLED:
           "Behavioral Rating of Putative Schizotypes"

The Institutional Review Board (IRB) concurs with the departmental Human Subjects Review Committee's (HSRC's) preliminary review of the application concerning the above referenced project. The IRB has approved the application and the research involving human subjects described therein. We ask that any future communications with our office regarding this research reference the IRB HSR identification number indicated above.

We also ask that you not make any changes to the approved protocol without first notifying and obtaining the approval of the IRB. Also, please report any deviations from the approved protocol to the Chairperson of your departmental HSRC. If you have any questions or concerns, please do not hesitate to contact us at irb@deans.umd.edu. Thank you.

ADDITIONAL INFORMATION REGARDING IRB/HSRC APPROVALS

EXPIRATION OF IRB APPROVAL—Approval of non-exempt projects expires one year after the official date of IRB approval; approval of exempt projects expires three years after that date. If you expect to be collecting or analyzing data after the expiration of IRB approval, please contact the HSRC Chairperson in your department about submitting a renewal application. **(PLEASE NOTE: If you are not collecting data from human subjects and any on-going data analysis does not increase the risk to subjects, a renewal application would not be necessary.)**

STUDENT RESEARCHERS—Unless otherwise requested, the IRB will send copies of approval paperwork to the supervising faculty researcher (or advisor) of a project. We ask that such persons pass on that paperwork or a copy to any student researchers working on that project. That paperwork may be needed by students in order to apply for graduation. **PLEASE BE ADVISED THAT THE IRB MAY NOT BE ABLE TO PROVIDE COPIES OF THAT PAPERWORK, particularly if several years have passed since the date of the original approval.**

Enclosures (where appropriate), will include stamped copy of informed consent forms included in application and any copies of the application not needed by the IRB; copies of this memorandum and any consent forms to be sent to the Chairperson of the Human Subjects Review Committee

APPENDIX B: INFORMED CONSENT

Participant Screen # _____   Initials _____ Date _____
Family Study of Traits and Psychological Functioning (Full Study)

INFORMATION AND INFORMED CONSENT
YOUNG ADULT

Project Title: FAMILY STUDY OF TRAITS AND PSYCHOLOGICAL FUNCTIONING

I certify that I am 18 years of age or older, in good health, and wish to participate in a program of research being conducted by Jack Blanchard, Ph.D. in the Department of Psychology at the University of Maryland, College Park, MD 20742.

Purpose:
The purpose of this project is to examine the relationship between social behavior, traits, and psychological functioning in individuals and families.

Procedure:
The procedures I voluntarily agree to take part in are:
    Baseline Assessment
- I will receive a clinical diagnostic interview and will be asked about my feelings, mood, thoughts, beliefs, drug and alcohol use, and relationships with others. This interview will he videotaped and only accessible to project research staff. Should the diagnostic assessment at the time of either the baseline or 3-year follow-up interview identify any clinical diagnosis this information will be provided to me. Dr. Blanchard or a trained member of his research team will provide a summary of this diagnostic information to me and will provide me with treatment referrals in the community. I understand that neither Dr. Blanchard nor members of his research team will be able to provide any treatment. If I provide a written request, Dr. Blanchard will provide any diagnostic information to my treatment provider. I understand that such information will only be released with my permission, otherwise all diagnostic information is strictly confidential and will not be released except as required by law.
- I will be asked to complete a questionnaire about social support, family interactions, and personality.
- I will be asked to complete a computerized test of attention.
- I will be asked to complete tasks that involve providing the definition of words and arranging blocks in patterns.
- I will be asked to complete memory tasks that will have me remember different kinds of information such as a story or numbers and letters.
- This assessment will last about 2 ½ - 4 hours.
- I agree to allow my parents to be contacted and invited to participate in this project. *My consent now in no way obligates my parents to participate. I*

understand that no information provided by me will be shared with my parents without my written permission.

- I will be paid for both phases of the project. I will be paid *$100* for the current Baseline Assessment and *$100* for the Follow-up Assessment in 3 years.
- If I withdraw from the study, I will be given *partial* payment for the tasks completed. For example, if I complete 1/4 of the tasks, I will be paid *$25.* No medical benefits are associated with this project.

Follow-up Assessment
- At times, research assistants will contact me to update my current address and telephone number.
- I will be asked to return for a 3-year follow-up assessment at which time the structured interviews which were administered at baseline will be re-administered.
- This assessment will last about 1-3 hours.

Risks:
No known risks are associated with this project. However, I may become bored while completing the project. I may also experience discomfort due to the sensitive nature of some of the questions. If discomfort should result, the following services are available:

UMD College Park Resources:
- The Counseling Center, 301-314-7651
- The Health Center, 301-314-8184
- The Psychology Clinic, 301-405-4808

Local County Resources:
- Crisis Response Service, PG County, 301-927-4500
- Montgomery County Crisis Center, 301-315-4000
- Emergency Psychiatric Risk Dept., 202-675-7888

Whenever confidential information is collected there is some risk that this information may somehow be inappropriately disclosed. However, I understand that the researchers are taking clear and specific steps to guard the confidentiality of the information I provide (as outlined below in the section on *Confidentiality*).

Benefits:
Although this project is not designed to help me personally, the researchers hope to gain valuable information about the relationship between personality traits, social behavior and psychological functioning.

Confidentiality:
Efforts will be made to keep all information collected during this project confidential to the extent permitted by law. All records and tapes will be stored in a locked file cabinet in a locked room. Only members of the research team will have access to these records. *Family members will not have access to this information unless I give written consent. My name will be kept confidential.* Any presentations or publications of the study will be based on grouped data and

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will not reveal my identity. At the conclusion of this study copies of any written material from my participation will be shredded and discarded; videotapes will be magnetically erased.

I understand that confidentiality is not absolute or perfect. There are some circumstances where the research staff might be required by law to share information I have provided. For example, if the interviewer has reason to believe that a child is being abused, the interviewer is required by law to file a report with appropriate agencies. If you are an adult and you have been abused in the past, the interviewer may also have to file such a report. In addition, if you are threatening serious harm to yourself or another person, it may be necessary for the interviewer to seek your hospitalization, to warn an intended victim, or notify the police.

Participant Rights:
By signing this form, I agree that:
- I have freely volunteered to participate in the interview
- I may ask questions before, during, and after the interview takes place.
- I may contact the researchers at any time for verbal or written information about the project.
- I may withdraw from the project at any time without penalty.

In the event of physical injury resulting from participation in this study, I understand that immediate medical treatment is available. However, I understand that the University of Maryland does not provide any medical or hospitalization insurance coverage for participants in the research study nor will the University of Maryland provide compensation for any injury sustained as a result of this research study except as required by law.

Contact Information:
If I have further questions or concerns about this study, I may contact the primary investigator:
Dr. Jack Blanchard, 301-405-8438
University of Maryland College Park
Biology/Psychology Building
College Park, MD 20742


_____
Participant's Name (Please Print)

_____   _____
Participant's Signature   Date   Investigator's Signature   Date

IRB APPROVED
VALID UNTIL

APR 3 0 2004

UNIVERSITY OF MARYLAND
COLLEGE PARK
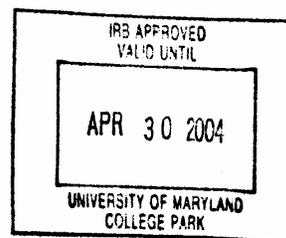
APPENDIX C: IM-SS

Participant Number: _____ **Rater:** _____ **Circle one:** Interviewer   Observer

Instructions: Please rate each construct by circling the word(s) that describes the individual you interviewed. A few examples of each trait are also listed. Please check any of the examples that apply and feel free to note other manifestations of these traits in the blank space. Please note that a construct will frequently describe an individual even if none of the examples are relevant to the individual.

<u>Interpersonal Measure of Schizoidia</u>

1)   <u>Constricted Facial Affect</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ dull facial expression
_____ infrequent blinking
_____ rarely if ever smiles
_____ flatness

2)   <u>Lack of Non-Verbal Expression</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ very little head/body movement
_____ frozen posture
_____ few expressive hand/arm gestures

3)   <u>Detachment (Lack of Engagement)</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ diverts direct eye contact
_____ directs eye gaze down and holds it in one place

4)   <u>Lack of Verbal Expression</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ little elaboration, one word or short answer
_____ non-dramatic language
_____ lack of inflection in general
_____ lack of animation or enthusiasm in describing any life event or relationship
_____ reluctant to express any firm opinions

6) <u>Guardedness</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ only reveals personal details when directly questioned
_____ has difficulty describing feelings about personally significant events (regardless of the depth or concreteness of his answers)
_____ avoids or discourages in-depth exploration of motives or feelings

7) <u>Lack of Variability in Affect/Expression Over Time</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ from start to finish, individual does not warm up during interview
_____ emotional coldness throughout interview

8) <u>Poor Rapport</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ seems aloof
_____ interviewer feels no sense of rapport with individual
_____ individual may not seem to be attending to interviewer's questions
_____ lack of response to jokes

9) <u>Absence of Spontaneity in Speech</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ tolerant of long, silent pauses
_____ does not initiate conversation or ask questions

10) <u>Lack of Verbal Responsiveness to Interviewer's Remarks</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ lack of "uh, huh," "yeah," "ok," or "umm"
_____ lack of verbal expression of commonality

12) Poor Personal Hygiene
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ apparent lack of attention to own appearance
_____ poor grooming (unshaven, uncombed hair, unshowered)

13) Physical Anergia
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ seems lethargic
_____ takes a long time to respond to questions
_____ speaks very slowly

Interpersonal Measure of Schizotypy

1) Inappropriate Affect
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ labile affect – changes with thought content
_____ inappropriate laughter

2) Suspiciousness/Paranoid Behavior
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ tries to ascertain what interviewer is writing down
_____ asks why a question is being asked (other than to clarify meaning of words)
_____ remarks about untrustworthiness of most people

3) Thought Disorder
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ overvalued ideas
_____ ideas of reference
_____ difficult to follow in conversation

4) <u>Negative Reaction of Interviewer to Individual</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ evokes negative responses/rejection
_____ feeling of helplessness
_____ feeling aggressive/on guard

5) <u>Odd Behavior</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ stereotyped mannerisms
_____ silly behavior

6) <u>Odd Speech</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ tangential, vague, circumstantial speech
_____ pressured speech
_____ use of foreign terms/neologisms
_____ talks to self – mutters
_____ speaking in quick, loud, aggressive manner
_____ rambling or disjointed answers

9) <u>Expresses Social Anxiety</u>
describes this individual (please circle your rating)
not at all ---------- somewhat ---------- very well ---------- perfectly

check all that apply:
_____ substantial anxiety at start of interview
_____ uncomfortable, restless throughout interview
_____ expresses hypersensitivity to criticism

version 1.1 (10/29/98)

APPENDIX D: RSAS, MIS, PAS

Revised Social Anhedonia Scale

1. I feel pleased and gratified as I learn more about the emotional life of my friends. (-)
2. I am usually content to just sit alone, thinking and daydreaming.
3. When someone close to me is depressed, it brings me down also. (-)
4. Although I know I should have affection for certain people, I don't really feel it.
5. My relationships with other people never get very intense.
6. I prefer hobbies and leisure activities that do not involve other people.
7. When others try to tell me about their problems and hang-ups, I usually listen with interest and attention. (-)
8. Although there are things that I enjoy doing by myself, I usually seem to have more fun when I do things with other people. (-)
9. There are things that are more important to me than privacy. (-)
10. Making new friends isn't worth the energy it takes.
11. I never had really close friends in high school.
12. When things are going really good for my close friends, it makes me feel good too. (-)
13. I prefer watching television to going out with other people.
14. A car ride is much more enjoyable if someone is with me. (-)
15. I like to make long distance phone calls to friends and relatives. (-)
16. In many ways, I prefer the company of pets to the company of people.
17. When I am alone, I often resent people telephoning me or knocking on my door.
18. It made me sad to see all my high school friends go their separate ways when high school was over. (-)
19. Having close friends is not as important as many people say.
20. People are usually better off if they stay aloof from emotional involvements with most others.
21. Knowing that I have friends who care about me gives me a sense of security. (-)
22. I sometimes become deeply attached to people I spend a lot of time with. (-)
23. People sometimes think I'm shy when I really just want to be left alone.
24. Just being with friends can make me feel really good. (-)
25. People who try to get to know me better usually give up after awhile.
26. I could be happy living all alone in a cabin in the woods or mountains.
27. When I move to a new city, I feel a strong need to make new friends. (-)
28. I 'm much too independent to really get involved with other people.
29. My emotional responses seem very different from those of other people.
30. When things are bothering me, I like to talk to other people about it. (-)
31. People often expect me to spend more time talking with them than I would like.
32. There are few things more tiring than to have a long, personal discussion with someone.
33. I don't really feel very close to my friends.
34. If given the choice, I would much rather be with others than be alone. (-)
35. I have often found it hard to resist talking to a good friend, even when I have other things to do. (-)

APPENDIX D: RSAS, MIS, PAS

36. I find that people too often assume that their daily activities and opinions will be interesting to me.
37. I attach very little importance to having close friends.
38. Playing with children is a real chore.
39. I have always enjoyed looking at photographs of friends. (-)
40. It's fun to sing with other people. (-)

Magical Ideation Scale

1. I almost never dream about things before they happen. **(-)**
2. I have sometimes felt that strangers were reading my mind.
3. I sometimes have a feeling of gaining or losing energy when certain people look at me or touch me.
4. When introduced to strangers, I rarely wonder whether I have known them before. **(-)**
5. I have sometimes sensed an evil presence around me, although I could not see it.
6. At times, I have felt that a professor's lecture was meant especially for me.
7. I have wondered whether the spirits of the dead can influence the living.
8. I have worried that people on other planets may be influencing what happens on earth.
9. People often behave so strangely that one wonders if they are part of an experiment.
10. I have sometimes been fearful of stepping on sidewalk cracks**.**
11. Good luck charms don't work. **(-)**
12. I have sometimes had the passing thought that strangers are in love with me.
13. Some people can make me aware of them just by thinking about me.
14. I think I could learn to read others' minds if I wanted to.
15. I have never had the feeling that certain thoughts of mine really belonged to someone else. **(-)**
16. Numbers like 13 and 7 have no special powers. **(-)**
17. I have felt that there were messages for me in the way things were arranged, like in a store window.
18. I have had the momentary feeling that I might not be human.
19. I have felt that I might cause something to happen just by thinking too much about it.
20. I have never doubted that my dreams are the products of my own mind. **(-)**
21. Things sometimes seem to be in different places when I get home, even though no one has been there.
22. If reincarnation were true, it would explain some unusual experiences I have had.
23. Horoscopes are right too often for it to be a coincidence.
24. The hand motions that strangers make seem to influence me at times.
25. I have had the momentary feeling that someone's place has been taken by a look-alike.
26. I have noticed sounds on my records that are not there at other times.
27. It is not possible to harm others merely by thinking bad thoughts about them. **(-)**
28. The government refuses to tell us the truth about flying saucers.
29. I have occasionally had the silly feeling that a TV or radio broadcaster knew I was listening to him.
30. At times I perform certain little rituals to ward off negative influences.

APPENDIX D: RSAS, MIS, PAS

Perceptual Aberration Scale

1. I have felt that my body and another person's body were one and the same.
2. Occasionally I have felt as though my body did not exist.
3. My hands or feet have never seemed far away. **(-)**
4. I can remember when it seemed as though one of my limbs took on an unusual shape.
5. I have felt as though my head or limbs were somehow not my own.
6. I sometimes have had the feeling that my body is abnormal.
7. I have sometimes felt that some part of my body no longer belongs to me.
8. Now and then, when I look in the mirror, my face seems quite different than usual.
9. It has seemed at times as if my body was melting into my surroundings.
10. Sometimes I have had feelings that I am united with an object near me.
11. I have never felt that my arms or legs have momentarily grown in size. **(-)**
12. Sometimes I feel like everything around me is tilting.
13. Sometimes part of my body has seemed smaller than it usually is.
14. I sometimes have to touch myself to make sure I'm still there.
15. Sometimes people whom I know well begin to look like strangers.
16. I sometimes have had the feeling that some parts of my body are not attached to the same person.
17. I have never had the passing feeling that my arms or legs have become longer than usual. **(-)**
18. Parts of my body occasionally seem dead or unreal.
19. Sometimes I have had a passing thought that some part of my body was rotting away.
20. My hearing is sometimes so sensitive that ordinary sounds become uncomfortable.
21. Often I have a day when indoor lights seem so bright that they bother my eyes.
22. At times I have wondered if my body was really my own.
23. Sometimes I have felt that I could not distinguish my body from other objects around me.
24. Occasionally it has seemed as if my body had taken on the appearance of another person's body.
25. I have sometimes had the feeling that my body is decaying inside.
26. I have had the momentary feeling that my body has become misshapen.
27. I have sometimes felt confused as to whether my body was really my own.
28. The boundaries of my body always seem clear. **(-)**
29. I have sometimes had the feeling that one of my arms or legs is disconnected from the rest of my body.
30. For several days at a time I have had such a heightened awareness of sights and sounds that I cannot shut them out.
31. I have had the momentary feeling that the things I touch remain attached to my body.
32. Sometimes when I look at things like tables and chairs, they seem strange.
33. Sometimes I have had the feeling that a part of my body is larger than it usually is.
34. I have felt that something outside my body was a part of my body.
35. Ordinary colors sometimes seem much too bright for me.

REFERENCES

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Asarnow, R., Nuechterlein, K., Fogelson, D., Subotnik, K., Payne, D., Russell, A., Asamen, J., Kuppinger, H., & Kendler, K. (2001). Schizophrenia and schizophrenia-spectrum personality disorders in first-degree relatives of children with schizophrenia. *Archives of General Psychiatry, 58*, 581-588.

Bailey, B., West, K., Widiger, T., & Freiman, K. (1993). The convergent and discriminant validity of the Chapman Scales. *Journal of Personality Assessment, 61* (1), 121-135.

Battaglia, M., Gasperini, M., Sciuto, G., Scherillo, P., & Bellodi, L. (1991). Psychiatric disorders in the families of schizotypal subjects. *Schizophrenia Bulletin, 17*, 659-668.

Blyler, C.R., Maher, B.A., Manschreck, T.C., & Fenton, W.S. (1997). Line drawing as a possible measure of lateralized motor performance in schizophrenia. *Schizophrenia Research, 26,* 15-23.

Cannon, T.D., & Mednick, S.A. (1993). The schizophrenia high-risk project in Copenhagen: Three decades of progress. *Acta Psychiatrica Scandinavica, 370*, 33-47.

Cannon, T.D., Mednick, S.A., & Parnas, J. (1990). Antecedents of predominantly negative and predominantly positive symptom schizophrenia in a high-risk population. *Archives of General Psychiatry, 47*, 622-632.

Chang, B.P. & Lenzenweger, M.F. (2001). Somatosensory processing in the biological

    relatives of schizophrenia patients: A signal detection analysis of two-point

    discrimination. *Journal of Abnormal Psychology, 110* (3), 433-442.

Chapman, L., Chapman, J., Kwapil, T., Eckblad, M., & Zinser, M. (1994). Putatively

    psychosis-prone subjects ten years later. *Journal of Abnormal Psychology, 103,*

    171-183.

Chapman, L., Chapman, J. and Raulin, M. (1976). Scales for physical and social

    anhedonia. *Journal of Abnormal Psychology, 85,* 374-382.

Chapman, L., Chapman, J. and Raulin, M. (1978). Body image aberration in

    schizophrenia. *Journal of Abnormal Psychology, 87,* 399-407.

Cohen, D. (1988). *Statistical power analysis for the behavioral sciences, second edition.*

    Hissdale, NJ: Erlbaum.

Coleman, M., Levy, D., Lenzenweger, M., Holzman, P. (1996). Thought disorder,

    perceptual aberrations, and schizotypy. *Journal of Abnormal Psychology, 105*(3),

    469-473.

Collins, L. (2002). Signs versus symptoms approach to assessing schizotypy: An

    examination of the incremental validity of a behavioral rating scale. Unpublished

    masters thesis, University of Maryland, College Park.

Eckblad, M. and Chapman, L. (1983). Magical ideation as an indicator of schizotypy.

    Journal of Consulting and Clinical Psychology, 51, 215-225.

Eckblad, M.L., Chapman, L.J., Chapman, J.P., & Mishlove, M. (1982). *The Revised*

    Social Anhedonia Scale. Unpublished test, University of Wisconsin at Madison

Edell, W.S. (1995). The psychometric measurement of schizotypy using the Wisconsin

    scales of psychosis-proneness. In G.A. Miller (Ed.). The behavioral high-risk

    paradigm in psychopathology (pp. 3-46). New York: Springer-Verlag.

Faraone, S., Green, A., Seidman, L., and Tsuang, M. (2001). "Schizotaxia": Clinical

    implications and new directions for research. *Schizophrenia Bulletin, 27*(1), 1-18.

First, M.B., Gibbon, M., Spitzer, R.L., & Williams, J.B.W. (1996). *User's guide for the*

    Structured Clinical Interview for DSM-IV Axis I Disorders – Research Veresion

    (SCID-I, version 2.0, February 1996 Final Version). New York: Biometrics

    Research Department, New York State Psychiatric Institute.

Fujioka, T. & Chapman, L. (1984). Comparison of the 2-7-8 MMPI profile and the

    Perceptual Aberration-Magical Ideation Scales in identifying hypothetically

    psychosis-prone college students. *Journal of Consulting and Clinical*

    Psychology, 52(3), 458-467.

Gooding, D. (1999). Antisaccade task performance in questionnaire identified

    schizotypes. *Schizophrenia Research, 35,* 157-166.

Gooding, D., Kwapil T., & Tallent, K. (1999). Wisconsin Card Sorting Test deficits

    in schizotypic individuals. *Schizophrenia Research, 40,* 210-209.

Gooding, D., Miller, M., & Kwapil, T. (2000). Smooth pursuit eye tracking and visual

    fixation in psychosis prone individuals. *Psychiatry Research, 93,* 41-54.

Gottesman, I. (1991). *Schizophrenia genesis: The origins of madness.* San Francisco:

    Freeman.

Horan, W., Blanchard, J., Gangestad, S., & Kwapil, T. (in press). The psychometric

    detection of schizotypy: Do putative indicators identify the same latent class?

Kendler, K.S. (1988). Familial aggregation of schizophrenia and schizophrenia-spectrum disorders: Evaluation of conflicting results. *Archives of General Psychiatry, 45*, 377-383.

Kendler, K.S., Gruenberg, A.M., & Strauss, J.S. (1981). An independent analysis of the Copenhagen sample of the Danish adoption study of schizophrenia: II. The relationship between schizotypal personality disorder and schizophrenia. *Archives of General Psychiatry, 38*, 982-984.

Kendler, K.S., McGuire, M., Gruenberg, A.M., O'Hare, A., Spellman, M., & Walsh, D. (1993). The Roscommon Family Study, III: Schizophrenia-related personality disorders in relatives. *Archives of General Psychiatry, 50*, 781-788.

Kendler, K.S., McGuire, M., Gruenberg, A.M., O'Hare, A., & Walsh, D. (1995). Schizotypal symptoms and signs in the Roscommon family study. Archives *of General Psychiatry, 52*, 296-303.

Kendler, K.S., Ochs, A.L., Gorman, A.M., Hewitt, J.K., Ross, D.E., & Mirsky, A.F. (1991). The structure of schizotypy: A pilot multitrait twin study. *Psychiatry Research, 36,* 19-36.

Kosson, D.S., & Byrnes, K.A. (1999) *The Interpersonal Measure of Schizoidia and Schizotypy (IM-SS).* Unpublished test.

Kosson, D.S., & Byrnes, K.A. (1999) *Notes for Using the Interpersonal Measure of Schizoidia and Schizotypy (IM-SS).* Unpublished manual.

Kring, A., Kerr, S., Smith, D. & Neale, J. (1993). Flat affect in schizophrenia does not reflect diminished subjective experience of emotion. *Journal of Abnormal Psychology, 102*, 507-515.

Kring, A. M., & Earnst, K. S. (1999). Stability of emotional responding in schizophrenia. *Behavior Therapy, 30*, 373-388.

Kwapil, T. (1998). Social anhedonia as a predictor of the development of schizophrenia-spectrum disorders. *Journal of Abnormal Psychology, 107*, 558-565.

Kwapil, T., Chapman, L., & Chapman, J. (1999). Validity and usefulness of the Wisconsin Manual for Assessing Psychotic-like Experiences. *Schizophrenia bulletin, 25* (2), 363-375.

Laurent, A., Biloa-Tang, M., Bougerol, T., Duly, D., Anchisi, A., Bosson, J., et al. (2000). Executive/attentional performance and measures of schizotypy in patients with schizophrenia and in their nonpsychotic first degree relatives. *Schizophrenia Research, 46,* 269-283.

Lenzenweger, M. (1991). Confirming schizotypic personality configurations in hypothetically psychosis-prone college students. *Psychiatry Research, 37,* 81-96.

Lenzenweger, M.F. (2000). Two-point discrimination thresholds and schizotypy: Illuminating a somatosensory dysfunction. *Schizophrenia Research, 42,* 111-124.

Lenzenweger, M.F. (2001). Reaction time slowing during high-load, sustained-attention task performance in relation to psychometrically identified schizotypy. *Journal of Abnormal Psychology, 110* (2), 290-296.

Lenzenweger, M., Jensen, S., & Rubin, D. (2003). Finding the "genuine" schizotype: A model and method for resolving heterogeneity in performance on laboratory measures in experimental psychopathology research. *Journal of Abnormal Psychology, 112* (3), 457-468.

Lenzenweger, M.F. & Maher, B.A. (2002). Psychometric schizotypy and motor performance. *Journal of Abnormal Psychology, 111* (4), 546-555.

Loranger, A.W., Santorious, N., Andreoli, A., Berger, P., Buchheim, P., Channabasavanna, S.M., Coid, B., Dahl, A., Diekstra, R.F.W., Ferguson, B., Jacobsberg, L.B., Mombour, W., Pull, C., Ono, Y., & Reiger, D.A. (1994). The international personality disorder examination. *Archives of General Psychiatry, 51*, 215-224.

Lowing, P.S., Mirsky, A.F., & Pereira, R. (1983). The inheritance of schizophrenia spectrum disorders: A reanalysis of the Danish Adoptee Study data. *American Journal of Psychiatry, 140*, 1167-1171.

Meehl, P.E. (1962). Schizotaxia, schizoptypy, schizophrenia. *American Psychologist, 17*, 827-838.

Meehl, P.E. (1989). Schizotaxia revisited. *Archives of General Psychiatry, 46*, 935-944.

Meehl, P.E. (1990). Toward an integrated theory of schizotaxia, schizotypy, and schizophrenia. *Journal of Personality Disorders, 4*, 1-99.

Meehl, P.E. (1990). Schizotaxia as an open concept. In A. I. Rabin, R. Zucker, R. Emmons, & S. Frank (Eds.), *Studying persons and lives* (pp. 248-303). New York: Springer.

Shrout, P. E. & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86*, 420-427.

Suhr, J.A., & Spitznagel, M.B. (2001). Factor versus cluster models of schizotypal traits: A comparison of unselected and highly schizotypal samples. *Schizophrenia Research, 52* (3), 231-239.

Tallent, K. & Gooding, D. (1999). Working memory and WCST performance in

schizotypic individuals: A replication and extension. *Psychiatry Research, 89,*

161-170.

Thacker, G., Moran, M., Adami, H. & Cassidy, S. (1993). Psychosis proneness scales

in schizophrenia spectrum disorders: Familial vs. non-familial samples.

Psychiatry Research, 46, 47-57.

Torgersen, S. (1985). Relationship of schizotypal personality disorder to schizophrenia:

Genetics. *Schizophrenia Bulletin, 4,* 554-563.

Vollema, M.G., & van den Bosch, R.J. (1995). The multidimensionality of schizotypy.

Schizophrenia Bulletin, 21, 19-31.