

THE RELATIONSHIP BETWEEN SELF-REPORT
AND BEHAVIORAL MEASURES OF EMPATHY

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CHAPTER I

INTRODUCTION

The definition of empathy has undergone many changes. Early researchers characterized empathy as either a strictly cognitive process by emphasizing the role-taking process (e.g., Deutsch & Madle, 1975; Dymond, 1949; Hogan, 1969) or an emotional process (e.g., Mehrabian & Epstein, 1972), and examined empathy through self-report measures in adults. However, criticisms of self-reported measures have motivated the use of alternative methods of measurement, including behavioral indices (e.g., Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). Today, research has suggested that empathy may involve multiple components both cognitive and emotional (Baron-Cohen & Wheelwright, 2004; Davis, 1980; Smith, 2006).

Statement of Purpose

The purpose of the present study was to investigate the relationship between self-report measures of empathy and individuals' performance on a behavioral measure of empathy (Eyes test; Baron-Cohen et al., 2001). In addition, the present study investigated the role of individual differences in dispositional attributes, such as

temperament and personality, in predicting self-reported empathy and performance in the Eyes test.

Hypotheses

Hypothesis 1. It was predicted that individuals with higher scores on the “Reading the Mind in the Eyes” test (empathic accuracy; Baron-Cohen, et al., 2001) would have higher scores on the Perspective Taking subscale of the IRI (cognitive empathy; Davis, 1980, 1983b) and the Empathic Concern subscale (affective empathy), such that all of these items would be predicted to be significantly positively correlated with one another. Due to theoretical relatedness, the above measures were predicted to positively correlate with higher Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004) total scores.

Hypothesis 2. To examine empathy’s relationship to the dispositional constructs of temperament and personality, it was predicted that higher dispositional empathy scores (i.e., EQ and IRI subscales) would coincide with higher scores on Effortful Control from the Adult Temperament Questionnaire (ATQ; Evans & Rothbart, 2007; Rothbart, Ahadi, & Evans, 2000). In addition, higher scores on Agreeableness and Extraversion from the Mini-Marker Big Five inventory (Saucier, 1994) were expected to be significantly correlated with the Empathic Concern and Perspective Taking subscales of the IRI. However, accuracy rates of the Eyes test were not expected to correlate with any subscales of personality or temperament.

CHAPTER II

REVIEW OF PREVIOUS LITERATURE

Changing Definitions of Empathy

The changes in the definition of empathy have been reflected in early self-report testing of empathy. One self-report scale of empathy was developed by Hogan (1969). By his definition, empathy was “the intellectual or imaginative apprehension of another’s condition or state of mind without actually experiencing that person’s feelings.” He developed a scale that assessed cognitive empathy using a 64-item questionnaire presented using the Q-sort methodology. Each final question was forced choice between true or false, and the questions yielded a single total score. This measure of empathy (referred to in the literature as the “Hogan Empathy Scale;” Chlopan, McCain, Carbonell, & Hagen, 1985), treats empathy as a cognitive process. A criticism of this theoretical position by others (e.g., Hoffman, 1977) is that the treatment of empathy as a strictly cognitive process is inappropriate because it does not take into account the affective aspect of empathy; therefore, others (e.g., Aderman & Berkowitz, 1970; Feshbach, 1964; Feshbach & Roe, 1968; Stotland, 1969) emphasized empathy as an affective process.

Mehrabian and Epstein (1972) proposed an alternative self-report measure of empathy -- Questionnaire Measure of Emotional Empathy (QMEE). The QMEE included the following subscales: Susceptibility to Emotional Contagion, Appreciation of the

Feelings of Unfamiliar and Distant Others, Extreme Emotional Responsiveness, Tendency to Be Moved by Others' Positive Emotional Experiences, Tendency to Be Moved by Others' Negative Emotional Experiences, Sympathetic Tendency, and Willingness to Be in Contact with Others Who Have Problems. These subscales were designed to assess emotional rather than cognitive empathy, a distinction made by the authors. Each of the 33 items on the questionnaire is on a 9-point, -4 (very strong disagreement) to +4 (very strong agreement), scale. Although the scale has shown good test-retest reliability ($r = .84$; Bryant, 1982), researchers since then have theorized that empathy entails both a cognitive and affective aspects (e.g., Batson & Shaw, 1991), for which the QMEE does not account in its measurement (for an extensive review of the Hogan Empathy Scale and the QMEE, see Chlopan et al., 1985).

The Interpersonal Reactivity Index

The most widely used self-report measure of empathy is the Interpersonal Reactivity Index (IRI; Davis, 1980, 1983b). The IRI was designed to assess both cognitive and affective (emotional) constructs of empathy. Davis cites a general lack of uniformity in the definitions of empathy, and states that many theorists pursued either a cognitive perspective-taking route or an affective experience route in defining empathy. In creating a questionnaire, Davis's goal was to create an integrated self-report measure of empathy based on theoretical shifts in understanding empathy (e.g., Coke, Batson, & McDavis, 1978; Hoffman, 1975; Iannotti, 1979) that included both. The IRI has four subscales: Fantasy Scale (e.g., When I watch a good movie, I can very easily put myself in the place of a leading character.), Perspective-Taking Scale (e.g., I try to look at everybody's side of a disagreement before I make a decision.), Empathic Concern Scale

(e.g., When I see someone being taken advantage of, I feel kind of protective toward them.), and Personal Distress Scale (e.g., Being in a tense emotional situation scares me.).

This measure has been used widely in examinations of empathy in adults, and gender differences have been found in studies utilizing the IRI and its subscales (Davis, 1980; Barr & Higgins-D'Alessandro, 2007). Typically, studies have found the Perspective Taking and Empathic Concern subscales to be significantly positively correlated (e.g., Davis, 1980; Davis, Luce, & Kraus, 1994; Laurent & Hodges, 2008). The Fantasy and Personal Distress subscales have not been consistently found to be related to the other scales (e.g., Davis, 1980; Davis et al., 1994; Yamada & Decety, 2009).

The Perspective Taking and Empathic Concern subscales of the IRI have been found to be related to other social and emotional constructs. For example, the Perspective Taking subscale has been found to be significantly predictive of empathic accuracy (Bernstein & Davis, 1982; Laurent & Hodges, 2008; Rogers, Dziobek, Hassenstab, Wolf, & Convit, 2007) and emotional support (Devoldre, Davis, Verhofstadt, & Buysse, 2010). In addition, it has been found to be positively correlated with mimicking behaviors (Chartrand & Bargh, 1999), interpersonal functioning (Davis, 1983b), helping/prosocial behaviors (Barr & Higgins-D'Alessandro, 2007; Stahl & Hill, 2008), and emotional intelligence (Schutte et al., 2001). The Empathic Concern subscale has been found to be predictive of helping behaviors (Davis, 1983a), estimates of observed pain (Green, Tripp, Sullivan, & Davidson, 2009), empathic accuracy (Laurent & Hodges, 2008), and peer acceptance in adolescents (Oberle, Schonert-Reichl, & Thomson, 2010) and is correlated with prosocial behaviors (Barr & Higgins-D'Alessandro, 2007; Oberle et al, 2010).

Current Conceptualization of Empathy

Nevertheless, the aspects of empathy measured by the IRI reflect an out-of-date definition of empathy and do not measure aspects of empathy that have been the focus of more recent research. Current theories generally exclude personal distress as an aspect of empathy itself when described as an overwhelming feeling resulting from a shared experience with another (Batson & Shaw, 1991; Eisenberg, Wentzel, & Harris, 1998). The Personal Distress scale is sometimes not included in analyses on the basis of theoretical definitions of emotional empathy (e.g., Besel & Yuille, 2010; Oberle et al., 2010) or has been found to be unrelated to variables of interest in empathy studies (e.g., Davis et al., 1994; Devoldre et al., 2010; Rogers et al., 2007). It has also been found to be related to self-perspective rather than other-perspective (Lamm, Batson, & Decety, 2007); this finding is important given that other-perspective is an important aspect of empathy as a construct.

An important distinction to make in the process of understanding empathy is the differentiation between empathy, sympathy (Baron-Cohen & Wheelwright, 2004; Singer & Lamm, 2009) and personal distress (Batson, Duncan, Ackerman, Buckley, & Birch 1981; Batson & Shaw, 1991). Sympathy is generally described as an appropriate response to the emotions of another that is not necessarily congruent with the target's emotional state (Decety & Michalska, 2010; Eisenberg et al., 1998; Eisenberg, 2000). Therefore, a perceiver who is sympathetic to a target's distress as a result of mistreatment might respond by feeling anger rather than mirroring the target's distress or attempt to alleviate the other's distress, which stems from an empathic response to the target (Baron-Cohen & Wheelwright, 2004; Eisenberg, 1991; Eisenberg & Fabes, 1990).

In contrast, personal distress would be the perceiver's egocentric response to the target's distress (Davis, Mitchell, Hall, Lothert, & Snapp, 1999; Decety & Jackson, 2006; Eisenberg et al., 1998). Thus, the perceiver would respond to a target's distress in a manner that is congruent, sometimes at the expense of the perceiver's help to the target. Or, the perceiver's motivation to help would be to reduce personal aversive arousal rather than alleviate the distress of the target (see Batson, 1991 for further discussion).

Most current empathy theories also do not generally include a fantasy component/construct that pertains to fictional characters prominently in empathy theories today (e.g., de Waal, 2008; Eisenberg & Miller, 1987). Davis (1980, 1983b) does not give theoretical justification for the Fantasy subscale's inclusion in the IRI other than a theoretical precedent of a previous empathy scale (Stotland, Mathews, Sherman, Hansson, & Richardson, 1978) which included fantasy items. Davis (1980) stated that his purpose in creating a new scale was to create one that examined cognitive and affective aspects of empathy independent of one another, and the Fantasy scale is often not included in analyses as a measure of cognitive empathy (e.g., Davis et al., 1994; Davis et al., 1999; Devoldre et al., 2010; Stahl & Hill, 2008) or is found to have a non-significant relationship to the variables of interest (e.g., Davis, 1983b; Larson, Fair, Good, & Baldwin, 2010; Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004).

The Empathy Quotient

The most recently developed self-report measure of empathy is the Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004). The EQ is an empathy scale whose creators attempted to create a holistic measure of empathy rather than create questions to measure cognitive and affective empathy separately. Baron-Cohen and Wheelwright

(2004) conceptualize empathy as entailing both cognitive and affective empathy as independent yet overlapping components. The measure therefore reflects this theoretical position.

The EQ was originally developed to distinguish differences between individuals with Autism Spectrum Disorders (ASDs) and neurotypical individuals (Baron-Cohen & Wheelwright, 2004). Individuals with ASDs have lower average EQ scores in comparison studies with neurotypical comparison groups (Baron-Cohen & Wheelwright, 2004; Johnson, Filliter, & Murphy, 2009) and the EQ is negatively correlated with other self-report measures of Autism (Baron-Cohen & Wheelwright, 2004; Walter, Dassonville, & Bochsler, 2008; Wheelwright et al., 2006).

Across many studies, significant gender differences have been found in average EQ scores, with a female advantage (Baron-Cohen & Wheelwright, 2004; Kempe, 2009; Lawrence et al., 2004; Mohr, Rowe, & Blanke, 2010; Penton-Voak, Allen, Morrison, Gralewski, & Campbell, 2007). Cross-cultural studies using the EQ have also found similar results, including gender differences favoring females' higher empathy self-ratings (e.g., Berthoz, Wessa, Kedia, Wicker, & Grézes, 2008; Martinotti, Di Nicola, Tedeschi, Cundari, & Janiri, 2009; Wakabayashi et al., 2007) and significant deficits in self-reported empathy in individuals with ASDs (Berthoz et al., 2008; Kaland, Callesen, Møller-Nielsen, Mortensen, & Smith, 2008). These findings suggest that the EQ is a stable cross-cultural measure of empathy.

The EQ has been found to be significantly positively correlated with subscales of the IRI, specifically the Empathic Concern and Perspective Taking subscales (Besel & Yuille, 2010; Larson, et al., 2010; Lawrence et al., 2004; Mohr et al., 2010; Silas, Levy,

Nielsen, Slade, & Holmes, 2010; Yamada & Decety, 2009). However, comparisons with behavioral measures of empathy and related constructs have been mixed (Ali & Chamorrow-Premuzic, 2010; Arnott, Singhal, & Goodale, 2009; Larson et al., 2010; Lawrence et al., 2004; Penton-Voak et al., 2007; Silas et al., 2010; Yamada & Decety, 2009). This may be due to the design of the IRI and the EQ scales as measures of dispositional rather than behavioral empathy. A better understanding of the construct of empathy (both dispositional and behavioral) is necessary to understand its relation to other constructs of interest.

Affective vs. Cognitive Empathy

Today, most empathy researchers agree with Baron-Cohen and Wheelwright (2004) and Davis (1980) that the conceptualization of empathy entails both affective and cognitive dimensions (Davis et al., 1999; Decety & Jackson, 2006; Preston & de Waal, 2002; Watt, 2007). Current empathy research generally considers emotional contagion to be part of empathy or a precursor to empathy (de Waal, 2008; Iacoboni, 2009; Kimura, Daibo, & Yogo, 2008), which is defined as the tendency of an individual to unconsciously imitate the emotions of others around him/her (Hatfield, Cacioppo, & Rapson, 1993).

Emotional contagion is closely related to our innate imitative ability, which is likely an evolutionary adaptation to the social network of human beings (Iacoboni, 2009; Lakin, Jefferis, Cheng, & Chartrand, 2003). The behavioral mimicry of emotion expression, sometimes referred to as the “chameleon effect,” is the “non-conscious mimicry of the postures, mannerisms, facial expressions, and other behaviors of one’s interaction partners, such that one’s behavior passively and unintentionally changes to

match that of others” (Chartrand & Bargh, 1999). Thus, like chameleons, we as humans cannot always control these tendencies to imitate those around us. This effect is considered part of emotional contagion, in that individuals mirror the emotional states of others automatically. An added component of emotional contagion beyond the chameleon effect is the affective “resonance” of the emotional expression, such that an emotion expressed by another affects not only the motor behavior of an observer, but also the mood state of the observer as well (Doherty, 1997; Hatfield et al., 1993). Emotional contagion is often equated with affective empathy in theoretical definitions of empathy (Davis, 1980; Hoffman, 1975; Smith, 2006).

In contrast, cognitive empathy typically encompasses or equates to cognitive perspective-taking skills and is generally described as the ability to imagine, with intention, the feelings and motivations of others (de Waal, 2008; Eisenberg, 1991; Smith, 2006). In this definition, there are striking similarities between this definition and the definition of theory of mind (ToM; Premack & Woodruff, 1978), or the idea that individuals can attribute thoughts, motivations, beliefs, and desires to another person that are separate from their own cognitions (Flavell, 1999; Humphrey, 1976; Oberman & Ramachandran, 2007), but an added component is the affective perspective of another (Harwood & Farrar, 2006). Many theorists equate ToM to the cognitive aspect of empathy (e.g., Baron-Cohen & Wheelwright, 2004; Blair, 2005; Singer, 2006).

Criticisms of Self-Report Measures

Some researchers have criticized all self-report measures of empathy because they believe that they are influenced by social desirability bias (e.g., Eisenberg & Fabes, 1990; Eisenberg & Lennon, 1983). Participants may not respond truthfully to the questions;

rather, they may report tendencies that they perceived to be socially desirable (Eisenberg, Fabes, Bustamante, & Mathy, 1987). Researchers specifically refer to the adherence to gender norms as an influence on responses to self-report empathy scales as a source of social desirability responding (Eisenberg & Lennon, 1983). These researchers point out that there are discrepancies between physiological measures of empathy and self-report measures of empathy (e.g., Anastassiou-Hadjicharalambous & Warden, 2007; Anastassiou-Hadjicharalambous & Warden, 2008; Stotland, 1969). A growing number of studies have investigated the relationship between self-report measures of empathy and physiological measures, such as skin conductance, electromyographic (EMG) and heart rate measures during empathy-eliciting situations (Stotland, 1969; Eisenberg & Fabes, 1990; e.g., Anastassiou-Hadjicharalambous & Warden, 2008; Levenson & Ruef, 1992). These physiological measures, however, indicate an emotional reaction to an event or laboratory manipulation, but do not explain cognitive processes involved in empathy (Eisenberg et al., 1987).

An Alternative Measure of Empathy

Behavioral tasks have also been created to understand the processes involved in cognitive perspective-taking (e.g., Gopnik & Astington, 1988; Perner & Wimmer, 1985; Stone, Baron-Cohen, & Knight, 1998; Wimmer & Perner, 1983). A recent behavioral measure of empathy is the Reading the Mind in the Eyes Test-Revised (the Eyes test; Baron-Cohen et al., 2001). The Eyes test is a measure of empathy through empathic accuracy, or the ability of the individual to accurately assess the emotional state of another individual by cognitively labeling an emotion expressed by a target individual (Ickes, 1993). Participants (perceivers) are asked to view a picture of an individual's eyes

only (the target), then are given four words and asked to choose which of the four words best describes the target (e.g., skeptical, contemplative). Example stimuli from the Eyes test are displayed in Figure 1 (Appendix G; correct answers are italicized).

Baron-Cohen et al. (2001) updated the Eyes test measure as a theory of mind measure in order to detect differences between individuals, even individuals without impairments such as Autism Spectrum Disorders through accuracies in identifying emotional states of individuals in pictures. The Eyes test has been predominantly used in studies comparing individuals with ASDs to samples of control individuals without the disorder, and connections between low empathic accuracy scores from the Eyes test and social deficits in individuals with ASDs have been found (Baron-Cohen et al., 2001; Demurie, de Corel, & Roeyers, 2011; Kaland, Callesen, Møller-Nielsen, Mortensen, & Smith, 2008).

Prior studies that have used the Eyes test have found connections between the ability to infer mental states and self-reported dispositional empathy (Ali & Chamorro-Premuzic, 2010; Billington, Baron-Cohen, & Wheelwright, 2007; Declerck & Bogaert, 2008). It has also been found to be negatively correlated with other indicators of Autism Spectrum Disorders (Carroll & Yung, 2006; Voracek & Dressler, 2006). When comparing “psychopathic” individuals to controls, no significant differences in accuracy between the two groups were found (Dolan & Fullam, 2004; Richell, Newman, Leonard, Baron-Cohen, & Blair, 2003). This may indicate that the cognitive perspective-taking accuracy of individuals is separate from affective empathy indicated by physiological and self-reported empathy measures.

Despite this behavioral measure's apparent advantages in reducing desirability responding more than self-report measures, like other behavioral measures, it cannot always explain what specific emotion the perceiver is feeling (Eisenberg et al., 1987; Izard, 1982; Stotland, 1969), and thus creates an incomplete measure of empathy as it is currently understood conceptually. A measure of empathy that has a comprehensive understanding of both affective and cognitive components therefore is the optimal tool for examining empathy in adults.

Empathy's Relationship to Other Constructs

Given empathy's multifaceted nature, its relation to other constructs is also of interest in the current study. In terms of empathy's relationship to dispositional constructs such as temperament and personality, theories have varied as to their conceptualization of this relationship. For example, studies of young children have found connections between positive affect and empathy-related responding in young children (Volbrecht, Lemery-Chalfant, Aksan, Zahn-Waxler, & Goldsmith, 2007), and others have found that inhibition is related to empathetic behaviors in toddlers (Young, Fox, & Zahn-Waxler, 1999); these two aspects of temperament are also examined in the current study in an adult sample. Given the complex development of empathy throughout childhood, previous literature indicates that temperament's relationship to empathy is important to empathy's conceptualization. Despite previous studies examining temperament and empathy in childhood, the current study seeks to understand whether the conceptualization of these two constructs in an adult sample mirrors the developmental literature.

In the previous literature, effortful control (Rothbart, 2007) has been found to be related to empathy (Eisenberg & Okun, 1996; Eisenberg, Smith, Sadovsky, & Spinrad, 2004; Rothbart, Ahadi, & Evans, 2000; Rothbart, Ahadi, & Hershey, 1994; Valiente et al., 2004), which is the ability of an individual to inhibit attention and behavior when needed or appropriate (Evans & Rothbart, 2007; Rothbart, 2007; Rothbart, Ahadi, & Evans, 2000). Some theories even include aspects of effortful control in theories of empathy (i.e., emotion regulation, Decety & Jackson, 2006; Eisenberg et al., 1998; Preston & de Waal, 2002). Negative affectivity (a factor of temperament), which is the tendency of an individual to experience negative emotions such as fear and frustration, has been shown to be positively correlated with personal distress (Eisenberg et al., 1994); this may indicate an important relation to dispositional empathy (i.e., self-reported empathy) when separated from personal distress as a psychological construct. The relationship between empathy and other factors of temperament (i.e., extraversion/surgency and orienting sensitivity) are also of interest.

Extraversion/surgency is the dispositional tendency to be highly sociable and experience positive emotions and pleasure, and orienting sensitivity is composed of scales assessing an individual's tendency to notice environmental and emotional stimuli (Evans & Rothbart, 2007). The research in the area of temperament as related to empathy has been predominantly with children. Therefore, empathy's relation to temperamental factors in adults is an important avenue of research, which will be addressed in the current study, especially given the limited research on the relationship between empathy and extraversion/surgency and orienting sensitivity in an adult sample.

Empathy (or lack thereof) has been conceptualized as a symptom of more than one personality disorder (American Psychiatric Association, 2000), and some researchers have also included empathy as an additional facet of the conceptualization of personality (e.g., Mooradian, Davis, & Matzler, 2011). Thus, empathy's relationship to personality is an important avenue of research, given that empathy's conceptualization may also impact future conceptualizations of personality and personality psychopathology. In addition, previous studies of adults have also shown dispositional empathy to have a positive relationship to Agreeableness and Extraversion and a non-significant relationship to with the Emotional Stability subscale (Claxton-Oldfield & Banzen, 2010; Graziano, Bruce, Sheese, & Tobin, 2007; Nettle, 2007). However, studies on the relationship between personality and empathy are limited, and the studies of personality and empathy have not created a clear picture of the relationship between the two (Nettle, 2006). Thus, the relationship between Big Five personality traits and empathy will also be examined.

CHAPTER III

METHOD

Participants

Participants were college undergraduate students who received research participant credit or extra credit in their psychology classes. There were 224 participants (65 males and 159 females) with an average age of 19.84 ($SD = 2.88$). Eighty-one percent were European American, 4% were African American, 4% were Native American, 3% were Hispanic, 4% answered “Other,” and 4% were multiracial. Participants were native speakers of American English in order to ensure better understanding of the vocabulary presented in the measures; fourteen individuals were excluded from analyses because they were not native speakers of English, and three were excluded because of failure to follow instructions.

Materials

Reading the Mind in the Eyes. The “Reading the Mind in the Eyes” test (or “Eyes test”) is a 36-item questionnaire with four choices per question (Baron-Cohen et al., 2001; see Appendix A for word definitions). It is designed to assess empathic accuracy by administering black-and-white pictures of different individuals’ eyes, and then allowing participants to select one of the four words to describe what the individual is

feeling in the picture (e.g., playful, comforting, irritated, or bored; see Figure 1 for example stimuli). The test shows good test-retest reliability ($r = .67$) and split-half reliability ($r = .55$; DeSoto, Bumgarner, Close, & Geary, 2007).

Interpersonal Reactivity Index. The Interpersonal Reactivity Index (IRI; Davis, 1980, 1983b) is a self-report measure designed to assess both cognitive and affective (emotional) constructs of empathy (Appendix B). The final version of the IRI consists of 28 questions answered on a 5-point Likert-type scale from 0 = *does not describe me well* to 4 = *describes me very well*. The four subscales are: Fantasy (7 items; $\alpha = .85$), Perspective-Taking (7 items; $\alpha = .80$), Empathic Concern (7 items; $\alpha = .84$), and Personal Distress (7 items; $\alpha = .77$). The scale shows strong psychometric properties, including strong convergent and discriminant validity (Davis, 1983b), and the subscales show acceptable to high internal consistency ($\alpha = .69$ to $.80$; Laurent & Hodges, 2008). Cronbach's alpha for the total scale in the current study was high ($\alpha = .86$), and subscale alphas from the current study are listed above.

Empathy Quotient. The Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004) is a self-report measure of empathy (see Appendix C). It is a 60-item, 4-point Likert-type scale (*Strongly agree*, *Slightly agree*, *Slightly disagree*, and *Strongly disagree*) questionnaire with 20 filler questions and 40 questions (20 agree statements and 20 disagree statements contribute to a higher empathy score), with scores ranging from 0 to 80. The test-retest reliability of the scale was high in both the original scale development ($r = .97$), and other studies ($r = .84$; Lawrence et al., 2004). In studies utilizing English-speaking samples, internal consistency was high ($\alpha = .83$ to $.92$; Baron-Cohen & Wheelwright, 2004; Besel & Yuille, 2010; Kempe, 2009; Muncer & Ling,

2006; Nettle, 2006), and was high in the current study ($\alpha = .88$).

Adult Temperament Questionnaire. The Adult Temperament Questionnaire Short Form (ATQ; Derryberry & Rothbart, 1988; Evans & Rothbart, 2007; Rothbart, Ahadi, & Evans, 2000) is a 77-item questionnaire designed to assess four factors of temperament (alpha coefficients are from the current study): Negative Affect ($\alpha = .80$), Extraversion/Surgency ($\alpha = .78$), Effortful Control ($\alpha = .79$), and Orienting Sensitivity ($\alpha = .76$) on a 7-point Likert-type scale (1 = *extremely untrue of you* and 7 = *extremely true of you*). Each factor has three or four subscales associated within it. Negative Affect involves subscales assessing fear (7 items; $\alpha = .62$), sadness (7 items; $\alpha = .68$), discomfort (6 items; $\alpha = .70$), and frustration (6 items; $\alpha = .74$). The Extraversion/Surgency factor measures sociability (5 items; $\alpha = .77$), positive affect (5 items; $\alpha = .73$), and high intensity pleasure (7 items; $\alpha = .66$), and the Orienting Sensitivity factor assesses neutral perceptual sensitivity (5 items; $\alpha = .48$), affective perceptual sensitivity (5 items; $\alpha = .61$), and associative sensitivity (5 items; $\alpha = .65$). The Effortful Control factor assesses attentional (5 items; $\alpha = .76$), inhibitory (7 items; $\alpha = .51$), and activation control (7 items; $\alpha = .73$). Subscales of the ATQ show overall good internal consistency in previous studies of undergraduate students ($\alpha = .66$ to $.90$; Evans & Rothbart, 2007). See Appendix D for questions.

Mini-Marker Big Five. The Mini-Marker Big Five is a brief, 40-item inventory designed to assess five major personality factors: Intellect/Openness (8 items; $\alpha = .77$), Emotional Stability (8 items; $\alpha = .77$), Agreeableness (8 items; $\alpha = .83$), Conscientiousness (8 items; $\alpha = .84$), and Extraversion (8 items; $\alpha = .86$) on a 9-point (1 = *Extremely Inaccurate* to 9 = *Extremely Accurate*) Likert-type scale (Saucier, 1994;

Appendix E). Cronbach's alphas for the subscales of the Mini-Marker Big Five are high ($\alpha = .82$ to $.90$).

Bem Sex Role Inventory. The Bem Sex Role Inventory (Bem, 1974) is a 60-item questionnaire designed to assess the individual's tendency to endorse traditional male or female sex roles on a 7-point Likert-type scale (1 = *Never or almost never true* to 7 = *Always or almost always true*). Each item is a word or phrase (e.g., self-reliant, sensitive to the needs of others); twenty of the items assess male gender role characteristics (e.g., independent, willing to take a stand, dominant) and 20 items are designed to assess female characteristics (e.g., loves children, soft-spoken, tender; see Appendix F). High scores (i.e., above an average score of on either scale) indicate an endorsement of those characteristics in the individual. Cronbach's alphas for the current study were .85 for the masculinity scale and .83 for the femininity scale.

Procedure

Participants were seated at a computer and instructed to start the questionnaire via a research design program. Informed consent was given via a waiver of written consent at the beginning of the computer program. Demographics questions asked the gender, age, race/ethnicity, native language, and country of origin first. The questionnaires were then administered in one of two ways, where the Eyes test was either first or last, and the self-report measures in a random order. A paper giving definitions of emotional words was provided for the Eyes test (from the authors; Baron-Cohen & Wheelwright, 2004) in the case that individuals are unsure of the definition(s) of specific emotional terms, and the participants were briefed about its function and possible use in the task. The session lasted approximately an hour. After finishing, participants were thanked for their time

and given credit for their participation.

CHAPTER IV

RESULTS

Participants' responses were initially screened for missing data. No participants were excluded for missing data; however, three participants were excluded by the data analysis because of failure to follow instructions.

Eyes Test and Self-Reported Empathy

Correlational analyses were conducted to determine the relationship between participants' self-reported empathy, temperament, and personality and performance on the Eyes test (Baron-Cohen et al., 2001). Correlations with performance on the Eyes test showed that only one of the self-report scales of empathy (EQ total scale and four subscales of the IRI) – the Fantasy subscale – significantly correlated with the Eyes test. Table 1 (Appendix G) shows descriptive statistics for scales and subscales of empathy. Contrary to hypotheses, with two exceptions, only two of the subscales of the temperament questionnaire (Sadness and Attentional Control) were significantly correlated with the Eyes test, $r_s = .13$ to $.15$, $p < .05$. None of the five subscales of the Mini-Marker Big Five or the two subscales of the Bem Sex Role Inventory significantly correlated with Eyes test accuracy scores.

Consistent with hypotheses, the EQ, the IRI PT subscale, and the IRI EC subscale were significantly positively intercorrelated, $r_s = .42$ to $.63$, $p < .001$. The IRI EC was

also significantly correlated with the other two subscales of the IRI (PD and FS) and the IRI PT subscale was significantly correlated with the IRI FS subscale. See Table 2 for correlations among measures of empathy for the overall sample.

Self-Reported Empathy in Relation to Temperament

In order to investigate the relationships of the measures of self-reported empathy to measures of temperament, personality, and gender roles, additional correlational analyses were conducted. Aspects of temperament significantly correlated with measures of empathy (see Table 3). Effortful control was significantly positively correlated with EQ and the IRI Perspective Taking subscale, and significantly negatively correlated with the IRI PD subscale. The Inhibitory Control subscale and the IRI PT subscale were significantly positively correlated, $r(224) = .32, p = .001$, and the Attentional Control subscale of the Effortful Control factor scale was significantly correlated with the Eyes test, $r = .13, p < .05$. Effortful Control and its subscales were significantly negatively correlated with IRI PD, $r_s = -.26$ to $-.41, p < .001$.

The Negative Affect scale of the ATQ was significantly positively correlated with the IRI EC subscale, the IRI Fantasy subscale, and consistent with previous research (i.e., Eisenberg et al., 1994), the IRI PD subscale. Interestingly, the Sadness subscale of the ATQ was significantly positively correlated with all self-report measures of empathy, $r_s = .15$ to $.55, p < .05$. With the exception of the IRI PD subscale, in most cases, both the Frustration and Discomfort subscales were negatively correlated with the self-report measures of empathy. The Fear subscale was positively correlated with all measures of empathy, with the exception of the IRI PT subscale.

The Orienting Sensitivity factor scale of the ATQ was also significantly positively correlated with four of the five self-report scales of empathy (excluding IRI PD; $r_s = .18$ to $.43, p < .05$). With one exception, all three subscales of the Orienting Sensitivity factor scale (i.e., Neutral Perceptual, Affective Perceptual, and Associative Sensitivity) were significantly positively correlated with self-report empathy measures. The Extraversion/Surgency factor scale of the ATQ was significantly positively correlated with the EQ total score, the IRI EC subscale, and the IRI FS subscale, $r_s = .15$ to $.35, p < .05$. The Sociability and Positive Affect subscales were significantly positively correlated with the other four dispositional empathy scales/subscales (with one exception).

Self-Reported Empathy in Relation to Personality

Agreeableness was significantly positively correlated with four of the five self-report scales of empathy (excluding Personal Distress; $r_s = .28$ to $.66, p < .001$). Other personality factors were inconsistently correlated with the self-report scales of empathy. An interesting pattern emerged, however, with the Emotional Stability subscale, such that it was significantly positively correlated with the EQ total, $r = .26, p = .001$ and the IRI PT subscale, $r = .35, p = .001$ and significantly negatively correlated with the IRI PD subscale, $r = -.38, p = .001$ (see Table 4).

Sex Differences and Self-Reported Empathy

In order to further investigate some of the apparent inconsistencies in correlations that were expected, additional correlation analyses were also conducted for males and females separately, which indicated a different relationship between self-reported empathy and the Eyes test in males and females (see Table 5). Independent samples t-tests were also conducted to examine differences in males and female responses to

measures of empathy; Table 6 displays these results. Further, correlational analyses of the Bem Sex Role Inventory masculinity and femininity subscales indicated a relationship between self-reported empathy and the femininity subscale, $r_s = .29$ to $.69$, $p < .001$; however, as mentioned above, the subscales were not significantly correlated with the Eyes test (see Table 7).

In order to further examine the differences between behavioral and self-report measures of empathy based on biological sex, moderation analyses were conducted. Table 8 displays the initial results. In the first moderation analysis, total EQ scores, sex, and their interaction predicted Eyes test scores. The interaction was significant, $\beta = .26$, $t(220) = 2.00$, $p = .05$, and the overall model accounted for a significant proportion of the variance in Eyes test accuracy scores, $R^2 = .04$, $F(3, 220) = 2.88$, $p = .04$.

By further analyzing the interaction of gender and the EQ total self-report scale, the simple slopes of the regression were analyzed using methods recommended by Aiken and West (1991), namely analyzing the simple slopes at the mean, two standard deviations above the mean, and two standard deviations below the mean of the EQ total scores. Scores were analyzed at two standard deviations above and below the mean rather than one standard deviation due to the nature of the interaction, such that the effects were more pronounced at two standard deviations from the mean, although analyses at one standard deviation above/below show similar trends. At two standard deviations above the mean, the relationship between the EQ scores and Eyes test scores was stronger for females, $\beta = .44$, $t(220) = 2.46$, $p = .02$. However, below the mean, there was not a significant relationship between EQ scores and Eyes test scores, $\beta = -.14$, $t(220) = -0.97$, $p = .33$ (Table 9; see also Figure 2).

In the second moderation analysis (see Table 8), a total score for the four subscales of the IRI was computed, and then was entered to predict Eyes test scores along with sex and an interaction term between sex and the centered IRI total scores. In the final step, the interaction was significant, $\beta = .31$, $t(220) = 2.40$, $p = .02$, and the overall model accounted for a significant proportion of the variance in Eyes test accuracy scores, $R^2 = .05$, $F(3, 220) = 3.67$, $p = .01$.

Simple slopes analyses revealed a significant difference between IRI total scores and Eyes test scores when moderated by sex at two standard deviations above the mean. Table 10 displays these results (see also Figure 3). As indicated in the table, at two standard deviations above the mean, the relationship between IRI scores and Eyes test scores was stronger for females, $\beta = .47$, $t(220) = 2.86$, $p = .005$. However, at two standard deviations below the mean, there was not a significant relationship between the two, $\beta = -.19$, $t(220) = -1.33$, $p = .19$. In both regression analyses, sex was a significant predictor of Eyes test scores at the mean and two standard deviations above the mean; however, it was not a significant predictor at two standard deviations below the mean. The two moderation analyses indicate a significant difference between overall self-reported empathy and accuracy scores of a behavioral measure of empathy.

Given the complex nature of empathy's conceptualization, additional moderation analyses were conducted to examine the subscales of the IRI. Four moderation analyses were conducted to examine each of the four subscales. The interaction term was a marginally significant predictor of Eyes test scores for the Perspective Taking moderation analysis, $\beta = .23$, $t(220) = 1.78$, $p = .08$. The interaction was not significant between sex and the Empathic Concern subscale, $\beta = .17$, $t(220) = 1.52$, $p = .13$, Personal Distress

subscale, $\beta = .19$, $t(220) = 1.55$, $p = .12$, and Fantasy subscale, $\beta = .16$, $t(220) = 1.25$, $p = .21$.

CHAPTER V

DISCUSSION

Relationship between Eyes Test and Self-Report Measures

The current study sought to assess the relationship between self-report measures of empathy and accuracy in performance on the Eyes test, a behavioral measure of empathy. Consistent with some previous research (e.g., Ali & Chamorro-Premuzic, 2010; Declerck & Bogaert, 2008), the Eyes test did not significantly correlate with the self-report measures of empathy (except for the significant correlation between the Eyes test and the Fantasy subscale). The Eyes test was also found to be significantly correlated with the Attentional Control and Sadness subscales of the Adult Temperament Questionnaire; however, no other scales of temperament or personality were found to be related to the Eyes test, whereas results showed significant relationships between self-reported measures of empathy, temperament, and personality. These results indicate that self-report measures may not be used interchangeably with the Eyes test as an indicator of empathy.

One explanation for these findings is that as a test of cognitive empathy, the Eyes test is an incomplete measure of empathy and thus cannot give a completely accurate assessment of empathy as a construct. However, an additional issue is that, had the self-report measures of empathy been consistent with the Eyes test, in addition to being highly

positively correlated (which was not the case), it was expected that the moderation analyses would not have shown a significant interaction (which was the case). Given the inconsistent findings in both the correlations and moderation analyses, further research is needed to understand the relationship between different types of measures of empathy, especially if measures of empathy are used interchangeably.

Empathy researchers frequently cite the inherent vulnerability of self-report measures to social desirability and also refer to the adherence to gender norms that influence responses to self-report empathy scales (Eisenberg & Lennon, 1983), which may account for the findings in the current study. For example, Eisenberg and Lennon argue that self-report data is vulnerable to over-reporting in females and under-reporting in males, thus advocating for the use of alternative methods for assessing empathy rather than self-report measures. Further support for this assertion in the current study is self-reported empathy measures' significant correlations with the Bem Sex Role Inventory femininity subscale (Bem, 1974), whereas the Eyes test did not correlate. In addition, the lack of a significant (albeit marginally significant) difference between males and females on Eyes test accuracy scores indicate that there is a likely alternative that explains the differences in self-reported empathy and accuracy rates on the Eyes test that were not accounted for in the current study.

Sex differences in self-reported empathy cannot be completely ignored as a by-product of gender norms. Developmental literature suggests that sex differences exist for empathy-related behaviors very early, such as responding to another's distress (Zahn-Waxler, Radkey-Yarrow, Wagner, & Chapman, 1992), and attention to faces (Connellan, Baron-Cohen, Wheelwright, Btaki, & Ahluwalia, 2001; Lutchmaya & Baron-Cohen,

2002). In addition, males are more likely to be diagnosed with an Autism Spectrum Disorder, of which one of the major features is an inability to empathize with others (Fombonne, 2005), and biological differences in individuals with these disorders are being examined as evidence for overall sex differences in empathy (Baron-Cohen, Lombardo, Auyeung, Ashwin, Chakrabarti, & Knickmeyer, 2011).

A more likely explanation for the differences in self-reported empathy is that females have an innate biological advantage over males in terms of empathy-related behaviors, and although developmental literature has shown that socialization plays a key role in the development of empathy (e.g., Miklikowska, Duriez, & Soenens, 2011), the argument for the adherence to gender norms creates a simplistic explanation for the sex differences found in multiple aspects of empathy in the developmental literature. Rather, early sex differences may predispose females to social interactions more so than males, which facilitate the development of empathy in ways that females are more likely to engage in other-oriented behaviors.

Empathy in Relation to Other Constructs

In the current study, empathy was considered in the context of temperament and personality. The findings indicated a strong relationship between temperament and empathy. The current study examined the relationship between the factor scales of the Adult Temperament Questionnaire and measures of empathy, with several patterns of note. For example, Effortful Control, as a measure of executive cognitive functioning directed toward a specific goal (e.g., “I can easily resist talking out of turn, even when I’m excited and want to express an idea.”). All subscales of the Effortful Control factor scale were negatively correlated with the IRI Personal Distress subscale; this supports the

theoretical assertion that some regulatory abilities may be related to and/or one aspect of empathy, such that individuals who are highly empathetic are able to suppress emotional states in order to understand others' emotional states (Decety & Jackson, 2006; Preston & de Waal, 2002). The IRI Perspective Taking subscale was also significantly positively correlated with Effortful Control and two of its three subscales; this further supports the theoretical assertion that some type of control is related to the ability of the individual to take the perspectives of others. These findings are consistent with previous literature showing a positive relation between effortful control and empathy and a negative relationship with personal distress (e.g., Eisenberg et al., 2004; Valiente et al., 2004).

The Negative Affect factor scale was consistent with hypotheses in that it significantly positively correlated with the Personal Distress subscale of the IRI; however, its subscales' mixed relationships with the measures of empathy should be further examined in future studies. While in general the Frustration and Discomfort subscales were negatively correlated with self-reported measures of empathy, the Fear and Sadness subscales were (for the most part) significantly positively correlated with dispositional empathy measures, and only the Sadness subscale was significantly positively correlated with the Eyes test.

In more exploratory analyses, the Orienting Sensitivity and Extraversion/Surgency factor scales of the ATQ were examined in relation to measures of empathy. Orienting Sensitivity and its subscales were significantly positively correlated with the self-reported measures of empathy (except for Personal Distress), but was not significantly correlated with the Eyes test. Orienting Sensitivity and its subscales may be related to measures of empathy because its purpose is to measure the individual's

tendency to notice barely noticeable perceptual differences (e.g., “When I am listening to music, I am usually aware of subtle emotional tones.”); however, given that this measure is not significantly correlated with the Eyes test, the relationship between a questionnaire designed to measure sensitivity to stimuli (such as the Eyes test) should be further explored in the context of the dispositional construct of Orienting Sensitivity and its subscales.

Extraversion/Surgency was significantly related to three of the five measures of dispositional empathy, but this factor scale and its subscales were consistently not significantly correlated with the Eyes test and the Personal Distress subscale. The Sociability and Positive Affect subscales were positively correlated with the other measures of empathy. High Intensity Pleasure was, however, not consistently significantly correlated with the remaining measures of empathy. These characteristics may point to a relationship between empathy and the tendency to enjoy being around others (sociability), but not necessarily the tendency to seek out instances of intense experiences (High Intensity Pleasure). The tendency to experience positive emotions (positive affect) should be further examined in future studies given that the Negative Affect factor scale subscales were inconsistently correlated with measures of empathy. Overall, the assessment of temperament revealed interesting patterns of correlations, and future research should further parse out the relationship between empathy and temperament, especially given that (with two exceptions) the behavioral measure of empathy (the Eyes test) was not significantly correlated with measures of self-reported temperament.

Along with the assessment of temperament, in the assessment of empathy's relationship to personality, Agreeableness was significantly positively correlated with four of the six measures of empathy. Agreeableness, an inherently other-oriented personality construct, may be theoretically related to empathy such that the two constructs affect one another (Claxton-Oldfield & Banzen, 2010; Graziano et al., 2007; Nettle, 2007). Emotional stability was also significantly correlated with the EQ, the IRI Perspective Taking subscale, and the IRI Personal Distress subscale. Its positive relationship to the first two scales and the negative correlation to the latter scale may support the theoretical assertion that the individual's emotional tendencies may be related to and/or affect the individual's ability to empathize with others. The Extraversion scale was inconsistently correlated with measures of empathy. The findings from the current study regarding emotional stability and extraversion were inconsistent with the limited literature examining these personality factors in relation to empathy (e.g., Nettle, 2006).

Limitations

The current sample was composed of undergraduate students who were predominantly younger adults, and thus may not generalize to other populations. Although research has primarily focused on children or adults in special populations, future research is needed to determine changes in both emotional and cognitive empathy throughout adult development because thus far, the research in this area is unclear (Gruhn, Rebucal, Diehl, & Luney, 2008). An additional limitation was the uneven numbers of males and females in the current study. Future analyses should utilize samples with males and females equally represented.

Future Directions

Given the discordant findings in the research, it is recommended in future research that alternative measures of empathy be used to demonstrate a relationship between performance-based cognitive measures of empathy (such as the Eyes test) and other alternative methods of empathy rather than self-report. The current study addresses a gap in the literature as to how different indices of empathy are showing inconsistencies in the relationships; thus, the sex differences in self-reporting may be accounted for by factors other than gender stereotypes. Future research should address this question by comparing males and females on tasks involved in the empathy process, thus reducing the likelihood of socially desirable responding cited by previous researchers (e.g., Eisenberg & Lennon, 1983).

The “Reading the Mind in the Eyes” test, which has the inherent disadvantage that (by its authors’ own admission) it was created from photographs of actors expressing specific emotions, but it is unknown whether the expressions were spontaneous or posed (Baron-Cohen et al., 2001). As Frank, Ekman, and Friesen (1993) and other authors (e.g., Krumhuber & Manstead, 2009) have noted, there are differences in the spontaneous expression of emotions and forced emotions such as happiness. This may hinder empathic accuracy in individuals identifying emotions in the use of this test (Johnston, Miles, & McKinlay, 2008).

Future studies may create and/or utilize photographs of subjects whose facial expressions are spontaneous, identifying emotional states is not a forced choice, and/or the emotions expressed are determined via a rigorous coding system based on previous research rather than the Eyes test. Additional studies utilizing multiple empathy-related

tasks can then better address the sex differences observed in the self-reports utilized in the current study. By utilizing alternative methods of examining empathy, the nuances of this psychological phenomenon may be better understood.

Given the overall inconsistent findings with empathy measures in relation to personality, future research may use a different personality measure when examining the relationship between personality and empathy to further explore these relationships. Future research should also further examine the relationships between theoretical aspects of temperament and empathy, and examine the possibility that temperament and empathy have a reciprocal relationship in affecting each other. Based on the current research, temperament seems to be consistently theoretically related construct to empathy, and thus may be a possible candidate as a predictor of empathetic behaviors. Examining empathy in the context of other psychological constructs may better inform the understanding and underlying mechanisms of empathy in its conceptualization.

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APPENDICES

APPENDIX A

“READING THE MIND IN THE EYES” TEST-REVISED WORD DEFINITIONS

WORD DEFINITIONS

| | |
|--------------|---|
| ACCUSING | blaming The policeman was accusing the man of stealing a wallet. |
| AFFECTIONATE | showing fondness towards someone Most mothers are affectionate to their babies by giving them lots of kisses and cuddles. |
| AGHAST | horrified, astonished, alarmed Jane was aghast when she discovered her house had been burgled. |
| ALARMED | fearful, worried, filled with anxiety Claire was alarmed when she thought she was being followed home. |
| AMUSED | finding something funny I was amused by a funny joke someone told me. |
| ANNOYED | irritated, displeased Jack was annoyed when he found out he had missed the last bus home. |
| ANTICIPATING | expecting At the start of the football match, the fans were anticipating a quick goal. |
| ANXIOUS | worried, tense, uneasy The student was feeling anxious before taking her final exams. |
| APOLOGETIC | feeling sorry The waiter was very apologetic when he spilt soup all over the customer. |
| ARROGANT | conceited, self-important, having a big opinion of oneself The arrogant man thought he knew more about politics than everyone else in the room. |

| | |
|---------------|---|
| ASHAMED | overcome with shame or guilt The boy felt ashamed when his mother discovered him stealing money from her purse. |
| ASSERTIVE | confident, dominant, sure of oneself The assertive woman demanded that the shop give her a refund. |
| BAFFLED | confused, puzzled, dumbfounded The detectives were completely baffled by the murder case. |
| BEWILDERED | utterly confused, puzzled, dazed The child was bewildered when visiting the big city for the first time. |
| CAUTIOUS | careful, wary Sarah was always a bit cautious when talking to someone she did not know. |
| COMFORTING | consoling, compassionate The nurse was comforting the wounded soldier. |
| CONCERNED | worried, troubled The doctor was concerned when his patient took a turn for the worse. |
| CONFIDENT | self-assured, believing in oneself The tennis player was feeling very confident about winning his match. |
| CONFUSED | puzzled, perplexed Lizzie was so confused by the directions given to her, she got lost. |
| CONTEMPLATIVE | reflective, thoughtful, considering John was in a contemplative mood on the eve of his 60 th birthday. |

| | |
|--------------|---|
| CONTENTED | satisfied After a nice walk and a good meal, David felt very contented . |
| CONVINCED | certain, absolutely positive Richard was convinced he had come to the right decision. |
| CURIOUS | inquisitive, inquiring, prying Louise was curious about the strange shaped parcel. |
| DECIDING | making your mind up The man was deciding whom to vote for in the election. |
| DECISIVE | already made your mind up Jane looked very decisive as she walked into the polling station. |
| DEFIANT | insolent, bold, don't care what anyone else thinks The animal protester remained defiant even after being sent to prison. |
| DEPRESSED | miserable George was depressed when he didn't receive any birthday cards. |
| DESIRE | passion, lust, longing for Kate had a strong desire for chocolate. |
| DESPONDENT | gloomy, despairing, without hope Gary was despondent when he did not get the job he wanted. |
| DISAPPOINTED | displeased, disgruntled Manchester United fans were disappointed not to win the Championship. |
| DISPIRITED | glum, miserable, low Adam was dispirited when he failed his exams. |

| | |
|--------------|---|
| DISTRUSTFUL | suspicious, doubtful, wary The old woman was distrustful of the stranger at her door. |
| DOMINANT | commanding, bossy The sergeant major looked dominant as he inspected the new recruits. |
| DOUBTFUL | dubious, suspicious, not really believing Mary was doubtful that her son was telling the truth. |
| DUBIOUS | doubtful, suspicious Peter was dubious when offered a surprisingly cheap television in a pub. |
| EAGER | keen On Christmas morning, the children were eager to open their presents. |
| EARNEST | having a serious intention Harry was very earnest about his religious beliefs. |
| EMBARRASSED | ashamed After forgetting a colleague's name, Jenny felt very embarrassed . |
| ENCOURAGING | hopeful, heartening, supporting All the parents were encouraging their children in the school sports day. |
| ENTERTAINED | absorbed and amused or pleased by something I was very entertained by the magician. |
| ENTHUSIASTIC | very eager, keen Susan felt very enthusiastic about her new fitness plan. |
| FANTASIZING | daydreaming Emma was fantasizing about being a film star. |

| | |
|-------------|--|
| FASCINATED | <p>captivated, really interested</p> <p>At the seaside, the children were fascinated by the creatures in the rock pools.</p> |
| FEARFUL | <p>terrified, worried</p> <p>In the dark streets, the women felt fearful.</p> |
| FLIRTATIOUS | <p>brazen, saucy, teasing, playful</p> <p>Connie was accused of being flirtatious when she winked at a stranger at a party.</p> |
| FLUSTERED | <p>confused, nervous and upset</p> <p>Sarah felt a bit flustered when she realized how late she was for the meeting and that she had forgotten an important document.</p> |
| FRIENDLY | <p>sociable, amiable</p> <p>The friendly girl showed the tourists the way to the town center.</p> |
| GRATEFUL | <p>thankful</p> <p>Kelly was very grateful for the kindness shown by the stranger.</p> |
| GUILTY | <p>feeling sorry for doing something wrong</p> <p>Charlie felt guilty about having an affair.</p> |
| HATEFUL | <p>showing intense dislike</p> <p>The two sisters were hateful to each other and always fighting.</p> |
| HOPEFUL | <p>optimistic</p> <p>Larry was hopeful that the post would bring good news.</p> |
| HORRIFIED | <p>terrified, appalled</p> <p>The man was horrified to discover that his new wife was already married.</p> |

| | |
|-------------|---|
| HOSTILE | unfriendly The two neighbors were hostile towards each other because of an argument about loud music. |
| IMPATIENT | restless, wanting something to happen soon Jane grew increasingly impatient as she waited for her friend who was already 20 minutes late. |
| IMPLORING | begging, pleading Nicola looked imploring as she tried to persuade her dad to lend her the car. |
| INCREDULOUS | not believing Simon was incredulous when he heard that he had won the lottery. |
| INDECISIVE | unsure, hesitant, unable to make your mind up Tammy was so indecisive that she couldn't even decide what to have for lunch. |
| INDIFFERENT | disinterested, unresponsive, don't care Terry was completely indifferent as to whether they went to the cinema or the pub. |
| INSISTING | demanding, persisting, maintaining After a work outing, Frank was insisting he paid the bill for everyone. |
| INSULTING | rude, offensive The football crowd was insulting the referee after he gave a penalty. |
| INTERESTED | inquiring, curious After seeing Jurassic Park, Hugh grew very interested in dinosaurs. |
| INTRIGUED | very curious, very interested A mystery phone call intrigued Zoe. |

| | |
|-------------|---|
| IRRITATED | exasperated, annoyed Frances was irritated by all the junk mail she received. |
| JEALOUS | envious Tony was jealous of all the taller, better-looking boys in his class. |
| JOKING | being funny, playful Gary was always joking with his friends. |
| NERVOUS | apprehensive, tense, worried Just before her job interview, Alice felt very nervous . |
| OFFENDED | insulted, wounded, having hurt feelings When someone made a joke about her weight, Martha felt very offended . |
| PANICKED | distraught, feeling of terror or anxiety On waking to find the house on fire, the whole family was panicked . |
| PENSIVE | thinking about something slightly worrying Susie looked pensive on the way to meeting her boyfriend's parents for the first time. |
| PERPLEXED | bewildered, puzzled, confused Frank was perplexed by the disappearance of his garden gnomes. |
| PLAYFUL | full of high spirits and fun Neil was feeling playful at his birthday party. |
| PREOCCUPIED | absorbed, engrossed in one's own thoughts Worrying about her mother's illness made Debbie preoccupied at work. |
| PUZZLED | perplexed, bewildered, confused After doing the crossword for an hour, June was still puzzled by one clue. |

| | |
|------------|---|
| REASSURING | supporting, encouraging, giving someone confidence Andy tried to look reassuring as he told his wife that her new dress did suit her. |
| REFLECTIVE | contemplative, thoughtful George was in a reflective mood as he thought about what he'd done with his life. |
| REGRETFUL | sorry Lee was always regretful that he had never travelled when he was younger. |
| RELAXED | taking it easy, calm, carefree On holiday, Pam felt happy and relaxed . |
| RELIEVED | freed from worry or anxiety At the restaurant, Ray was relieved to find that he had not forgotten his wallet. |
| RESENTFUL | bitter, hostile The businessman felt very resentful towards his younger colleague who had been promoted above him. |
| SARCASTIC | cynical, mocking, scornful The comedian made a sarcastic comment when someone came into the theatre late. |
| SATISFIED | content, fulfilled Steve felt very satisfied after he had got his new flat just how he wanted it. |
| SKEPTICAL | doubtful, suspicious, mistrusting Patrick looked skeptical as someone read out his horoscope to him. |
| SERIOUS | solemn, grave The bank manager looked serious as he refused Nigel an overdraft. |

| | |
|-------------|--|
| STERN | severe, strict, firm The teacher looked very stern as he told the class off. |
| SUSPICIOUS | disbelieving, suspecting, doubting After Sam had lost his wallet for the second time at work, he grew suspicious of one of his colleagues. |
| SYMPATHETIC | kind, compassionate The nurse looked sympathetic as she told the patient the bad news. |
| TENTATIVE | hesitant, uncertain, cautious Andrew felt a bit tentative as he went into the room full of strangers. |
| TERRIFIED | alarmed, fearful The boy was terrified when he thought he saw a ghost. |
| THOUGHTFUL | thinking about something Phil looked thoughtful as he sat waiting for the girlfriend he was about to finish with. |
| THREATENING | menacing, intimidating The large, drunken man was acting in a very threatening way. |
| UNEASY | unsettled, apprehensive, troubled Karen felt slightly uneasy about accepting a lift from the man she had only met that day. |
| UPSET | agitated, worried, uneasy The man was very upset when his mother died. |
| WORRIED | anxious, fretful, troubled When her cat went missing, the girl was very worried . |

APPENDIX B

INTERPERSONAL REACTIVITY INDEX

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate number on the scale. When you have decided on your answer, select the number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

- 0 Does not describe me well
1
2
3
4 Describes me very well

1. I daydream and fantasize, with some regularity, about things that might happen to me.
2. I often have tender, concerned feelings for people less fortunate than me.
3. I sometimes find it difficult to see things from the "other guy's" point of view.
4. Sometimes I don't feel very sorry for other people when they are having problems.
5. I really get involved with the feelings of the characters in a novel.
6. In emergency situations, I feel apprehensive and ill-at-ease.
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.
8. I try to look at everybody's side of a disagreement before I make a decision.
9. When I see someone being taken advantage of, I feel kind of protective towards them.
10. I sometimes feel helpless when I am in the middle of a very emotional situation.
11. I sometimes try to understand my friends better by imagining how things look from their perspective.
12. Becoming extremely involved in a good book or movie is somewhat rare for me.
13. When I see someone get hurt, I tend to remain calm.
14. Other people's misfortunes do not usually disturb me a great deal.
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.
16. After seeing a play or movie, I have felt as though I were one of the characters.
17. Being in a tense emotional situation scares me.
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
19. I am usually pretty effective in dealing with emergencies.
20. I am often quite touched by things that I see happen.
21. I believe that there are two sides to every question and try to look at them both.
22. I would describe myself as a pretty soft-hearted person.
23. When I watch a good movie, I can very easily put myself in the place of a leading character.
24. I tend to lose control during emergencies.
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.

26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.
27. When I see someone who badly needs help in an emergency, I go to pieces.
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

APPENDIX C
EMPATHY QUOTIENT

Following is a list of statements. Please read each statement carefully and rate how strongly you agree or disagree with it by selecting your answer. There are no right or wrong answers, or trick questions.

- 1 Strongly agree
- 2 Slightly agree
- 3 Slightly disagree
- 4 Strongly disagree

- E1. I would be very upset if I couldn't listen to music every day.
- E2. I prefer to speak to my friends on the phone rather than write letters to them.
- E3. I have no desire to travel to different parts of the world.
- E4. I prefer to read than to dance.
- 1. I can easily tell if someone else wants to enter a conversation.
- 2. I prefer animals to humans.
- 3. I try to keep up with the current trends and fashions.
- 4. I find it difficult to explain to others things that I understand easily, when they don't understand it the first time.
- 5. I dream most nights.
- 6. I really enjoy caring for other people.
- 7. I try to solve my own problems rather than discussing them with others.
- 8. I find it hard to know what to do in a social situation.
- 9. I am at my best first thing in the morning.
- 10. People often tell me that I went too far in driving my point home in a discussion.
- 11. It doesn't bother me too much if I am late meeting a friend.
- 12. Friendships and relationships are just too difficult, so I tend not to bother with them.
- 13. I would never break a law, no matter how minor.
- 14. I often find it difficult to judge if something is rude or polite.
- 15. In a conversation, I tend to focus on my own thoughts rather than on what my listener might be thinking.
- 16. I prefer practical jokes to verbal humor.
- 17. I live life for today rather than the future.
- 18. When I was a child, I enjoyed cutting up worms to see what would happen.
- 19. I can pick up quickly if someone says one thing but means another.
- 20. I tend to have very strong opinions about morality.
- 21. It is hard for me to see why some things upset people so much.
- 22. I find it easy to put myself in somebody else's shoes.
- 23. I think that good manners are the most important thing a parent can teach their child.
- 24. I like to do things on the spur of the moment.
- 25. I am good at predicting how someone will feel.
- 26. I am quick to spot when someone in a group is feeling awkward or uncomfortable.
- 27. If I say something that someone else is offended by, I think that that's their problem, not mine.
- 28. If anyone asked me if I liked their haircut, I would reply truthfully, even if I didn't like it.

29. I can't always see why someone should have felt offended by a remark
30. People often tell me that I am very unpredictable.
31. I enjoy being the center of attention at any social gathering.
32. Seeing people cry doesn't really upset me.
33. I enjoy having discussions about politics.
34. I am very blunt, which some people take to be rudeness, even though this is unintentional.
35. I don't tend to find social situations confusing.
36. Other people tell me I am good at understanding how they are feeling and what they are thinking.
37. When I talk to people, I tend to talk about their experiences rather than my own.
38. It upsets me to see an animal in pain.
39. I am able to make decisions without being influenced by people's feelings.
40. I can't relax until I have done everything I had planned to do that day.
41. I can easily tell if someone else is interested or bored with what I am saying.
42. I get upset if I see people suffering on news programs.
43. Friends usually talk to me about their problems as they say that I am very understanding.
44. I can sense if I am intruding, even if the other person doesn't tell me.
45. I often start new hobbies but quickly become bored with them and move on to something else.
46. People sometimes tell me that I have gone too far with teasing.
47. I would be too nervous to go on a big rollercoaster.
48. Other people often say that I am insensitive, though I don't always see why.
49. If I see a stranger in a group, I think that it is up to them to make an effort to join in.
50. I usually stay emotionally detached when watching a film.
51. I like to be very organized in day-to-day life and often make lists of the chores I have to do.
52. I can tune into how someone feels rapidly and intuitively.
53. I don't like to take risks.
54. I can easily work out what another person might want to talk about.
55. I can tell if someone is masking their true emotion.
56. Before making a decision I always weigh up the pros and cons.
57. I don't consciously work out the rules of social situations.
58. I am good at predicting what someone will do.
59. I tend to get emotionally involved with a friend's problems.
60. I can usually appreciate the other person's viewpoint, even if I don't agree with it.

APPENDIX D
ADULT TEMPERAMENT QUESTIONNAIRE

On the following screens you will find a series of statements that individuals can use to describe themselves. There are no correct or incorrect responses. All people are unique and different, and it is these differences which we are trying to learn about. Please read each statement carefully and give your best estimate of how well it describes you. Select the appropriate number to indicate how well a given statement describes you. If one of the statements does not apply to you (for example, if it involves driving a car and you don't drive), then choose "X" (not applicable).

- 1 Extremely untrue of you
- 2 Quite untrue of you
- 3 Slightly untrue of you
- 4 Neither true nor false of you
- 5 Slightly true of you
- 6 Quite true of you
- 7 Extremely true of you
- X Not applicable

1. I become easily frightened.
2. I am often late for appointments.
3. Sometimes minor events cause me to feel intense happiness.
4. I find loud noises to be very irritating.
5. It's often hard for me to alternate between two different tasks.
6. I rarely become annoyed when I have to wait in a slow moving line.
7. I would not enjoy the sensation of listening to loud music with a laser light show.
8. I often make plans that I do not follow through with.
9. I rarely feel sad after saying goodbye to friends or relatives.
10. Barely noticeable visual details rarely catch my attention.
11. Even when I feel energized, I can usually sit still without much trouble if it's necessary.
12. Looking down at the ground from an extremely high place would make me feel uneasy.
13. When I am listening to music, I am usually aware of subtle emotional tones.
14. I would not enjoy a job that involves socializing with the public.
15. I can keep performing a task even when I would rather not do it.
16. I sometimes seem to be unable to feel pleasure from events and activities that I should enjoy.
17. I find it very annoying when a store does not stock an item that I wish to buy.
18. I tend to notice emotional aspects of paintings and pictures.
19. I usually like to talk a lot.
20. I seldom become sad when I watch a sad movie.
21. I'm often aware of the sounds of birds in my vicinity.
22. When I am enclosed in small places such as an elevator, I feel uneasy.
23. When listening to music, I usually like turn up the volume more than other people.
24. I sometimes seem to understand things intuitively.
25. Sometimes minor events cause me to feel intense sadness.
26. It is easy for me to hold back my laughter in a situation when laughter wouldn't be appropriate.
27. I can make myself work on a difficult task even when I don't feel like trying.

28. I rarely ever have days where I don't at least experience brief moments of intense happiness.
29. When I am trying to focus my attention, I am easily distracted.
30. I would probably enjoy playing a challenging and fast paced video-game that makes lots of noise and has lots of flashing, bright lights.
31. Whenever I have to sit and wait for something (e.g., a waiting room), I become agitated.
32. I'm often bothered by light that is too bright.
33. I rarely notice the color of people's eyes.
34. I seldom become sad when I hear of an unhappy event.
35. When interrupted or distracted, I usually can easily shift my attention back to whatever I was doing before.
36. I find certain scratchy sounds very irritating.
37. I like conversations that include several people.
38. I am usually a patient person.
39. When I am resting with my eyes closed, I sometimes see visual images.
40. It is very hard for me to focus my attention when I am distressed.
41. Sometimes my mind is full of a diverse array of loosely connected thoughts and images.
42. Very bright colors sometimes bother me.
43. I can easily resist talking out of turn, even when I'm excited and want to express an idea.
44. I would probably not enjoy a fast, wild carnival ride.
45. I sometimes feel sad for longer than an hour.
46. I rarely enjoy socializing with large groups of people.
47. If I think of something that needs to be done, I usually get right to work on it.
48. It doesn't take very much to make feel frustrated or irritated.
49. It doesn't take much to evoke a happy response in me.
50. When I am happy and excited about an upcoming event, I have a hard time focusing my attention on tasks that require concentration.
51. Sometimes, I feel a sense of panic or terror for no apparent reason.
52. I often notice mild odors and fragrances.
53. I often have trouble resisting my cravings for food drink, etc.
54. Colorful flashing lights bother me.
55. I usually finish doing things before they are actually due (for example, paying bills, finishing homework, etc.).
56. I often feel sad.
57. I am often aware how the color and lighting of a room affects my mood.
58. I usually remain calm without getting frustrated when things are not going smoothly for me.
59. Loud music is unpleasant to me.
60. When I'm excited about something, it's usually hard for me to resist jumping right into it before I've considered the possible consequences.
61. Loud noises sometimes scare me.
62. I sometimes dream of vivid, detailed settings that are unlike anything that I have experienced when awake.
63. When I see an attractive item in a store, it's usually very hard for me to resist buying it.
64. I would enjoy watching a laser show with lots of bright, colorful flashing lights.
65. When I hear of an unhappy event, I immediately feel sad.

66. When I watch a movie, I usually don't notice how the setting is used to convey the mood of the characters.
67. I usually like to spend my free time with people.
68. It does not frighten me if I think that I am alone and suddenly discover someone close by.
69. I am often consciously aware of how the weather seems to affect my mood.
70. It takes a lot to make me feel truly happy.
71. I am rarely aware of the texture of things that I hold.
72. When I am afraid of how a situation might turn out, I usually avoid dealing with it.
73. I especially enjoy conversations where I am able to say things without thinking first.
74. Without applying effort, creative ideas sometimes present themselves to me.
75. When I try something new, I am rarely concerned about the possibility of failing.
76. It is easy for me to inhibit fun behavior that would be inappropriate.
77. I would not enjoy the feeling that comes from yelling as loud as I can.

APPENDIX E
MINI-MARKER BIG FIVE

Please use this list of common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you generally or typically are, as compared with other persons you know of the same sex and of roughly your same age. For each trait, please choose a number indicating how accurately that trait describes you, using the following rating scale:

- 1 Extremely Inaccurate
- 2 Very Inaccurate
- 3 Moderately Inaccurate
- 4 Slightly Inaccurate
- 5 Neither Inaccurate nor Accurate
- 6 Slightly Accurate
- 7 Moderately Accurate
- 8 Very Accurate
- 9 Extremely Accurate

1. Bashful
2. Bold
3. Careless
4. Cold
5. Complex
6. Cooperative
7. Creative
8. Deep
9. Disorganized
10. Efficient
11. Energetic
12. Envious
13. Extraverted
14. Fretful
15. Harsh
16. Imaginative
17. Inefficient
18. Intellectual
19. Jealous
20. Kind
21. Moody
22. Organized
23. Philosophical
24. Practical
25. Quiet
26. Relaxed
27. Rude

28. Shy
29. Sloppy
30. Sympathetic
31. Systematic
32. Talkative
33. Temperamental
34. Touchy
35. Uncreative
36. Unenvious
37. Unintellectual
38. Unsympathetic
39. Warm
40. Withdrawn

APPENDIX F
BEM SEX ROLE INVENTORY

Rate yourself on each item on a scale of 1 (never or almost never true) to 7 (always or almost always true).

- 1 Never or almost never true
- 2 Usually not true
- 3 Sometimes but infrequently true
- 4 Occasionally true
- 5 Often true
- 6 Usually true
- 7 Always or almost always true

- 1. Self-reliant
- 2. Yielding
- 3. Helpful
- 4. Defends own beliefs
- 5. Cheerful
- 6. Moody
- 7. Independent
- 8. Shy
- 9. Conscientious
- 10. Athletic
- 11. Affectionate
- 12. Theatrical
- 13. Assertive
- 14. Flatterable
- 15. Happy
- 16. Strong personality
- 17. Loyal
- 18. Unpredictable
- 19. Forceful
- 20. Feminine
- 21. Reliable
- 22. Analytical
- 23. Sympathetic
- 24. Jealous
- 25. Has leadership abilities
- 26. Sensitive to the needs of others
- 27. Truthful
- 28. Willing to take risks
- 29. Understanding
- 30. Secretive
- 31. Makes decisions easily
- 32. Compassionate
- 33. Sincere
- 34. Self-sufficient
- 35. Eager to soothe hurt feelings

36. Conceited
37. Dominant
38. Soft-spoken
39. Likable
40. Masculine
41. Warm
42. Solemn
43. Willing to take a stand
44. Tender
45. Friendly
46. Aggressive
47. Gullible
48. Inefficient
49. Acts as a leader
50. Childlike
51. Adaptable
52. Individualistic
53. Does not use harsh language
54. Unsystematic
55. Competitive
56. Loves children
57. Tactful
58. Ambitious
59. Gentle
60. Conventional

APPENDIX G

TABLES

Table 1

Descriptive Statistics for Measures of Empathy

| Measure | Total ($N = 224$) | | Males ($n = 65$) | | Females ($n = 159$) | |
|-----------|---------------------|-----------|--------------------|-----------|-----------------------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Eyes test | 27.13 | 3.55 | 26.42 | 3.73 | 27.42 | 3.44 |
| EQ Total | 46.63 | 11.99 | 41.28 | 10.84 | 48.91 | 11.76 |
| IRI Total | 67.93 | 14.61 | 62.83 | 13.80 | 70.01 | 14.46 |
| IRI EC | 20.51 | 5.37 | 18.51 | 5.65 | 21.33 | 5.05 |
| IRI PT | 18.05 | 5.17 | 18.25 | 5.04 | 17.97 | 5.23 |
| IRI PD | 11.55 | 5.25 | 9.80 | 5.11 | 12.27 | 5.15 |
| IRI FS | 17.81 | 6.53 | 16.28 | 6.11 | 18.43 | 6.61 |

Note. Eyes test = “Reading the Mind in the Eyes” Test; EQ = Empathy Quotient; IRI = Interpersonal Reactivity Index; EC = Empathic Concern; PT = Perspective Taking; PD = Personal Distress; FS = Fantasy

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 2

Correlations among Self-Reported and Behavioral Measures of Empathy

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|----|-----|--------|--------|--------|--------|--------|
| Eyes test | -- | .10 | .11 | .07 | -.03 | -.06 | .25*** |
| EQ Total | | -- | .59*** | .63*** | .49*** | .01 | .41*** |
| IRI Total | | | -- | .80*** | .57*** | .47*** | .74*** |
| IRI EC | | | | -- | .42*** | .22*** | .46*** |
| IRI PT | | | | | -- | -.08 | .22*** |
| IRI PD | | | | | | -- | .14* |
| IRI FS | | | | | | | -- |

Note. Eyes test = “Reading the Mind in the Eyes” Test; EQ = Empathy Quotient; IRI = Interpersonal Reactivity Index; PT = Perspective Taking; EC = Empathic Concern; PD = Personal Distress; FS = Fantasy

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3

Correlations between Measures of Empathy and Temperament

| Measure | Eyes test | EQ Total | IRI EC | IRI PT | IRI FS | IRI PD |
|-------------------------|-----------|-------------|--------|---------|--------|---------|
| Effortful Control | .01 | .21** | -.03 | .25*** | .01 | -.41*** |
| Inhibitory | .03 | .10 | -.01 | .32*** | -.05 | -.26*** |
| Activation | -.07 | .20** | .02 | .13 | .02 | -.31*** |
| Attentional | .13* | .18** | -.08 | .14* | .07 | -.39*** |
| Negative Affect | .12 | -.02 | .19** | -.06 | .21** | .51*** |
| Fear | .13 | .01 | .19** | -.01 | .21** | .47*** |
| Sadness | .15* | .33*** | .55*** | .15* | .38*** | .43*** |
| Discomfort | -.05 | -.19** | -.16* | .07 | -.03 | .13 |
| Frustration | .07 | -.25*** | -.10 | -.39*** | -.03 | .34*** |
| Extraversion/Surgency | -.02 | .35*** | .32*** | -.02 | .15* | .07 |
| Sociability | -.06 | .44*** | .35*** | .08 | .13* | .10 |
| High Intensity Pleasure | -.02 | -.05 | -.01 | -.23*** | .03 | .05 |
| Positive Affect | .04 | .43*** | .42*** | .18** | .18** | -.02 |
| Orienting Sensitivity | .06 | .28*** | .27*** | .32*** | .47*** | -.05 |
| Neutral Perceptual | .10 | .32*** | .29*** | .23*** | .24*** | -.13 |
| Affective Perceptual | .03 | .23*** | .20** | .32*** | .45*** | -.06 |
| Associative | .04 | .12 | .15** | .20** | .39*** | .08 |

Note. Eyes test = “Reading the Mind in the Eyes” Test; EQ = Empathy Quotient; IRI = Interpersonal Reactivity Index; EC = Empathic Concern; PT = Perspective Taking; FS = Fantasy; PD = Personal Distress; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4

Correlations between Measures of Empathy and Personality

| Measure | E | A | ES | O | C |
|-----------|--------|--------|---------|--------|--------|
| Eyes test | -.02 | .05 | .10 | .12 | -.01 |
| EQ Total | .23*** | .55*** | .26*** | .09 | .20** |
| IRI EC | .07 | .66*** | .08 | .13 | .10 |
| IRI PT | -.06 | .35*** | .35*** | .20** | .13 |
| IRI FS | .07 | .28*** | -.07 | .26*** | .03 |
| IRI PD | -.15* | .13 | -.38*** | -.19** | -.19** |

Note. Eyes test = “Reading the Mind in the Eyes” Test; EQ = Empathy Quotient; IRI = Interpersonal Reactivity Index; EC = Empathic Concern; PT = Perspective Taking; FS = Fantasy; PD = Personal Distress; E = Extraversion; A = Agreeableness; ES = Emotional Stability; O = Openness to Experience; C = Conscientiousness

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 5

Correlations among Self-Reported and Behavioral Measures of Empathy for Males and Females

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|------|--------|--------|--------|--------|--------|--------|
| Eyes test | -- | .15 | .18* | .11 | .04 | -.03 | .30*** |
| EQ Total | -.15 | -- | .61*** | .62*** | .53*** | .02 | .43*** |
| IRI Total | -.16 | .43*** | -- | .78*** | .56*** | .50*** | .76*** |
| IRI EC | -.10 | .58*** | .82*** | -- | .39*** | .21** | .48*** |
| IRI PT | -.21 | .48*** | .69*** | .55*** | -- | -.06 | .18* |
| IRI PD | -.24 | -.27* | .32** | .11 | -.12 | -- | .20* |
| IRI FS | .09 | .27* | .67*** | .38** | .33** | -.13 | -- |

Note. Intercorrelations for female participants ($n = 159$) are presented above the diagonal. Intercorrelations for male participants ($n = 65$) are presented below the diagonal. Means and standard deviations for females are presented in the vertical columns; means and standard deviations for males are presented in the horizontal rows. Eyes test = “Reading the Mind in the Eyes” Test; EQ = Empathy Quotient; IRI = Interpersonal Reactivity Index; PT = Perspective Taking; EC = Empathic Concern; PD = Personal Distress; FS = Fantasy
 * $p < .05$; ** $p < .01$; *** $p < .001$

Table 6

Independent Samples t-tests for Measures of Empathy

| Measure | Males (<i>SD</i>) | Females (<i>SD</i>) | <i>t</i> -value | <i>p</i> (two-tailed) |
|-----------|------------------------|--------------------------|-----------------|-----------------------|
| Eyes test | 26.42 (3.73) | 27.42 (3.44) | -1.93 | .06 |
| EQ Total | 41.28 (10.84) | 48.91 (11.76) | -4.51 | .001 |
| IRI EC | 18.51 (5.65) | 21.33 (5.05) | -3.67 | .001 |
| IRI PT | 18.25 (5.04) | 17.91 (5.23) | 0.36 | .72 |
| IRI FS | 16.28 (6.11) | 18.43 (6.61) | -2.26 | .03 |
| IRI PD | 9.80 (5.12) | 12.27 (5.15) | -3.27 | .001 |

Note. T-tests compare male participants ($n = 65$) to female participants ($n = 159$). Means for each measure are presented in their respective columns, and standard deviations are directly beneath means in parentheses. Eyes test = “Reading the Mind in the Eyes” Test-Revised; EQ = Empathy Quotient; IRI = Interpersonal Reactivity Index; EC = Empathic Concern; PT = Perspective Taking; FS = Fantasy; PD = Personal Distress
 $*p < .05$; $**p < .01$; $***p < .001$

Table 7

Correlations between Empathy and Sex Roles Scales

| Measure | BSRI-M | BSRI-F |
|-----------|---------|--------|
| Eyes test | -.09 | -.01 |
| EQ Total | .00 | .53*** |
| IRI EC | -.14* | .69*** |
| IRI PT | -.08 | .32*** |
| IRI FS | -.05 | .34*** |
| IRI PD | -.40*** | .29*** |

Note. Eyes test = “Reading the Mind in the Eyes” Test; EQ = Empathy Quotient; IRI = Interpersonal Reactivity Index; EC = Empathic Concern; PT = Perspective Taking; FS = Fantasy; PD = Personal Distress; BSRI-M = Bem Sex Role Inventory Masculinity subscale; BSRI-F = Femininity subscale

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 8

*Hierarchical Multiple Regression Analyses for Predicting Eyes Test from Self-Report**Measures of Empathy*

| Measure | IRI Total | | | | EQ Total | | | |
|-------------|--------------|------------|---------|------|--------------|------------|---------|------|
| | ΔR^2 | ΔF | β | p | ΔR^2 | ΔF | β | p |
| Step 1 | .011 | 2.50 | | | .009 | 2.06 | | |
| Self-Report | | | .11 | .11 | | | .10 | .15 |
| Step 2 | .012 | 2.61 | | | .011 | 2.48 | | |
| Self-Report | | | .08 | .24 | | | .06 | .36 |
| Gender | | | .11 | .11 | | | .11 | .11 |
| Step 3 | .025 | 5.78 | | .02* | .018 | 4.01 | | .05* |
| Self-Report | | | -.19 | .15 | | | -.17 | .21 |
| Gender | | | .15 | .04* | | | .15 | .04* |
| Self-Report | | | .31 | .02* | | | .26* | .05* |
| X Gender | | | | | | | | |
| Total R^2 | .048 | | | | .038 | | | |
| N | 224 | | | | 224 | | | |

Note. IRI = Interpersonal Reactivity Index; EQ = Empathy Quotient

* $p < .05$

Table 9

Simple Slopes Analyses for Predicting Eyes Test from Empathy Quotient

| Measure | 2 SDs Above | | | 2 SDs Below | | |
|----------------------|-------------|-------|------|-------------|-------|------|
| | β | t | p | B | t | p |
| Step 1 | | | | | | |
| EQ Total | .10 | 1.44 | .15 | .10 | 1.44 | .15 |
| Step 2 | | | | | | |
| EQ Total | .06 | 0.92 | .36 | .06 | 0.92 | .36 |
| Gender | .11 | 1.58 | .12 | .11 | 1.58 | .12 |
| Step 3 | | | | | | |
| EQ Total | -.17 | -1.26 | .21 | -.17 | -1.26 | .21 |
| Gender | .44 | 2.46 | .02* | -.14 | -0.97 | .33 |
| EQ Total X Gender | .37 | 2.00 | .05* | .41 | 2.00 | .05* |

Note. EQ = Empathy Quotient

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

Table 10

Simple Slopes Analyses for Predicting Eyes Test from Interpersonal Reactivity

| Measure | 2 SDs Above | | | 2 SDs Below | | |
|-----------------------|-------------|-------|--------|-------------|-------|------|
| | β | t | p | B | t | p |
| Step 1 | | | | | | |
| IRI Total | .11 | 1.58 | .12 | .11 | 1.58 | .12 |
| Step 2 | | | | | | |
| IRI Total | .08 | 1.19 | .24 | .08 | 1.19 | .24 |
| Gender | .11 | 1.61 | .11 | .11 | 1.61 | .11 |
| Step 3 | | | | | | |
| IRI Total | -.19 | -1.43 | .15 | -.19 | -1.43 | .15 |
| Gender | .47 | 2.86 | .005** | -.19 | -1.33 | .19 |
| IRI Total X Gender | .43 | 2.40 | .02* | .47 | 2.40 | .02* |

Note. IRI = Interpersonal Reactivity Index

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

APPENDIX H
FIGURES

Figure 1

Example Stimuli from the “Reading the Mind in the Eyes” Test-Revised



Which word best describes what the person in the picture is thinking or feeling?

1. Hateful
2. Jealous
3. Arrogant
4. *Panicked*



Which word best describes what the person in the picture is thinking or feeling

1. *Contemplative*
2. Flustered
3. Encouraging
4. Amused

Figure 2

Interaction between Empathy Quotient and Sex Predicting Eyes Test

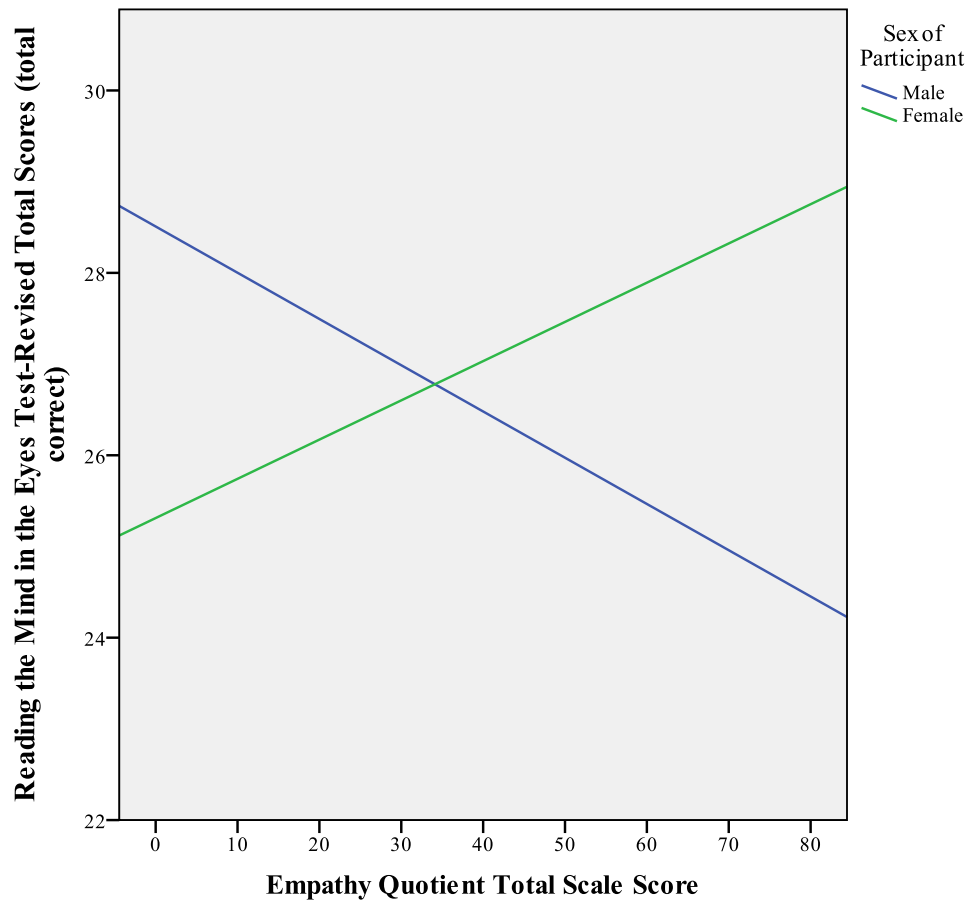
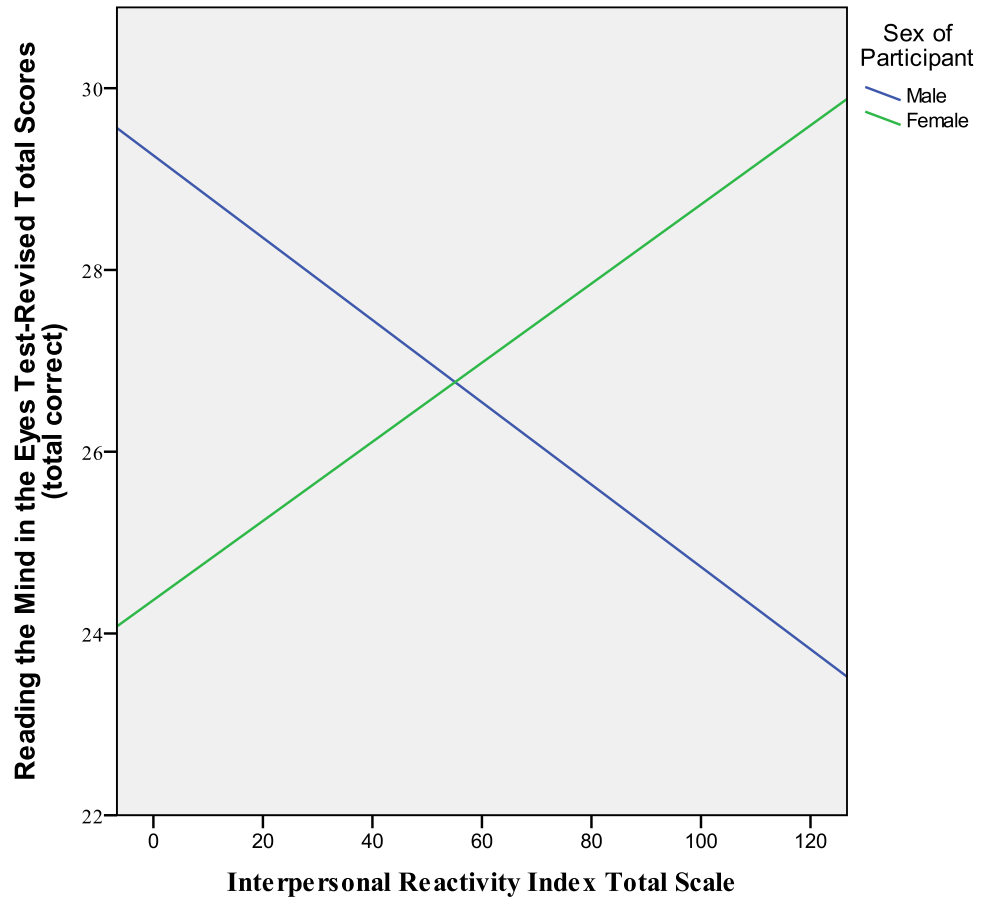


Figure 3

Interaction between Interpersonal Reactivity Index and Sex Predicting Eyes Test



APPENDIX I
IRB APPROVAL

Oklahoma State University Institutional Review Board

Date: Wednesday, May 18, 2011
IRB Application No AS1160
Proposal Title: Processing Social Information

Reviewed and Exempt
Processed as:

Status Recommended by Reviewer(s): Approved Protocol Expires: 5/17/2012

Principal Investigator(s):

| | |
|----------------------|----------------------|
| Jessica Calvi | Shelia M. Kennison |
| 116 North Murray | 116 N. Murray |
| Stillwater, OK 74078 | Stillwater, OK 74078 |

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

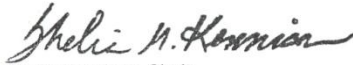
The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,



Shelia Kennison, Chair
Institutional Review Board

VITA

Jessica L. Calvi

Candidate for the Degree of

Master of Science/Arts

Thesis: THE RELATIONSHIP BETWEEN SELF-REPORT AND BEHAVIORAL MEASURES OF EMPATHY

Major Field: Psychology

Biographical:

Education: Completed the requirements for the Master of Science in Psychology at Oklahoma State University, Stillwater, Oklahoma in December, 2011. Completed the requirements for the Bachelor of Science in Development and Family Studies at the University of North Texas, Denton, Texas in May, 2009. Completed the requirements for Bachelor of Arts in Psychology at University of North Texas, Denton, Texas in May, 2009.

Experience: Graduate student teaching assistant at Oklahoma State University (2009-2010), Instructor for Introductory Psychology at Oklahoma State University (2010- 2011), Instructor for Quantitative Methods at Oklahoma State University (2011).

Professional Memberships: American Psychological Association student affiliate, Southwestern Psychological Association student affiliate

Name: Jessica L. Calvi

Date of Degree: December, 2011

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: THE RELATIONSHIP BETWEEN SELF-REPORT AND
BEHAVIORAL MEASURES OF EMPATHY

Pages in Study: 96

Candidate for the Degree of Master of Science

Major Field: Psychology

Scope and Method of Study:

Conceptualizations of the construct of empathy have varied with differing methods used to examine it. Based on discordant findings in previous research on self-reported empathy and behavioral measures of empathy, the current study tested the hypothesis that self-reported and behavioral measures are significantly positively correlated with one another. Neurotypical undergraduate students completed self-report measures of empathy (Interpersonal Reactivity Index; Davis, 1980 and Empathy Quotient; Baron-Cohen & Wheelwright, 2004), a behavioral measure of empathy ("Reading the Mind in the Eyes" test-Revised; Baron-Cohen et al., 2001), temperament (Adult Temperament Questionnaire; Rothbart et al., 2000), personality (Mini-Marker Big Five; Saucier, 1994), and gender identification (Bem, 1974).

Findings and Conclusions:

Results showed that empathy self-report scales were not consistently correlated with the behavioral measure of empathy, and moderation analyses revealed significant differences between males and females on self-reported versus behavioral measures of empathy. Additional analyses indicated that empathy may also be understood in the context of other dispositional traits such as temperament. As a multidimensional construct, the study of empathy may be better understood with measures of empathy that are behaviorally based in order to correct for potential issues with self-report measures.

ADVISER'S APPROVAL: Dr. Shelia Kennison
