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Differences in Empathy Between High and Low Schizotypal College Students

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Trinity College
Hartford, CT

Thesis 2013

Introduction

Background

High schizotypal individuals are healthy individuals who exhibit traits found in schizotypal personality disorder (Raine, 1991). High schizotypal individuals and schizotypal personality disorder are thought to be part of the schizophrenia spectrum and therefore related to schizophrenia (Butcher, Mineka & Hooley, 2010). Disruptions in empathy are common in individuals on the schizophrenia spectrum is empathy. Empathy is particularly important to investigate because disruptions in this area could exacerbate the social difficulties experienced by this population (Smith et al., 2011). This study aims to investigate the connection between schizotypal traits and disruptions in empathy by using a population of healthy undergraduate Trinity College students categorized as high schizotypal or low schizotypal individuals and exploring the relationship between gender, empathy, and depressive symptoms.

Schizophrenia Spectrum Disorder

Some researchers believe that several disorders fall on the schizophrenia spectrum. These disorders are characterized as schizophrenia spectrum disorders, meaning that there are many different behaviors and traits along the schizophrenia spectrum ranging from no traits, to the axis one disorder of schizophrenia (Butcher, Mineka & Hooley, 2010). The three types of schizophrenia spectrum disorders that are important to our research are schizophrenia disorder (the most severe form), schizotypal personality disorder (a milder form), and finally healthy individuals who are high in schizotypal traits (lowest form). There are suggestions that these disorders run along a continuum and some researchers have found that scoring high in schizotypal traits in young adulthood can

predict future psychotic experiences (Gooding, Tallent & Matts, 2005). The data found in our study may be able to help contribute more knowledge to the schizophrenia spectrum disorder.

Schizotypal Personality Disorder

It is estimated that about 2% of the population has schizotypal personality disorder (Raine, 2007). Schizotypal personality disorder, like all personality disorders, is thought to be difficult to treat and causes disturbances either in the individual's own life, or to those around them (Butcher, Mineka & Hooley, 2010). In the DSM IV, schizotypal personality disorder is labeled as a Cluster A personality disorder. Cluster A personality disorders are labeled as such since they involve odd behavior. Schizotypal personality disorder is characterized by social deficits that are exacerbated by an inability and uneasiness with close relationships, in addition to having five out of nine cognitive, perceptual, or behavioral disturbances listed in the DSM IV (Butcher, Mineka & Hooley, 2010). The nine categories are ideas of reference, odd beliefs or magical thinking, unusual perceptual experiences, odd thinking and speech, suspiciousness or paranoid ideation, inappropriate or constricted affect, behavior or appearance that is odd, lack of close friends or confidants, or excessive social anxiety that does not diminish with familiarity. Although empathy is not specifically cited in this definition, it is believed that empathy disruptions are associated with schizotypal personality disorder and could lead to some of the social deficits exhibited such as lack of close friends and excessive social anxiety (de Wied, Branje & Meeus, 2007).

High Schizotypal Individuals

An even milder form along the schizophrenia spectrum disorder includes individuals who are considered healthy, but score high on schizotypal traits (Raine, 2007).

This means that these individuals are fully functioning adults who tend to have more traits associated with schizotypal personality disorder. This can be assessed using a variety of scales, but a common scale used is the Schizotypal Personality Questionnaire (SPQ) (Raine, 1991). The SPQ (Raine, 1991) assesses the individuals' level of schizotypal traits by asking questions which address the nine categories of the schizotypal personality disorder listed above. Therefore, it is believed that disruptions in empathy seen in schizotypal personality disorder will also be seen in high schizotypal individuals (Henry, Bailey & Rendell, 2008).

Support for the Relationship between Schizophrenia, Schizotypal Personality Disorder, and High Schizotypal Individuals

Schizotypal personality disorder has many traits associated with schizophrenia disorder such as paranoia, strange affect, and magical thinking without the hallucinations or delusions found in schizophrenia (Butcher, Mineka & Hooley, 2010). Schizotypal personality disorder is therefore similar in traits, but it is a less severe disorder than schizophrenia in terms of functioning. High schizotypal individuals are non-clinical but exhibit some symptoms of schizotypal personality disorder. High schizotypal individuals, while nonclinical, are closely related to schizotypal personality disorder on the spectrum.

Individuals with schizophrenia exhibit cognitive deficits, including deficits in executive functioning (Bozikas et al., 2010). Individuals who have schizotypal personality disorder or are regarded as high in schizotypal traits have also been found to have deficits in learning and memory, and executive functions (Trotman, McMillan & Walker, 2006 and Cochrane, Petch & Pickering, 2012). A study by Cochrane, Petch and Pickering (2012) showed that not only were there cognitive deficits in individuals with

schizophrenia, but that individuals who scored high on the SPQ (Raine, 1991) showed similar deficits. This research supports the schizophrenia spectrum disorder model.

Schizophrenia and schizotypal personality disorder are familial (Battaglia et al., 1997) Even unaffected siblings of individuals with schizophrenia score higher on schizotypal scales than control groups (Mechri et al., 2010). In addition, neurological soft signs (subtle dysfunction in motor skills such as coordination and right and left orientation) have been found to be associated with both schizophrenia and higher scores on schizotypal scales in both a random sample of healthy individuals and first degree relatives of individuals with schizophrenia (Mechri et al., 2010).

These ideas suggest that schizotypal traits could be precursors to the onset of schizophrenia and that part of these traits could be inherited. This is also supported by the idea that the brain abnormality that leads to schizophrenia is already present long before adolescence, when the disorder is expressed (Marengo & Weinberg, 2000). Thus it seems reasonable that disorders seen in schizophrenia, such as disruptions in empathy, might also be present in high schizotypal individuals.

Empathy Defined

Empathy is a broad term used to identify the emotional state of a person. In psychology, the term empathy is broken down into two main subcategories termed cognitive empathy and affective (or emotional) empathy (Rueckert & Naybar, 2008). Cognitive empathy is when the on-looker can perceive and understand that another person is thinking or feeling a certain way. Affective empathy is when the on-looker also feels a similar emotion to the other person (Rueckert & Naybar, 2008).

Unfortunately, many other definitions of empathy have been created and many different measures have been created which claim to measure empathy. Therefore

collectively they do not capture the same concept in their results, making it difficult to compare across studies (Gerdes & Segal, 2011). Some measures, such as Bryant's Index of Empathy for Children and Adolescents (1982), aim to capture only the affective component of empathy. While measures, like Ickes (1997), aim to capture just the cognitive aspects of empathy.

Although cognitive and affective empathy measures capture certain aspects of empathy, the Interpersonal Reactivity Index (IRI) (1983) was created in order to capture the multidimensional nature of empathy, targeting both affective and cognitive aspects of empathy (Davis, 1983). In this measure four subscales are used to assess affective and cognitive components of empathy. The perspective-taking subscale measures cognitive empathy, while the other three subscales, fantasy, empathetic concern, and personal distress, measure affective empathy.

Empathy Sex Differences

Researchers have found sex differences across a wide variety of empathy measures and across ages. Studies of students from ages 18-25, 18-57 and 10-14 have used different self-report empathy questionnaires and found females were more empathetic than males (Kobach&Weaver 2012 and Rueckert, Branch & Doan, 2011 and Graaigordobil 2009). We will explore whether this still holds true across the high and low schizotypal populations.

Empathy and Social Dysfunction

Empathy is important to study because it relates to the social functioning of individuals. Social functioning is defined as "the ability of the individual to interact in the normal or usual way in society" (Social Functioning, 2013). Social functioning includes having interpersonal skills, being able to solve conflicts, and engage in appropriate/non-

violent behavior. Several studies have looked at the association between empathy and social function including global social functioning, interpersonal skills, and solving problems with lower levels of violence (Davis, 1983 and de Wied, Branje & Meeus, 2007 and Richardson et al., 1994 and Munoz, Qualter & Padgett, 2011 and Lauterbauch & Hossler, 2007). Overall, empathy disruptions are related to social dysfunction, but affective and cognitive components have contradictory findings.

Davis (1983) wanted to study how the subscale measures of the IRI related to global social dysfunction in healthy individuals. Social dysfunction was assessed by self-report questionnaires. He found that high ratings of personal distress, from the affective subscale, were related to the highest levels of social dysfunction. However, the other two affective components, fantasy and empathetic concern, were not related to social functioning. The study also found that the cognitive scale of perspective taking correlated with social function, with higher levels of perspective taking associated with higher levels of social functioning. Therefore he found both aspects of affective and cognitive empathy are important for social functioning.

An aspect of social function important to all humans is the ability to make and maintain friends. One of the main symptoms of schizotypal personality disorder is the inability to have close friendships (Butcher, Mineka & Hooley, 2010). Studies have shown that higher levels of empathy are associated with better conflict resolution strategies and less violence between friends and siblings, leading to the maintenance of friendships (de Wied, Branje & Meeus, 2007 and Richardson et al., 1994). Therefore it is possible that the inability to have close friendships is caused or maintained by deficits in empathy that lead to poor interpersonal relationships.

De Wied, Branje & Meeus (2007) explored the idea that affective empathy is related to the ability for best friends to problem-solve. High schoolers ages 13-16 were assessed using self-report questionnaires on both their affective empathy, using Bryant's Index of Empathy for Children and Adolescents (1982), and their conflict resolution style using Kurdek's Conflict Resolution Style Inventory (1994). Bryant's Index of Empathy (1982) assessed emotional matching, sympathy, and personal distress. Kurdek's Conflict Resolution Style Inventory (1994) assessed the four conflict resolution styles of positive problem solving, conflict engagement, withdrawal and compliance. They focused this study on positive problem-solving and conflict engagement. Positive problem-solving is when someone actively performs an action to help the future of the friend relationship. Conversely, conflict engagement is destructive and involves getting angry and verbally abusive towards friends. For both females and males, the higher affective empathy ratings were linked to higher rates of problem-solving and lower rates of conflict engagement between best friends. This shows that higher levels of affective empathy lead to better conflict resolutions and better interpersonal relationships.

In healthy adult populations, the cognitive component of empathy, perspective taking, has been linked towards less aggression and better conflict resolution strategies (as measured by the IRI (Davis, 1983)) (Richardson et al., 1994). Unlike in De Wied, Branje & Meeus (2007), this study found no relationship between affective components of empathy and conflict resolution. However, this could be due to the different measures used and the different age groups. Although there are discrepancies in which aspect of empathy account for the social dysfunction, both studies found a connection between empathy and social functioning.

Bullying, another socially dysfunctional behavior, has been shown to be effected by empathy too (Munoz, Qualter & Padgett, 2011). Empathy can deter individuals from bullying. Although at first it seems obvious that bullying is carried out by individuals who are low in empathy, it is not global deficits in empathy that lead to bullying. Munoz, Qualter, and Padgett (2011) found that individuals who did not care about others' feelings, therefore showing deficits in affective empathy, were more likely to engage in direct bullying. Interestingly, the bullies showed no deficits in cognitive empathy. This shows that bullies know and understand how other people feel, they just don't feel the connected sense of emotion to their victims.

In both criminal populations and healthy populations, levels of empathy have been related to violence, another aspect of social dysfunction (Lauterbauch & Hosser, 2007 and Richardson et al., 1994). Low levels of empathy have also been associated with violent behavior. Using a revised version of the IRI (Davis, 1983), the cognitive empathetic component (perspective taking) of the scale and affective component of the scale (empathetic concern and fantasy) were negatively related to violent delinquency in a prison population (Lauterbauch & Hosser, 2007). Interestingly personal distress showed no relationship to violence. This means, excluding personal distress, that the higher the affective and cognitive empathy of the offender, the less likely they were to have committed violent crimes as reported via self-report.

In general it seems that higher levels of affective and cognitive empathy are related to better social functioning. However, different findings for affective empathy could be a product of a medium amount of affective empathy, especially personal distress, is important for social functioning. Therefore people who are too high or too low in affective empathy have social dysfunction.

Empathy Disruptions in the Schizophrenia Spectrum

Across the schizophrenia spectrum there have been different findings for empathy. Some studies have found lower levels of empathy in the spectrum as compared to healthy individuals, while others have found increased levels of empathy in the spectrum as compared to healthy individuals (Smith et al., 2011 and Dickey et al., 2011 and Asia, Sugimori & Tanno, 2011).

Individuals with schizophrenia have been found to have lower cognitive empathy and are less able to place themselves in another person's situation (perspective-taking) than healthy individuals (Smith et al., 2011). They also score lower on empathetic concern, part of the affective empathy scale. In contrast, they experience more personal distress, another measure of affective empathy, than control subjects. It has been hypothesized that the heightened distress experienced by individuals with schizophrenia makes it difficult for them to take the perspective of another person since they become focused on their own emotional distress.

Individuals diagnosed with schizotypal personality disorder have been found to also have deficits in empathy. They are slower and less accurate at identifying facial expressions of others (Dickey et al., 2011). They are also poor at effectively creating facial expressions to reflect an emotion when asked. This suggests cognitive and affective deficits in empathy.

An another study, involving the Rubber Hand Illusion, they showed a relationship between empathy and individuals who scored high on the schizotypal scale (Asia, Sugimori & Tanno, 2011). (The Rubber Hand Illusion is when a participant is fooled into thinking a rubber hand is their own. Their real hand is hidden from view, and they see a rubber hand, which is stroked simultaneously to their real hand). In this study they found

that individuals who had a high score in schizotypal traits were also more often fooled by the illusion and more empathetic (as assessed by the IRI (Davis, 1983)). Specifically, they found one of the affective subscales, empathetic concern, to be related to the illusion. They explained that the lack of ability to distinguish between other and self could be one of the reasons people higher on the schizotypal scale would also be more often fooled by the illusion. The inability to distinguish between other and self could also be the reason these individuals feel more emotional distress.

Social Dysfunction and Empathy and Schizophrenia Spectrum

In one study the relationship between empathy and social functioning in individuals with schizophrenia was investigated (Smith et al., 2011). They assessed social functioning through an interview asking about social relationships, social acceptability, activities of daily living and working skills (Specific Levels of Functioning scale (Schneider & Struening, 1983)). They also assessed social functioning through the UCSD Performance-based Skills assessment (Mausbach et al., 2007), where the participants had to complete everyday tasks that relate to finance, communication, counting and scheduling appointments. They found that individuals with schizophrenia and lower perspective taking scores (the cognitive empathy component) on the IRI (Davis, 1983) had lower social functioning scores on both scales.

Henry, Bailey & Rendell (2008) linked empathy, social functioning and high schizotypal individuals. They found that low levels of empathy (as assessed by the Empathy Quotient (Baron-Cohen & Wheelwright, 2004) were related to poor social functioning (as assessed by the Social Functioning Scale (Birchwood et al., 1990)) They also found that high schizotypal scores were associated with empathy deficits. Interestingly, high schizotypal individuals self-reported lower levels of affective empathy

but not lower levels of cognitive empathy. However, when using the Reading the Mind in the Eyes Test Revised (Baren-Cohen et al., 2001), high schizotypal individuals did show cognitive empathy deficits. The Reading the Mind in the Eyes Test Revised involves participants viewing pictures of a pair of eyes and choosing one of four words that best describes the expression shown. Exploratory analyses showed affective empathy was related to two schizotypal traits, constricted affect and no close friends. Ultimately they found that high schizotypal individuals had low levels of affective and cognitive empathy and the low levels of empathy related to low levels of social functioning.

In addition, researchers have found high schizotypal individuals from healthy populations to be more sensitive to social rejection when viewing pictures of others being rejected and have even found differences in activation of brain regions for high schizotypal individuals as compared to low schizotypal individuals (Premkumar et al., 2012). This could show increased affective empathy in high schizotypal individuals.

Although many of the studies cited have shown there are empathy deficits across the schizophrenia spectrum, both Lee et al. (2011) and Henry, Bailey & Rendell (2008) showed that self-reports of empathy can misrepresent true differences in the schizophrenia spectrum. Lee et al. (2011) used the self-report IRI (Davis, 1983) and found no differences between cognitive empathy for schizophrenia and healthy individuals. However, when they used a video clip assessment they did find impairments of empathy in schizophrenia. Similarly, in Henry, Bailey & Rendell (2008) they found that self-report empathy ratings were not accurate to the actual implementation of empathy abilities.

Depression and Schizotypy

Individuals who score high on schizotypal scores also tend to score high on depressive scales, as do relatives of individuals with schizophrenia who are high in schizotypal traits (Vollema & Postma, 2002 and Henry, Bailey & Rendell, 2008). In the Vollema & Postma (2002) study, the participants attributed their depression to the stress of having a relative with schizophrenia.

However, other studies of healthy participants who are not related to individuals with schizophrenia have also shown a relationship between depression and high schizotypal symptoms (Henry, Bailey & Rendell, 2008) High scores on the Hospital Anxiety Depression scale (Zigmond & Snaith, 1983), which assess depression and anxiety, were related to high schizotypal scores (Henry, Bailey & Rendell, 2008). Although they did not differentiate between anxiety and depression in their discussion of the results, it appears as though depression was higher in high schizotypal individuals. Interestingly, another study found a relationship between depression and individuals high in positive schizotypy traits (Debbane et al., 2009). This is surprising because ratings for negative schizotypy include flat affect and more lonely qualities that could be associated with depressive symptoms. However, positive schizotypy involves magical thinking and other more delusional symptoms that would not seem to overlap with depressive symptoms. Researchers have suggested that depression can sustain the hallucinations and are predictive of schizotypal symptoms leading to psychosis.

Social Dysfunction & Depression

Major Depression is defined in the DSM IV as having at least five of the following symptoms for two weeks or more: a depressed mood, a loss in interest or pleasure in activities, over sleeping or under sleeping, over eating or under eating, slow movements, loss of energy, inability to think or concentrate, recurrent thoughts of death

(Butcher, Mineka & Hooley, 2010). This means that depressed individuals do not gain joy from doing activities they used to enjoy. This can cause a withdrawal from social settings for the depressed individual and interferes with everyday social functioning.

A reciprocal relationship between depression and social functioning has also been shown. Poor problem solving in a healthy population can lead to depressive symptoms (Anderson, Goddard & Powell, 2011). In this study they found that in real life interpersonal conflict situations, individuals who did not problem solve well (as assessed by a diary) had higher depressive ratings on the Beck Depression Inventory (Beck, Steer & Brown, 1996) after four weeks. They also found people who were prompted to problem solve imaginary situations also had higher ratings of depressive symptoms. This relates to schizotypy because deficits in empathy have been related to problems solving interpersonal conflict, which could lead to depression (Wied et al., 2007).

Current Study and Schizotypal Traits and Empathy

Based on the research discussed above we designed an experiment to further investigate schizotypal traits and their relationship to empathy and depression. Although many of the studies cited in this paper were based on articles across the schizophrenic spectrum, we focused on individuals in the general population who were high in schizotypal traits verses those who were low in schizotypal traits. We used the SPQ (Raine, 1991) to assess high and low schizotypal individuals. We also wanted to use two measures to assess empathy, a self report questionnaire and a behavioral scale. The first was the IRI (Davis, 1983), a self-report empathy questionnaire. We also created a new measure of empathy to capture an immediate emotional response to a stimuli rather than expecting individuals to accurately portray their own perceived levels of empathy. The measure we created for this experiment is the Emotion Reactivity to Pictures Scale

(ERPS) (Corbera, 2012). The ERPS involves individuals viewing both painful and neutral pictures. The participant records the perceived pain of the person in the picture and their own pain while viewing the picture, as well as several other measures. This gets at both the cognitive aspect of empathy (how much pain the person in the picture is in) and the affective aspect of empathy (how much pain you felt while viewing the picture) as well as overall the degree to which the person was emotionally reactive. The ERPS (Corbera, 2012) has never been used before, but we predict it will be an accurate measure of empathy.

Hypotheses

We hypothesized that individuals in the high schizotypal group will have lower cognitive empathy scores as well as higher affective empathy scores than individuals in the low schizotypal group. We also hypothesized that the high schizotypal group will have higher levels of depression than low schizotypal individuals. Finally, we hypothesized that females will score higher on cognitive empathy and affective empathy than males, regardless of whether they are in the high schizotypal or low schizotypal group.

Methods

Participants

51 Trinity College undergraduate students were recruited. Participants were determined to be healthy via self-report. Participants were excluded for neurological or psychiatric disorder; significant hearing or vision impairment, inability to write or inability to understand written and spoken English. Participants were split into two groups, high schizotypal and low schizotypal individuals using the Schizotypal Personality Questionnaire (Raine, 1991). We had 11 high schizotypal individuals and 22 low schizotypal individuals. High schizotypal individuals were the top 33% of scores in our sample (any score above 31.67) and low schizotypal individuals were the bottom 33% of scores (any score below 15.67). These cut offs were based on a previous study that used a sample of undergraduate students and SPQ (1991) scores to assess high and low schizotypal individuals (Wan, Crawford & Boutros, 2004). Our small sample size caused us to use these cut offs instead of the 10% cut-offs suggested by the SPQ manual (Raine, 2007). Participants in the low/high schizotypal groups were excluded if they were diagnosed with schizophrenia. Participants were between the ages of 17-22 with the mean age of 19 (SD=1). 59% were males. 77% were Caucasian, 6% were Black and 14% were other (Asian, Hispanic, and Indian) by self-report.

Measures

Emotion Reactivity Picture Scale (Corbera, 2012)

This measure consists of 129 rows (for each picture shown plus two practice pictures) and 8 separate columns for each scale (Figure 1). Participants rated each picture on gender, ethnicity, valence, activation, control, pain other suffered, pain you suffered, and a column was left for any comments about the picture. Each participant had a hard

copy of a sheet explaining what each measure meant with images to aid their assessment (Figure 2). They had access to this sheet throughout the study and during the direction section where the scales were explained. They were instructed to write M for male, F for female and to identify the ethnicity as either C for Caucasian, AA for African American (or someone of African decent), or O for other.

Valence, activation and control were all rated based on a Likert scale ranging from 1-9. Valence was described as the pleasantness of a given emotion ranging from very negative or sad (1) to positive or happy (9). Arousal was described as the excitement or arousal from a given emotion ranging from calm (1) to excited (9). An example to differentiate this from valence was given that one could be really happy and calm while holding their baby, but could also be really happy and excited as for a concert (in this example the valence is staying consistent while the arousal changes). Control was described as the dominance that a given emotion has on you, whether you feel dominated by the emotion (1) or whether you feel in control of the emotion (9). Finally the participants were asked to rate how much pain the person in the picture suffered and how much pain the participant themselves felt they suffered while watching the picture on a Likert scale from no pain (0) to very much painful (5).

ID: _____
 GENDER: _____
 DATE: _____

Decomposing Empathy to Understand Social Skills Deficits in Schizophrenia and Schizoaffective Disorder

Picture Number	Gender in Picture (M/F)	Ethnicity in Picture (C/A/A/O)	Valence (1-9)	Activation (1-9)	Control (1-9)	Pain other suffered (0-5)	Pain you suffered (0-5)	Comments
Practice Picture 1								
Practice Picture 2								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Silvia Corbera, Ph.D
 Funded by NARSAD, The Brain and Behavior Research Fund

Figure 1. Emotion Reactivity Picture Scale Answer Sheet

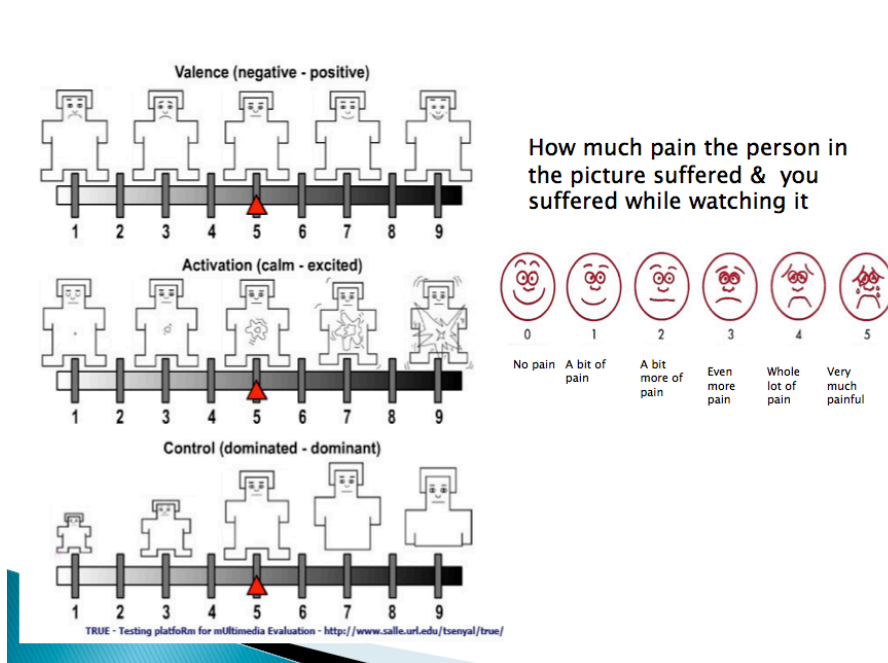


Figure 2. Guide to Rating the Measures

The measure consisted of 70 pictures that were considered to be painful, including images of individuals who had lost their homes, were crying, were at a funeral, and showing other signs of distress (Figure 3). There were 57 neutral pictures of individuals in different settings including grocery stores. Sixty-six pictures were of males while sixty-one were of females.



Figure 3. Painful Picture and Neutral Picture Examples

Clinical Measures

After finishing the power point, participants were asked to complete four additional measures, a General Information Form, the Beck Depression Inventory (Beck, Steer & Brown 1996), the Interpersonal Reactivity Index (Davis, 1983) and the Schizotypal Personality Questionnaire (SPQ) (Raine, 1991). A list of referrals to therapists on Trinity's Campus were available, however no one was in enough distress to utilize this resource.

The Beck Depression Inventory (Beck, Steer & Brown, 1996) is a self-report questionnaire consisting of 21 items with 4 statements per item. One statement is chosen that best describes the test-taker based on a Likert scale ranging from no depressive symptom (0) to a severe depressive symptom (3).

The Interpersonal Reactivity Index (Davis, 1983) is a multifaceted scale that measures empathy. There are 28 statements that are answered through self-report on a likert scale from 0 (does not describe me very well) to 4 (describes me very well). It has four subscales that measure the cognitive and affective aspects of empathy. The cognitive subscale consists of perspective-taking, while the affective subscales consist of fantasy, empathetic concern, and personal distress.

The SPQ (Raine, 1991) is a scale that measures levels of schizotypy through self report. There are 74 yes or no questions, with yes being scored as a 1 and no being scored as 0. There are 9 sub scales broken into ideas of reference, excessive anxiety, odd beliefs or magical thinking, unusual perceptual experiences, odd or eccentric behavior, no close friends, odd speech, constricted affect, and suspiciousness. The combination of these subscales can be grouped into the three factors of schizotypy, cognitive-perceptual, interpersonal, and disorganized.

Recruitment & Procedure

Participants were recruited via e-mail from Introduction to Psychology classes. The e-mail sent to all professors read:

I am conducting a research study and am interested in your emotional reaction towards pictures of people in different situations. The study consists of four preliminary questionnaires, followed by 127 pictures of people in different situations. You will be asked to rate your emotional responses to the pictures. The experiment will take an hour and fifteen minutes to complete. A licensed psychologist will supervise this study. The information in this study will be completely confidential. This experiment will take place in LSC 117 at Trinity

College in Hartford, CT. It's fun, easy, and quick. (This DOES count as research study participation if you are in intro psych.)

If you have any additional questions, please contact Sarah Raskin PhD at sarah.raskin@trincoll.edu or (860) 297-5188. If you would like to participate you can sign up online through <http://trincoll.sona-systems.com> (copy&paste this link or it doesn't work) You must make an account to sign up! The study is titled "Differences in Empathy within College Students" and the experimenter is Spencer McCauley.

As indicated, participants needed to create an online account in order to participate. Originally the time slots allowed up to ten participants to sign up. However, after the initial day of testing only five participants were able to sign up for each time slot since many participants were late and directions needed to be administered to everyone at the same time.

Once participants arrived, they were asked to read and sign a consent form. They were informed that the entire testing session would take an hour and fifteen minutes. After this they were allowed to choose a laptop at any place in the room that already had the power point aspect of the Emotion Reactivity Picture Scale (Corbera, 2012) measure cued up. The participants were also assigned an ID number at this time, which was written on the top of their response sheet. Once all individuals were ready, instructions, which were written on the power-point were read allowed to the participants by the researcher. They were told that they were participating in preliminary research for a larger research study being conducted at the Institute of Living at Hartford Hospital and

that we were interested in their reaction to different social situations. They were then instructed about how to use the new measure.

After these instructions, participants were told they would only have 20 seconds to view each picture and make their responses, as the power point was on a timer. If they finished early they could press space bar to move forward. They were also instructed to continue rating the next picture even if they did not finish rating the previous picture. Participants were asked if they had any questions following the instructions.

Two practice pictures were given so participants could get a sense of how quickly they needed to answer the questions. Participants were told they could ask questions about rating at this time, this way it wouldn't disrupt the power point.

Results

We used independent samples t-tests to determine if there were significant differences between high and low schizotypal groups on a variety of measures.

First, we compared whether there were differences between high and low schizotypal individuals and the ERPS (Corbera, 2012). Specifically, we wanted to test if high schizotypal and low schizotypal individuals' ratings of how they perceived the amount of pain the person in the picture experienced for both non-painful and painful stimuli. We found no significant differences between high schizotypal ($M=.40$, $SD=.31$) and low schizotypal ($M=.24$, $SD=.13$) individuals for ratings of how they perceived the amount of pain the person in the picture experienced in the non-painful pictures $t(25)=1.911$, *n.s.* (Figure 4) We found no significant differences between high schizotypal ($M=3.57$, $SD=.74$) and low schizotypal ($M=3.74$, $SD=.36$) individuals and ratings of how they perceived the amount of pain the person in the picture experienced in the painful pictures $t(23)=.812$, *n.s.*

Next, we compared whether there were differences between high and low schizotypal individuals and how they rated the pain they experienced while viewing the picture for both painful and non-painful stimuli. We found no significant differences between high schizotypal ($M=.18$, $SD=.20$) and low schizotypal ($M=.07$, $SD=.05$) individuals and their ratings of the amount of pain they felt while viewing the non-painful pictures $t(7)=1.476$ *n.s.* (Figure 5) (we could not assume equal variances for this one). We found no significant differences between high schizotypal ($M=1.94$, $SD=1.24$) and low schizotypal ($M=1.91$, $SD=.82$) individual and their rating of the amount of pain they felt while viewing the painful pictures $t(22)=.066$ *n.s.*

We also wanted to compare if there were significant differences in the four subscales of the IRI (Davis, 1983). For the personal distress scale there was a significant difference between high schizotypal and low schizotypal individuals $t(31)=.776, p<.05$ (Figure 6). High schizotypal individuals ($M=12, SD=4$) had significantly higher levels of personal distress than low schizotypal individuals ($M=7, SD=5$). There were no significant differences found between the remaining three scales. There was no significant difference for perspective taking between high schizotypal ($M=16, SD=5$) and low schizotypal individuals ($M=15, SD=9$); $t(31)=.433, n.s.$ There was no significant difference for empathetic concern between high schizotypal ($M=18, SD=7$) and low schizotypal individuals ($M=17, SD=9$); $t(31)=.327, n.s.$ There was no significant difference for fantasy between high schizotypal ($M=14, SD=6$) and low schizotypal individuals ($M=12, SD=8$); $t(31)=.776, n.s.$

Next, we compared whether there were differences between gender and ratings of how they perceived the amount of pain the person in the picture experienced for both non-painful and painful stimuli. We found females' ($M=.40, SD=.37$) ratings were significantly higher than males' ($M=.18, SD=.11$) for ratings of how they perceived the amount of pain the person in the picture experienced in the non-painful pictures although we could not assume equal variances $t(18)=2.33, p<.05$ (Figure 7). We found females' ($M=3.84, SD=.46$) ratings were significantly higher than males' ($M=3.43, SD=.57$) for ratings of how they perceived the amount of pain the person in the picture experienced in the painful picture $t(34)=2.289, p<.05$.

Next, we compared whether there were differences between gender and ratings of the pain they experienced while viewing the pictures for both painful and non-painful stimuli. We found females' ($M=.15, SD=.15$) ratings were significantly higher than males'

($M=.05$, $SD=.04$) for the amount of pain they felt while viewing the picture in the non-painful pictures although we could not assume equal variances $t(17)=2.510$, $p<.05$. We found females' ($M=2.34$, $SD=.99$) ratings were significantly higher than males' ($M=1.50$, $SD=.86$) for the amount of pain they felt while viewing the picture in the painful picture $t(33)=2.670$, $p<.05$ (Figure 8).

Finally, we compared the BDI (Beck, Steer & Brown, 1996) scores and high schizotypal and low schizotypal individuals. Although we could not assume equal variances, there was still a significant difference between BDI score and high and low schizotypal individuals $t(12)=3.83$, $p<.01$ (Figure 9). High schizotypal individuals ($M=15$, $SD=9$) scored significantly higher on the BDI than low schizotypal individuals ($M=4$, $SD=4$).

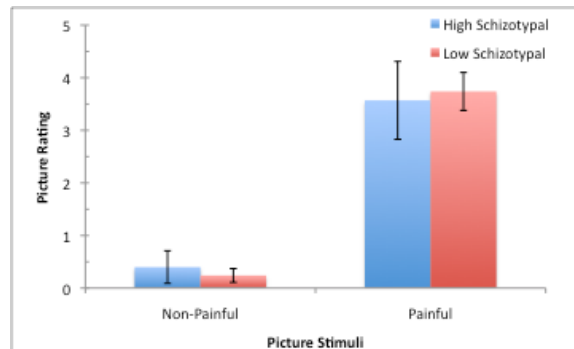


Figure 4. High and Low Schizotypal Ratings for the Perceived Amount of Pain the Person in the Picture Experienced.

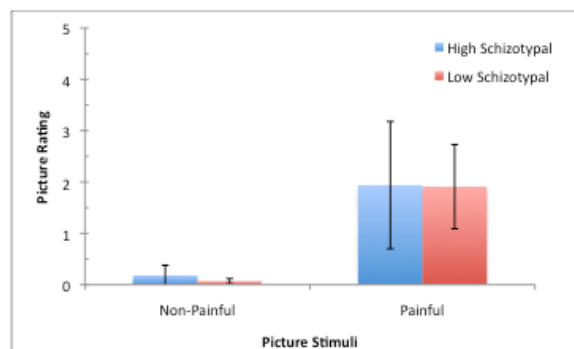


Figure 5. High and Low Schizotypal Ratings for the Amount of Pain the Participants Felt While Viewing the Picture.

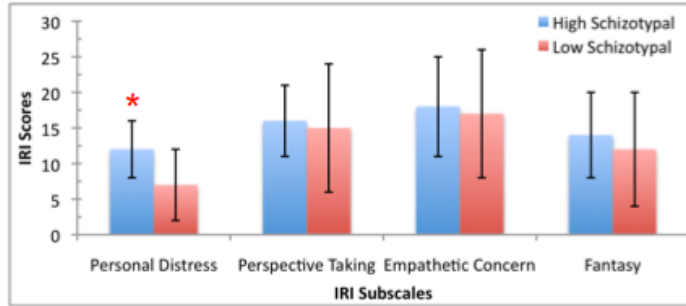


Figure 6. IRI Subscale Scores for High and Low Schizotypal Individuals (* $p < .05$).

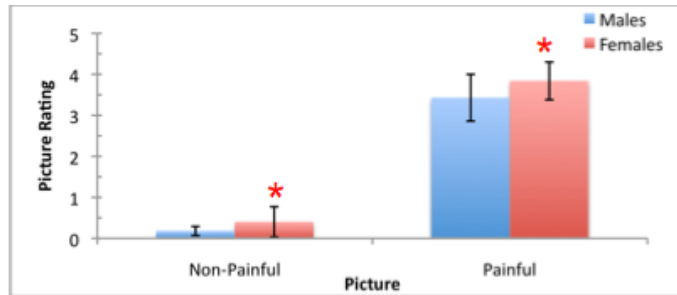


Figure 7. Male and Female Ratings for the Perceived Amount of Pain the Person in the Picture Experienced (* $p < .05$).

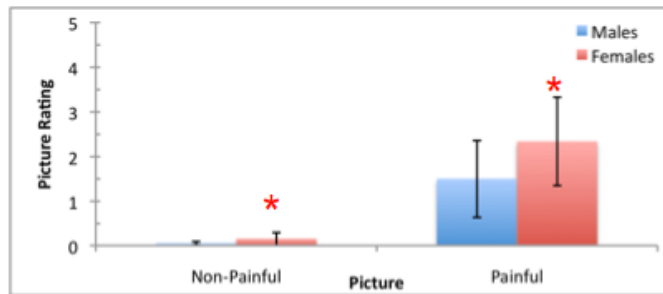


Figure 8. Male and Female Ratings for the Amount of Pain the Participants Felt While Viewing the Picture (* $p < .05$).

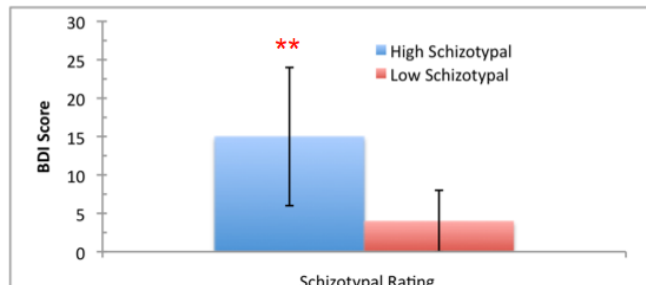


Figure 9. High and Low Schizotypal Individuals and BDI Score (** $p < .01$).

Discussion

Hypotheses Discussed

Cognitive Empathy and Schizotypy

Our first hypothesis that high schizotypal individuals would have lower cognitive empathy than low schizotypal individuals was not supported. We found that high schizotypal individuals had the same level of cognitive empathy as low schizotypal individuals using both the IRI (Davis, 1983) and the ERPS (Corbera, 2012).

We expected to find lower cognitive empathy levels for high schizotypal individuals because previous research has shown deficits in cognitive empathy along the schizophrenia spectrum (Henry, Bailey & Rendell, 2008 and Lee et al., 2011). However, it is not surprising that the self-report (IRI (Davis, 1983)) cognitive empathy levels were the same for both high and low schizotypal individuals. Previous research has shown that self-report empathy questionnaires are not always correlated with the actual behavioral empathy abilities of the participant (Henry, Bailey & Rendell, 2008 and Lee et al., 2011).

In a study looking at high schizotypal individuals and empathy ratings (using the IRI (Davis, 1983)), they found that high schizotypal self-reported cognitive levels were the same as low schizotypal individuals (Henry, Bailey & Rendell, 2008). However, when they used a behavioral test they found that cognitive empathy was impaired in high schizotypal individuals (Henry, Bailey & Rendell, 2008).

In a study looking at schizophrenia they found the same pattern. The self-reported cognitive empathy scores were the same for individuals with schizophrenia and healthy controls. However, when they used a behavioral test, individuals with schizophrenia had deficits in cognitive empathy as compared to healthy controls (Lee et al., 2011). This shows that individuals with schizophrenia and high in schizotypal traits weren't aware of

their own deficits in cognitive empathy (Lee et al., 2011 & Henry, Bailey & Rendell, 2008). This could be due to a lack of insight and could kept these individuals from attempting to improve their cognitive empathy since they do not perceive a problem.

Therefore, empathy self-report questionnaires like the IRI (Davis, 1983) may better represent individuals with schizophrenia's own perception of their empathy abilities, while not capturing their actual empathy abilities. Empathy self-report questionnaires are not the only self-report questionnaires prone to this contradiction. Self-report ratings have contradicted actual behavior ratings for problem solving measures too (Anderson, Goddard & Powell, 2011).

Although it seems the bias of a self-report questionnaire could explain why we found no differences in cognitive empathy between high and low schizotypal individuals, our behavioral test, the ERPS (Corbera, 2012) did not show cognitive empathy differences between high and low schizotypal individuals either. It is possible that the EPRS (Corbera, 2012) does not capture cognitive empathy accurately. Since it is a new measure and affective empathy and cognitive empathy overlap in many ways, perhaps viewing and rating the distress of the person in picture actually had affective and cognitive empathy components, causing high schizotypal individuals to score at a normal level (Brems, 1989).

In addition, it is possible that cognitive empathy was actually conserved in the high schizotypal population. Since we found the same pattern in both the IRI (Davis, 1983) and the ERPS (Corbera, 2012) it is possible that cognitive empathy is not disrupted in high schizotypal individuals, since this is a much less severe form of schizophrenia. Limitations of the population can also be considered as a possible reason we found no

group differences, since the high schizotypal group may be more representative of a medium schizotypal group.

Affective Empathy and Schizotypy

Our second hypothesis that high schizotypal individuals would have higher levels of affective empathy than low schizotypal individuals was partially supported. On the IRI (1983), one out of the three subscales (personal distress, empathetic concern & fantasy) thought to measure affective empathy was significantly higher for high schizotypal individuals than low schizotypal individuals. High schizotypal individuals were rated as having higher personal distress than low schizotypal individuals. Since personal distress has been linked to empathy deficits in individuals with schizophrenia, it is not surprising that this is the level at which we found significance (Smith et al., 2011).

It is possible that the personal distress score is the score that causes affective empathy to be rated as higher in individuals with schizophrenia than healthy individuals and that fantasy and empathetic concern do not contribute much to the difference. Personal distress may be the most disrupted of all the affective empathetic components. Our results support this idea.

Some studies have shown that high schizotypal individuals have an inability to distinguish between themselves and others (Asai, Sugimori & Tanno, 2011). Therefore, when viewing someone else in distress, it could cause much more personal distress for a high schizotypal individual than for someone who is better able to differentiate between themselves and others.

This inability to discern the self from others can best be described as a theory of mind deficit (Stratta, 2010). Theory of mind is a person's ability to understand that other people have intentions, beliefs and desires that differ from their own and is essential to

empathy. An inability to understand the difference between the self and other, could cause more personal distress for the viewer.

In a meta-analysis of theory of mind and emotion processing, theory of mind was the most impaired in individuals with schizophrenia (Savla et al., 2012). Social cognitive deficits appear to be present before the onset of the schizophrenia diagnoses also supporting that high schizotypal individuals would show these deficits (Miller & Lenzenwege, 2012). In addition, these deficits appear to be a vulnerability for schizophrenia and not a product of schizophrenia (Green et al., 2011). Therefore, personal distress may actually be higher in high schizotypal individuals because of their theory of mind deficits.

It is possible that the study's limitations contributed to no pattern found for the other affective scales, of empathetic concern and fantasy. However, this study supports that even with limitations, personal distress is still significantly higher in individuals with high schizotypal traits as compared to low schizotypal individuals.

Although we found a difference in affective empathy on the IRI (Davis, 1983), we did not find any differences in affective empathy between high and low schizotypal individuals as assessed using the ERPS (Corbera, 2012). Again, since this is a new measure it is possible that the affective empathy aspect (how much pain you felt while viewing the picture) did not actually capture just affective empathy (Brems, 1989). It is also possible that if the cognitive empathy abilities were conserved, participants could have matched their level of affective empathy (how much pain they felt while viewing the picture) to their level of cognitive empathy (how much pain they rated the person in the picture as experiencing). Therefore, it may have been more of a cognitive process of matching numbers, than actually capturing the participants' affective response.

Depression and Schizotypy

Our third hypothesis that high schizotypal individuals would have higher levels of depressive symptoms than low schizotypal individuals was supported. This is not surprising since many of the traits assessed to categorize someone as high in schizotypy involve social deficits, uneasiness with close relationships, odd behaviors, and lack of close friends (Butcher, Mineka & Hooley, 2010). It has also been found that relatives of individuals with schizophrenia who are high in schizotypal traits also score high on depressive scales (Vollema & Postma, 2002). In the Vollema & Postma (2002) study, the participants attributed their depression to the stress of having a relative with schizophrenia. However, our study shows that depression is also higher in high schizotypal individuals without a relative with schizophrenia.

Other studies have also shown a relationship between depression and positive schizotypy traits (Debbane et al., 2009). In another study the authors reported that high scores on the Hospital Anxiety Depression scale (Zigmond & Snaith, 1983), which assesses depression and anxiety, were related to high schizotypal scores, supporting our findings (Henry, Bailey & Rendell, 2008).

Sex and Empathy

Our fourth hypothesis that females would have higher empathy levels than males was supported. We found that on the ERPS (Corbera, 2012) females had higher affective and cognitive empathy than males. This causes us to believe that at some level our measure did capture empathy, since on most empathy scales and in most populations females score higher than males (Kobach & Weaver, 2012 and Ruckert & Naybar, 2008 and Graaigordobil 2009). Unfortunately, we cannot assess whether affective empathy and

cognitive empathy were differentiated on this measure using this method since females have been found to score higher on empathy overall than males.

Implications for Social Dysfunction

As stated in the introduction, low levels of cognitive empathy, high or low levels of affective empathy, and high levels of depression have been related to social dysfunction in the schizophrenia spectrum (Smith et al., 2011 and Henry, Bailey & Rendell, 2008). How do our results inform these associations? Overall we found that high schizotypal individuals had no differences in empathy as compared to low schizotypal individuals except for personal distress, which was found to be higher in high schizotypal individuals.

At first, this may seem promising, supporting the theory that high schizotypal individuals may not experience differences in empathy or social functioning as compared to low schizotypal individuals. With mostly healthy levels of empathy, their abilities to use correct interpersonal conflict resolution strategies should be fine, and they will be less likely to use violence than a less empathetic person. However, it has been shown that high levels of personal distress are related to social dysfunction as assessed by poor interpersonal skills including boastfulness, poor communication, shyness and anxiousness and lowest levels of social competence (Davis, 1983). Therefore, although there were only differences on the personal distress scale, and not the two other affective components, according to Davis (1983), this may actually be the most important predictor of social function in the empathy scale. However, we cannot conclude that the higher levels of personal distress found in our high schizotypal group were high enough to be at a dysfunctional level. Therefore it is possible that their level of personal distress is at a mid level and would not lead to social dysfunction. It is also possible that our high

schizotypal group does experience a dysfunctional level of personal distress and therefore has poor social functioning. Even if this is the case, it is also important to note that since the high schizotypal group had healthy levels of perspective taking, another important component to social function, that even with higher levels of personal distress they could still successfully function socially (Davis, 1983).

In addition, we found high levels of depression were associated with high schizotypal individuals. Depression has been shown to be effected by poor social skills but can also affect social functioning, since depression involves a withdrawal from social settings (Anderson, Goddard & Powell, 2011 and Butcher, Mineka & Hooley, 2010).

Another Explanation for the Collective Results

We found personal distress was significantly higher in high schizotypal individuals, and high schizotypal individuals had significantly higher ratings of depression. Perhaps in a certain way the depressive symptoms scale, personal distress scale and schizotypal scale are all assessing the same thing. The high schizotypal group ratings were also not very high at about the mid point of the SPQ (Raine, 1991). The depressive ratings were not very high for the higher schizotypal group with a mean at the mid range of depressive symptoms (Beck, Steer & Brown, 1996). Also, the high personal distress score was lower then the mid point of the personal distress scale for high schizotypal individuals (Davis, 1983). Therefore, these lower scores may all be assessing the common anxious and distressed underpinnings of each of these scales.

Limitations

Population Limitations

There are several population limitations in this study. One of the main limitations of this sample was the small sample size. Only 11 participants were considered high

schizotypal and only 22 participants were considered low schizotypal individuals. In addition, the SPQ (2007) manual suggests using 10% high and low cut offs in order to create high and low schizotypal groups (Raine, 2007). With our sample size we instead used 33% high and low cut offs. Although Wan, Crawford & Boutros (2004) used 33% cut offs to assess high and low schizotypal individuals, they had a much larger original sample (613 participants total but only 39 used in groups). Therefore, the high and low schizotypal groups used in our study may not have been very different from each other.

Our highest score on the SPQ (1991) was 48 out of a possible score of 74. Therefore, our high schizotypal group may have more accurately represented a middle schizotypal group. This can be explained by the fact that all participants were Trinity College students, which is an arguably high functioning group of individuals. It is possible that the high schizotypal group was a subset of individuals who do not have the empathy deficits or social functioning deficits that some schizotypal individuals experience.

Limitations to the ERPS (Corbera, 2012)

Although we did find the expected sex differences in the ERPS (Corbera, 2012), we did not find the differences we expected to find in empathy for high and low schizotypal individuals. It is hard to determine if this is a limitation of the ERPS (Corbera, 2012) itself or if other factors played a role.

One limitation to the ERPS (Corbera, 2012) is that the images presented may have been perceived as real or fictional. We did not explicitly tell the participants whether the pictures were fictional or real life pictures. One study showed that individuals rate violent pictures as less negative if they are under the impression the pictures are fictional as opposed to real (Kobach & Weaver, 2012). In this study, higher ratings of negativity of a

picture were also related to higher levels of empathy (as assessed by the Empathy Quotient (Baron-Cohen & Wheelwright, 2004)). In addition, females were still rated higher on this measure than males, just as we found on the ERPS (Corbera, 2012). This is because females had a harder time imagining the pictures as fictional, while males were more able to distance themselves due to the fictional nature of the pictures. In this study they found correlations between empathy and picture rating even for fictional pictures, but since people rated the fictional pictures as less painful perhaps this is a confound in our study.

Another limitations to our study is participants rated the amount of pain they perceived the person in the picture to be experiencing and the amount of pain they experienced while viewing it on the same sheet of paper. Therefore, they could easily match these numbers.

Lastly, the ERPS (Corbera, 2012) was writing intensive and very long. The test took about forty minutes to complete. Viewing and rating 127 pictures could have been extremely tiring. I think in the future a much smaller number of pictures, perhaps 30 could better assess the empathy of participants.

Design Limitations

One design limitation was our use of self-report questionnaires. As stated before, self-report questionnaires have been found to be less accurate than other measures (Henry, Bailey & Rendell, 2008, and Lee et al., 2011). There are many reasons for this but one of them is demand characteristics. Demand characteristics are when a participant thinks that an experimenter wants them to act or answer questions in a certain way, and the subject obliges the researcher.

All scales were labeled by their names, and therefore gave away what they were meant to measure. Participants may have wanted to make themselves seem more desirable and answered in a way untrue to themselves. Even on a subconscious level, females may have thought of their social role of being more empathetic than males and rated themselves higher than they truly are on empathy scales.

There were also multiple people in the room, which could have made the environment distracting. Participants may not have taken the task seriously. In addition, many participants left parts of the answer sheets blank.

Future Studies

Cognitive Empathy and Schizotypy

In the future, it would be interesting to add another validated cognitive empathy behavioral test other than the ERPS (Corbera, 2012) to assess cognitive empathy. As in the Henry, Bailey & Rendell (2008) study on schizotypy we could use the Reading the Mind in the Eyes Test Revised (Baren-Cohen et al., 2001) to assess cognitive empathy. For the Reading the Mind in the Eyes Test Revised (Baren-Cohen et al., 2001) test participants view a picture of eyes and choose one of four words that best describes the emotion. If we see cognitive empathy deficits on this test for our high schizotypal group, then we would know that the ERPS (Corbera, 2012) does not capture the cognitive component of empathy effectively. If we do not see any difference in cognitive empathy, as was the case in our data, we could assume it was due to sample limitations and not the measure that led to these results.

Affective Empathy and Schizotypy

In the future, we could do two things differently in assessing affective empathy and schizotypy. First, we could create a scale that focuses on personal distress and then

use a measure that assesses theory of mind, such as the Hinting Task (Corcoran & Frith, 1995) and see if there were theory of mind deficits as well as higher personal distress ratings in high schizotypal individuals. We could also see if low schizotypal individuals who had higher personal distress ratings also had lower theory of mind ratings to try to eliminate the confound of being high in schizotypy that relates to both theory of mind deficits and high personal distress ratings.

Secondly, for the ERPS (Corbera, 2012) we could have people rate each picture for just the cognitive rating or just the affective rating to eliminate individuals matching their affective empathy scores to their cognitive empathy scores. For example, they would view a picture and rate how much pain they thought the person in the picture was experiencing (cognitive empathy). For the next picture they would rate the amount of pain they experienced while viewing the picture (affective empathy).

Sex and Empathy

In a future study, we would like to examine the interaction of sex, schizotypy, and empathy. Unfortunately, since our sample was so small we were not able to look at empathy gender differences within the high schizotypal group. It would be interesting to see if high schizotypal individuals still showed the sex difference of females scoring higher in empathy than males.

Population

In the future we would like to recruit a larger sample size and recruit individuals from the community. Currently our results are only representative of a small, affluent, undergraduate, private college. Therefore all participants were student aged and arguably high functioning. We believe if we were able to recruit individuals from the larger Hartford community we would be able to recruit individuals high in schizotypal traits.

We would also capture a larger range in age, social economic status, education level, and general functioning, which could contribute to a better understanding of schizotypy and its interaction with empathy in the general population. It would also be interesting to test the ERPS (Corbera, 2012) on individuals with schizophrenia, although the sample size may again be restricted.

Conclusion

In conclusion, we found no differences in cognitive empathy between high and low schizotypal individuals. We found no differences in affective empathy between high and low schizotypal individuals, except on the personal distress scale. We found higher levels of personal distress for high schizotypal individuals than low schizotypal individuals. We also found higher levels of depressive scores for high schizotypal individuals than low schizotypal individuals. We hope that these findings can be used to inform the spectrum of schizophrenia disorders and the social functioning of schizotypal individuals. Finally, as has been found in many other studies, females were rated higher in empathy than males.

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