

## **Imagery, Empathy and Traumatic Stress**

(Welburn, K., Fraser, G. & Jordan, S. 2002)

### **Abstract**

The relationship between imagery, empathy and traumatic stress symptoms was explored in two studies. For this research, the Imagery Questionnaire (IQ) and the Empathic Concern Scale (ECS) were developed to measure imagery and empathy and results supported the reliability and validity of these instruments. It was hypothesized that higher levels of imagery and empathy would represent vulnerability factors for the development of Posttraumatic Stress Disorder (PTSD) symptoms. In the first study, a group with PTSD (N = 18) was compared with a group with other anxiety disorders (N = 10), and a group of community controls (N = 17), on measures of empathy and imagery abilities. The PTSD group manifested higher imagery scores than the community controls although there were no differences on empathy. The authors suggest that empathy may be especially relevant in witnessing other's experience trauma, rather than in the direct experience of traumatic events. In the second study, we prospectively examined traumatic stress responses to the events of September 11<sup>th</sup> at the time of the event (N = 533) and six months later (n = 231). Higher levels of imagery and empathy were associated with greater traumatic stress in the immediate aftermath and six months later. Multiple regression analyses indicated that empathy and imagery represent vulnerability factors comparable to the effects of other documented risk factors such as gender, trauma exposure, and prior diagnosis of PTSD.

### **STUDY 1**

Research has identified a number of vulnerability factors that are associated with an increased risk for developing PTSD subsequent to exposure to a traumatic event. These factors include gender (Fullerton et al., 2001), prior diagnosis of PTSD (Moyers, 1996) and higher levels of exposure to the traumatic event (Ehlers, Mayou, & Bryant, 1998; Green, Grace, Lindy, Gleser, & Leonard, 1990; Orcutt, Erickson, & Wolfe, 2002). In our clinical experience in working with trauma survivors, we noticed certain personality traits that often were co-existent with the diagnosis of PTSD. Specifically, imagery and empathy capabilities appeared to be highly prevalent in clients who developed PTSD after experiencing a traumatic event. We hypothesized that the trait ability to have vivid imagery, which is associated with greater hypnotizability, would predispose some individuals to a greater stress response in the face of traumatic events. Furthermore, another personality trait, empathy, also seemed to be implicated in the development of PTSD in that the empathic reaction to other's distress itself caused a great deal of distress.

There have been a number of views and definitions of empathy. Rogers (1957) described empathy as the ability to accurately understand and articulate the experience and feelings of others. Stotland and Smith (1993) defined empathy as the experience of emotions in an individual as a result of perceiving similar emotions in others. Others (Davis, 1983; Davis, Hull, Young & Warren, 1987) suggest that empathy is a multidimensional construct involving both cognitive and emotional aspects. Davis et al (1987) found that negative emotional reactions were most influenced by emotional empathy rather than cognitive empathy. Later researchers (BarOn, 1997; Mehriabian, 2000) viewed empathy as one aspect of emotional intelligence and

that this trait therefore represented a positive coping ability. However, empathy may also be a risk factor for stress and has been associated with more symptoms of burnout in helping professions (Williams, 1989). The relationship between empathy and stress in helping others who are suffering may be complex. Zonderman (1975) found that rape crisis counsellors had stress reactions that were comparable to the symptoms their clients experienced. Stotland, et al (1978) found that nursing students with higher empathy initially showed less patient contact than students with lower empathy, presumably because they were less able to tolerate their emotional reactions to the distress of the patients. However, these avoidance behaviors decreased over time as the students developed experience and confidence, apparently learning how to master the sensitivity that arises with the empathic response.

The nature of the empathic experience requires a loosening of barriers or boundaries between individuals as the experience of the other is felt more immediately and directly. The breadth and depth of this connection to others can therefore result in greater anguish or distress when others suffer. We are affected most deeply by the pain or loss of those we know and who are closest to us and least affected by the suffering of those we do not know and who are distant. However, for the highly empathic individual, there may be less of a distinction between the suffering of the closer individuals and the suffering of the more distant strangers.

What are the pathways by which empathy acts as a vulnerability factor? First, greater empathy may be related to higher levels of arousal (Mehrabian, Young & Sato, 1988). The enhanced arousal manifests in physiological activity such as increased heart rate and other sympathetic nervous system activity as well as increased affective tone. The intensity of these somatic and emotional reactions to the distressing experience of others thus may result in greater distress for the empathic individual. Secondly, empathy may lead to stress through the inherent sense of responsibility and concern for others. Empathy has been implicated in altruistic behaviour, indicating an enhanced need to help others and a feeling of responsibility towards others (Rushton, Chrisjohn & Fekken, 1981). This sense of responsibility and connection may lead to increased stress risk through greater exposure to conditions of human suffering, and also to greater feelings of helplessness, guilt and distress when one is not able to provide help. This sense of responsibility also implies a concern with justice and fairness and thus witnessing injustice in the world would elicit greater distress. Thirdly, empathy may increase one's stress response through a gating difficulty where highly empathic individuals are less able to screen out images of disturbing scenes. This would be salient for both imagery and empathic capabilities. Highly empathic individuals are more likely to resonate with the experience of others in not only an emotional way, but also in a sensory fashion as well. Empathy is enhanced through imagining what the other person is experiencing and so highly empathic individuals are more likely to have more vivid detailing of the experience. This would include such elements as physical pain, emotional distress and the sensory images of the experience of the distressed individual. These vivid images of distressing events may also be more persistent over time in highly empathic people. For example, highly empathic individuals may have traumatic images from television news coverage persist in their consciousness throughout the day. Less empathic individuals, even if initially distressed when viewing the events, may be more able to screen out those images as they focus their attention on other things.

Imagery has been defined as the collaboration of mental contents that possess sensory quality (Richardson, 1994). It has long been noted that individuals vary in their ability to generate vivid imagery and that this trait likely represents a continuum of skill variability (Betts, 1909). Some people are unable to generate imagery of any more than the vaguest notion of a representation of an external object. Others report being able to generate images that are so vivid that the image is practically indistinguishable from a perceived external object. Some students indicate that they experience eidetic memory where they can bring up an image of a textbook and simply read the page in their imagination to get the answer to an exam question. Lynn and Rhue (1988) have identified a sub-group of people that are extremely high in imagery capacity and have termed these “fantasy-prone”. It is thought that high imagery is related to creativity and artistic ability. For example, a composer may actually hear vivid music in imagination and simply write down what is heard to create the composition. Imagery capability can manifest in various sensory modalities including visual, auditory, olfactory, gustatory and tactile. The conceptual link between imagery capability and PTSD symptoms is most evident in the intrusive memories cluster of symptoms such as flashbacks. These intrusions are typically reported to be extremely vivid and take on a quality of re-experiencing the trauma rather than recalling a memory. In individuals with high imagery capacity, the normal (non-traumatic) memory may approximate a flashback experience in vividness and clarity. This high imagery capacity could therefore represent a predisposition to developing PTSD when exposed to a traumatic incident.

We felt there was a need to develop clinically useful instruments that would measure empathy and imagery traits. The empathy instrument ideally would assess the type of empathy most likely to be relevant to traumatic stress risk; emotional empathy and a concern for others. The imagery instrument ideally would assess vividness of imagery in a variety of sensory modalities. These instruments should demonstrate reliability and validity, as well as being clinically useful. One of our objectives was to develop measures of empathy and imagery that would be easy to administer and score and provide meaningful feedback to the respondent. A second objective was to examine the relationship between imagery, empathy and traumatic stress symptoms. We hypothesized that those with PTSD would manifest higher degrees of imagery and empathy, in contrast with other anxiety disorders and with a community sample.

## **Method**

### **Instruments**

The Empathic Concern Scale (ECS). An 18 item scale measuring empathy and concern for others was developed by one of the authors (KW). Items were created from a theoretical and conceptual understanding of empathy and concern for others. Examples of items are “I can often feel what other people feel” and “I care a great deal about what happens to people”. The ECS is made up of 18 items and respondents answer each item on a 5-point scale (1= not true of me, 2 = seldom true of me, 3 = sometimes true of me, 4 = often true of me, 5 = completely true of me). The ECS has a possible range of 18 to 90, with a higher score indicating a greater degree of empathic concern.

The Emotional Quotient Inventory (EQI). The EQI (BarOn, 1997) is a 133 item scale that measures emotional intelligence in adults and assesses five composite and factors and 15 subscales. For the purpose of this study, the 8-item Empathy (EM) subscale was used as a measure of empathy. BarOn (2000) defines empathy as an awareness, understanding and appreciation of the feelings of others. The EQI has good reliability and validity and the EM subscale positively correlates with other measures of empathy, sensitivity and warmth, and negatively correlates with antisocial features and aggression (BarOn, 1997).

The Balanced Emotional Empathy Scale (BEES). The BEES (Mehrabian, 2000; Mehrabian & Epstein, 1972) measures empathy, defined as the vicarious experience of other's feelings. Respondents are asked their degree of agreement or disagreement on a 9-point scale for 30 items. The BEES is positively correlated with pro-social skills, emotional success, relationship success, career and financial success, while being negatively correlated with interpersonal violence (Mehrabian, 1997).

The Imagery Questionnaire (IQ). A questionnaire was developed by one of the authors (GF) to measure imagery ability. The items were chosen to assess participant's ability to generate vivid imagery. Examples of items are "If I close my eyes and imagine seeing a tree of any kind, I can easily see that tree" and "If I think of a favorite piece of music, or a song, I can actually hear it in my head". The items assess visual, tactile, auditory, taste and olfactory imagery. Other items, phenomenologically derived from the reports of imagery experiences from PTSD clients, inquire about emotional vividness, seeing auras and possible experiences of derealization. The IQ is comprised of 10 items and respondents answer each item on a 4-point scale (0 = no, 1 = yes, but quite vaguely, 2 = yes, but only moderately, 3 = yes, quite vividly). The IQ has a possible range of 0 to 30 with a higher score indicating more vivid imagery.

The Questionnaire Upon Mental Imagery (QMI). The QMI was originally developed as a 150 item questionnaire to measure imagery vividness (Betts, 1909). Sheehan (1967) later developed a revised, shorter, 35-item version of the questionnaire. The questionnaire uses a 7-point scale to assess vividness of imagery. The QMI has good reliability and validity (Kihlstrom, Glisky, Peterson, Harvey & Rose, 1991; Richardson, 1994).

The Abbreviated Imagination Inventory (AII). The AII is comprised of 8 of the 15 items from the Barber and Wilson (1979) Imagination Inventory. The AII has good reliability and validity and correlates with other measures of imagery and hypnotic absorption (Richardson, 1994).

The Inventory of Childhood Memories and Imaginings. (ICMI). The ICMI (Wilson & Barber, 1983) is a 52-item, true-false questionnaire that assesses adult's memories of their childhood imaginative activities and fantasies (Lynn & Rhue, 1988; Rhue & Lynn, 1987). The ICMI has been shown to be correlated with other measures of imagery capacity and has demonstrated reliability in a number of samples (Myers & Austrin, 1985; Bryant, 1995; Rhue & Lynn, 1987). The ICMI is thought to measure fantasy proneness in respondents.

The Posttraumatic Stress Diagnostic Scale (PDS). The PDS (Foa, 1995) measures the full symptom criteria for PTSD as detailed in the DSM-IV (APA, 2000). The 49 item questionnaire is designed to assess the various criteria related to making a diagnosis of PTSD. The scale assesses trauma history as well as the three symptom clusters of PTSD: hyper-arousal, re-experiencing/intrusions and avoidance/numbing. The PDS exhibits good validity and reliability, correlates with other measures of symptoms severity and demonstrates adequate sensitivity and specificity in making a diagnosis of PTSD (Foa, 1995).

### **Procedure**

Participants completed a package of the questionnaires assessing imagery and empathy and one measure of PTSD. Demographic information was also obtained from all participants via a questionnaire. This information included gender, age, education, marital status, number of children, employment status, and questions regarding past and current psychiatric diagnoses. The entire package took between 30 and 60 minutes to complete.

For the clinical sample, clients in a community clinic who had been diagnosed with PTSD or another anxiety disorder were approached by their primary therapist. Clients who were interested in the study reviewed a consent form detailing the purpose of the research and their potential involvement. Each participant was informed that participation in the research project was completely voluntary, that the decision to participate or not in the study would in no way affect treatment at the clinic and that they could withdraw from the research project at any time. Participants were also informed that questionnaires would be kept confidential, used only for the purpose of this research project and that no identifying information would appear on the data. Each participant was given a copy of the consent form to keep.

For the community sample, researchers approached various sports and social clubs (i.e., volleyball club, choir club) to recruit participants. A recruitment script was read by the researcher to all club members and interested participants were provided with more detailed information about the research project and their potential expectations. Each participant was told their participation in the research project was completely voluntary and that they may withdraw from the study at any time. Participants were also informed that all questionnaire responses would be kept confidential and only used for the purpose of this research project and that no identifying information would appear on the data.

### **Participants**

The clinical sample consisted of 28 adults (7 male, 21 female) who were assessed by either a psychologist or a psychiatrist at a community clinic focusing on treatment of anxiety and trauma disorders. Of the 28 participants, 18 participants (4 male, 14 female) were diagnosed with PTSD. The remaining 10 participants (3 male, 7 female) were diagnosed with one of a number of anxiety disorders including Generalized Anxiety Disorder, Specific Phobia, Panic Disorder, or Social Anxiety Disorder.

Participants in the PTSD group, ranged in age from 22 to 57 years ( $M = 38.22$  years,  $SD = 8.03$ ). Three participants (17%) had an education level of grade 11 or less, five participants (28%) had a high school diploma, and eight participants (45%) had post secondary education. Two participants did not provide information regarding education level. Ten participants (56%) were currently married, three (17%) were single, one (6%) was divorced, and one (6%) was widowed. Three participants did not provide information regarding marital status.

Participants in the anxiety group, ranged in age from 24 to 62 years ( $M = 44.90$  years,  $SD = 13.11$ ). All participants had post-secondary education. Seven participants (70%) were currently married, one (10%) was single, and two (20%) were divorced. Three additional participants from the anxiety group were excluded from the study due to self-reported symptoms on the Posttraumatic Diagnostic Scale (PDS) that suggested a possible diagnosis of PTSD.

The community control sample consisted of 17 adults (3 male, 14 female) who were recruited from local sports and social clubs. Participants in the community control group, ranged in age from 18 to 70 years ( $M = 43.29$  years,  $SD = 14.46$ ). Four participants (24%) had a high school diploma and thirteen (76%) had post secondary education. Thirteen participants (76%) were currently married and four (24%) were single. Five additional volunteers were excluded from the study due to self-reported symptoms consistent with PTSD.

## Results

All statistical analyses were conducted using the SPSS package (SPSS Inc., 1995). Prior to data analyses, the data were examined for missing items. One participant was missing one item on the ICMI, one participant was missing four items on the QMI, and three participants were missing one item on the BEES. All missing data was recoded to the item mean for that participant. For the PTSD group, there were no items missing on the re-experiencing/intrusion, avoidance, or hyperarousal scales on the PDS.

Differences on age were examined using analysis of variance (ANOVA). The three groups did not differ significantly on age,  $F(2,42) = 1.27, p = .29$ . Chi-square statistics ( $\chi^2$ ) were calculated for categorical demographic variables. No significant differences were found in educational level between the PTSD and anxiety groups ( $\chi^2(4, N = 26) = 8.16, p = .09$ ) or the PTSD and community control groups ( $\chi^2(4, N = 33) = 8.57, p = .07$ ). No significant differences were found on marital status between the PTSD and anxiety groups ( $\chi^2(3, N = 25) = 1.94, p = .58$ ) or the PTSD and community control groups ( $\chi^2(3, N = 32) = 2.42, p = .49$ ).

**Table 1:** *Pearson Correlations Amongst the Imagery and Empathy Measures, and Internal Reliability for the Imagery Questionnaire(IQ) and Empathic Concern Scale (ECS) (N = 45)*

	Correlation	Sig.
IQ and QMI	.32	$p. < .05$
IQ and AII	.66	$p. < .001$
IQ and ICMI	.51	$p. < .001$
ECS and BarOn EI	.86	$p. < .001$
ECS and BEES	.83	$p. < .001$
ECS and IQ	.61	$p. < .001$

**Table 1** details the psychometric properties of the IQ and ECS. The IQ was significantly correlated to other measures of imagery, and the ECS was significantly correlated with other empathy measures. Both the IQ and the ECS demonstrated good internal reliability as assessed by Cronbach's alpha measure of internal item consistency.

Differences between the PTSD and community control groups with respect to imagery (ICMI and QMI) and empathy (BEES) were tested using a multivariate analysis of variance (MANOVA). A one-way between-subjects MANOVA was performed on the two imagery measures and the empathy measure. The PTSD and community control groups differed on the combination of the three measures,  $F(3, 31) = 4.45, p = .01$ . Univariate  $F$  ratios were then examined to determine which of the measures contributed to the group differences. The two groups differed on the ICMI,  $F(1, 33) = 10.99, p = .002$  and on the QMI,  $F(1, 33) = 4.27, p = .047$ . Compared to the community control group, the PTSD group reported more childhood imagings (ICMI) and greater imagery ability (QMI). The two groups did not differ on the BEES,  $F(1, 33) = .48, p = .51$ . Group means and standard deviations for the three dependent measures are reported in **Table 2**.

**Table 2:** PTSD, Anxiety, and Community Control Groups Compared on Imagery (ICMI, QMI) and Empathy (BEES) Measures

Variable	PTSD (n=18)		Anxiety (n=10)		Community (n=17)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
ICMI	20.11 <i>a</i>	7.13	16.93	5.43	12.76 <i>a</i>	5.88
QMI	78.25 <i>b</i>	31.36	96.00	18.39	100.29 <i>b</i>	31.73
BEES	1.76	1.05	1.62	1.02	1.52	1.08

*a* ( $p < .01$ )

*b* ( $p < .05$ )

## Discussion

The IQ was significantly correlated with other measures of imagery capability that have demonstrated reliability and validity, providing evidence for the convergent validity of the IQ as a measure of imagery abilities. The individual items of the IQ demonstrated adequate internal consistency, indicating that the IQ has internal reliability.

The PTSD group exhibited higher imagery scores than the control group, consistent with the other research indicating that those with PTSD have more vivid imagery (Stutman & Bliss, 1985). In our study, the PTSD group was not different on imagery from the group with other anxiety disorders. It may be that vivid imagery plays a role not only in PTSD but in other anxiety disorders as well. This is consistent with the findings of Sacco and Ruggieri (1997) indicating that individuals with phobias manifested high vividness of imagery. There may be a connection between catastrophic thinking and catastrophic imagery that predisposes some individuals to the development of other anxiety disorders such as generalized anxiety, phobias, agoraphobia or panic disorder. A possible mechanism for this may be evident in the mental style of predicting catastrophic outcomes, which is the hallmark of many anxiety disorders. Perhaps those who are able to anticipate catastrophic outcomes with richer and more vivid imagery, are also more likely to elicit greater physiological responses of arousal and concomitant emotional tone and thus be more likely to develop an anxiety disorder. For those lower on their capability to imagine vivid catastrophic outcomes, there may be less physiological arousal and therefore less mental and emotional concern, even when anticipating negative outcomes.

One limitation of this study is that the retrospective nature of the methodology makes it

difficult to infer causality. We expect that imagery and empathy represent vulnerabilities for the development of PTSD, but it may also be the case that PTSD symptoms impact on imagery and empathy capabilities as well. For example, the intrusive symptoms of PTSD may cause an increase in the vividness of imagery. Furthermore, those with PTSD often become more aloof and withdrawn from others, perhaps representing a decrease in empathic concern due to feelings of being overwhelmed. A prospective study is needed to determine the nature of the relationship between these variables.

The results indicated that the ECS has very good validity and reliability coefficients. The ECS demonstrated convergent validity as it was highly correlated with other measures of empathy. The ECS also had excellent internal reliability. The empathy and imagery scales were also correlated, suggesting that there is a conceptual overlap between these constructs, as previously hypothesized. The results of this study indicate that these measures have sound psychometric properties, although, as with any new instruments, these findings need to be replicated with other, larger samples.

The PTSD group was not higher on the empathy scale, contrary to our hypothesis. However, when we examined the types of trauma that the PTSD group had experienced, most were direct experiences of trauma, rather than witnessing trauma. Empathy may be more likely to play a role in the development of PTSD when witnessing others experience trauma. The ability to feel what others are feeling and have compassion for others may play less of a role when directly experiencing trauma. A study examining empathy and witnessing trauma is needed to more fully explore these potentially complex relationships.

## STUDY 2

In our second study, we assessed imagery, empathy and traumatic stress symptoms in a prospective study immediately following the events of September 11<sup>th</sup> and six months later. We anticipated that witnessing the horrific events of the terrorist attacks on television would result in traumatic stress symptoms for many viewers of these events. A phone survey of New York City residents indicated that there was a substantial stress response in the population five to eight weeks later, with those living close to the attack sites having an estimated PTSD prevalence of 20% (Galea et al., 2002). Results from a U.S. national survey indicated that even those far from the geographic sites of the events experienced significant acute mental health distress in the week following the attacks (Schuster et al., 2001).

Originally it was thought that extreme traumatic events were unusual and outside the scope of most people's experience. However, a 1995 U.S. national survey on co-morbidity, found that exposure to trauma is not uncommon, with a life-time prevalence greater than 50%. Further, witnessing serious injury or death is also common, with a 36% lifetime prevalence and an associated 6% risk for PTSD (Kessler et al., 1995). Epidemiological studies have indicated that traumatic events are quite common, but that exposure to such events in itself does not lead to the development of PTSD in the majority of cases (Creamer, Burgess, & McFarlane, 2001;

Kessler et al., 1999; Kilpatrick, & Resnick, 1992; Norris, 1992). In fact, past research indicates that for most individuals, there is a significant decrease in posttraumatic symptomatology within a few months following exposure to the traumatic event (Kessler et al., 1995; Shalev et al., 1998).

Although most acute stress reactions dissipate over time, specific factors have been identified that may increase risk for developing PTSD. Females are more than twice as likely as males to develop PTSD (Fullerton et al., 2001), although this may in part be due to greater exposure to certain types of trauma such as sexual assault (Kessler et al., 1999). Past traumas and other pre-existent psychiatric disorders have also been demonstrated to be risk factors for PTSD (Halligan & Yehuda, 2001; Kessler et al., 1999). Furthermore, there may be an exacerbation of symptomatology in those with a prior diagnosis of PTSD when exposed to new traumas (Moyers, 1996). Higher levels of exposure have also been associated with an increased probability of developing PTSD (Ehlers, Mayou, & Bryant, 1998; Green, Grace, Lindy, Gleser, & Leonard, 1990; Orcutt, Erickson, & Wolfe, 2002). A review study indicates that greater exposure and peritraumatic dissociation have been associated with an increased probability for developing PTSD in response to terrorist attacks (Gidron, 2002). Even indirect exposure such as witnessing traumatic events in the individual's local community through media coverage has been found to increase severity of posttraumatic symptomatology (Pfefferbaum et al., 2000).

One instrument that has been widely used to assess trauma responses in community samples is the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979), later revised into the Impact of Event Scale-Revised (IES-R; Weiss, & Marmar, 1996). Several studies have employed the IES-R to assess responses to disasters and traumatic events, including responses to a freeway collapse after an earthquake (Marmar, Weiss, Metzler, Ronfeldt, & Foreman, 1996), intensive combat exposure by journalists, (Feinstein & Owen, 2002), and community responses to a severe ice storm (Fraser & Welburn, 1998).

The objective of this study was to explore the relationship between imagery, empathy and traumatic stress responses prospectively, with a large sample of those who had witnessed traumatic events. We expected that those with higher levels of imagery and empathy would have a greater traumatic stress response, similar to other known vulnerability factors such as gender, degree of exposure and prior diagnosis of PTSD. Further, we anticipated that witnessing the events live would represent a greater degree of exposure and thus may result in more distress. Lastly, we wanted to elaborate the psychometric properties of the imagery and empathy scales with a larger sample.

## **Method**

### **Instruments**

Impact of Event Scale-Revised (IES-R). The IES-R (Weiss & Marmar, 1996) is a 22-item questionnaire that measures avoidance/numbing, intrusive recollections, and hyperarousal symptoms of PTSD and is an expanded version of the Impact of Event Scale (IES) (Horowitz et

al., 1979). Respondents answer each item on a 0 to 4 point scale (0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, 4 = extremely). In the present study, participants were asked to respond to the IES-R “related to the September 11 terrorist attacks in the USA.”

Weiss and Marmar (1996) report adequate internal and test-retest reliability for the IES-R. In the present study the three subscales of the IES-R had very good internal reliability with Cronbach’s alphas (Time 1 and 2, respectively) of .79 and .85 for the avoidance subscale, .89 and .90 for the intrusions subscale, and .85 and .89 for the hyperarousal subscale. The IES-R subscales also had good test-retest reliability over 6 months for avoidance ( $r(216) = .47, p < .001$ ), intrusion ( $r(216) = .57, p < .001$ ) and hyperarousal ( $r(216) = .54, p < .001$ ). The IES-R overall score (sum of the 22 items) also had very good internal reliability (Cronbach’s alpha = .92 and .93 at Time 1 and 2, respectively) and good test-retest reliability ( $r(216) = .56, p < .001$ ). For the present study, the overall IES-R score was used as a measure of traumatic stress symptoms.

The Imagery Questionnaire (IQ). The IQ is described in the prior study.

The Empathic Concern Scale (ECS). The ECS is described in the prior study.

September 11<sup>th</sup> Survey. A survey was developed to inquire about demographics and variables potentially related to stress reactions. Some questions had a yes/no format such as “Have you ever been diagnosed with posttraumatic stress disorder (PTSD)?” “Did you watch the second airplane crash into the World Trade Tower as it was happening, live on TV?”

## **Procedure**

The survey, including the IES-R (with Dr. Weiss’s permission), was published in the Ottawa Citizen on September 26, 2001 (Cook, 2001) and was also made available for online response. The Ottawa Citizen has a weekly readership of approximately half a million readers within a region of approximately one million. Respondents were asked if they would be willing to be contacted for a second survey in six months. The second survey was identical to the first with a few additional questions. On March 25, 2002, the survey and IES-R were mailed or e-mailed directly to those respondents who had indicated a willingness to be contacted for follow-up. Participants were informed that for every returned follow-up questionnaire we received, \$2 would be donated to the Twin Towers fund. Informed consent was obtained from all research participants and confidentiality was ensured.

## **Participants**

In all, 531 people responded to the survey at Time 1 (two weeks after September 11<sup>th</sup>, 2001). Of this sample, 74% were female (mean age = 47.61 years,  $sd = 15.63$ ) and 26% were male (mean age = 49.16 years,  $sd = 17.72$ ). Thirty-three respondents (6%) self-reported having a prior diagnosis of PTSD. Three hundred and ten (59%) respondents reported watching the second plane crash live on TV. Of the 531 respondents, 357 (67%) agreed to be contacted in six

months for a follow-up survey and 231 (65% of the 357 and 44% of the original survey respondents) actually responded when requested to at Time 2 (six months later). As some participants were missing data on relevant variables and/or more than 10% of IES-R items (3 or more items), these participants were not included in the analyses ( $n = 15$ ). Those participants missing data on one or two items of the IES-R were included in the analyses, with these items recoded to the participant's item mean.

We compared the group who responded at Time 1 and Time 2 with those who responded only at Time 1. Follow-up responders were not different on gender (*Chi square*, (1,  $N = 216$ ) = 1.24,  $p > .05$ ), but were slightly older ( $t(521) = 4.21$ ,  $p < .001$ ). The mean age for the follow up group was 51.49 years ( $sd = 13.37$ ) vs. a mean age of 45.54 years for Time 1 only responders ( $sd = 17.51$ ). Furthermore, follow up responders were not significantly different from Time 1 only responders on distress level at Time 1, as measured by the IES-R total score ( $t(530) = 1.88$ ,  $p > .05$ ).

## Results

The overall mean ( $N = 533$ ) for the IQ was 17.6, ( $sd = 5.86$ ), with a mean of 15.6 ( $sd = 6.1$ ) for males ( $n = 139$ ) and a mean of 18.4 ( $sd = 5.6$ ) for females ( $n = 392$ ). Females scored significantly higher on the IQ than males ( $t(529) = 5.03$ ,  $p < .001$ ). Fifteen percent of the 533 participants scored above 23 on the IQ, representing one standard deviation above the mean. The internal consistency of the IQ items was assessed with Cronbach's Alpha = .78. Examining the group that also responded at the follow-up, the test-retest reliability ( $n = 231$ ) over a 6-month period, using a Pearson's Correlation, was .69, ( $p < .001$ ).

The overall mean for the ECS ( $n = 533$ ) was 71.2, ( $sd = 12.21$ ). Males ( $n = 138$ ), had a mean = 64.2, ( $sd = 13.0$ ), and females ( $n = 397$ ) had a mean = 74. ( $sd = 73.6$ ). Females scored significantly higher on the ECS ( $t(528) = 8.33$ ,  $p < .001$ ). Fifteen percent scored above 83, representing one standard deviation above the mean. Cronbach's Alpha for the ECS items was .93. Test-retest reliability ( $n = 231$ ) was .65 ( $p < .001$ ), employing a Pearson Correlation.

The IQ and the ECS were factor analysed using a principal components analysis and a varimax rotation for interpretability of results (Stevens, 1986). For the IQ, a three factor solution converged in five iterations, accounting for 59.4% of the variance. All three factors had an eigen value greater than one. Factor one consisted of IQ items 1 to 5, factor two consisted of items 6 and 7, and factor three consisted of items 8 through 10. All items had factor loadings over .5.

The factor analysis of the ECS converged in three iterations and resulted in two factors with eigen values greater than one, accounting for 56.6% of the variance. Factor one consisted of ECS 11 items: items 3, 4, 5, 9, 11, 12, 13, 15, 16, 17 and 18. Factor two consisted of the remaining items: 1, 2, 6, 7, 8, 10 and 14. All factor loadings were higher than .5 for the relevant factor except for item 5, which loaded at .47, and item 10, which loaded at .45.

Using a cut-off of one standard deviation above the mean, high empathy and high

imagery groups were determined. The high imagery group was significantly more symptomatic than the non-high imagery group at time 1 ( $t(530) = 3.31, p. < .001$ ), and at time 2 ( $t(214) = 2.01, p. < .05$ ) on the IES-R. The high empathy group was significantly more symptomatic than the non-high empathy group at time 1 ( $t(529) = 4.7, p. < .001$ ), and at time 2 ( $t(214) = 2.47, p. < .05$ ).

Multiple regression analyses using the enter method were used to determine the relationship between the five predictor variables (empathy, imagery, gender, exposure, prior PTSD) and the posttraumatic stress symptoms (IES-R scores) at Time 1 and at Time 2 (six month follow-up). Together, the five predictor variables accounted for a significant amount of variance in posttraumatic stress symptoms at both Time 1 and Time 2. All five predictor variables were significant individual contributors to the multiple regression at Time 1. Only prior diagnosis of PTSD and higher imagery scores remained as significant individual predictors of posttraumatic stress symptoms at the six month point. See **Tables 3 and 4** for a summary of the results.

**Table 3.** Summary of Multiple Regression of Factors Predicting Posttraumatic Symptoms at Time 1.  $R Squared = .19, F = 25.13, p = .0000$ .

	<i>Beta</i>	<i>SE</i>	<i>T</i>	<i>p</i>
Empathy	0.21	0.06	4.81	.0000
Gender	0.19	1.68	4.67	.0000
Imagery	0.11	0.13	2.72	.0067
Exposure	0.10	1.42	2.76	.0060
Prior PTSD	0.08	2.89	2.05	.0405

**Table 4.** Summary of Multiple Regression of Factors Predicting Posttraumatic Symptoms at Time 2 (6 month follow-up). *R Squared* = .10, *F* = 4.79, *p* = .0004.

	<i>Beta</i>	<i>SE</i>	<i>T</i>	<i>p</i>
Prior PTSD	0.22	3.50	3.46	.0006
Imagery	0.14	0.17	2.02	.0442
Empathy	0.09	0.08	1.38	.1824
Gender	0.06	2.23	1.01	.3121
Exposure	0.06	1.90	0.91	.3638

### Discussion

Factor analytic results revealed two factors for the ESC while three factors comprised the IQ. On the ECS, empathy and concern emerged as separate factors. Examples of empathy items are “I often put myself in the other person’s shoes” and “I can usually tell what my friends are feeling”. Examples of the concern factor are “I care about what happens to the people around me” and “I am a compassionate person”.

The three factors of the IQ can be described as sensory-imagery, emotional-imagery and extra-sensory imagery. The five items comprising sensory-imagery refer to visual, gustatory, tactile, olfactory and auditory sensations such as imagining seeing a tree, eating a peach, petting a cat, smelling a flower or hearing music. An example of a sensory item is “If I close my eyes and imagine seeing a tree of any kind, I can easily see that tree”. The two emotional-imagery items are “If I think of an emotional event from my past, I have much of the same feelings now as I had then” and “I can easily become aware of how others feel by just looking at them or being with them”. The concept of emotional-imagery extends the more traditional definition of imagery as being primarily sensory. This imagery factor is also likely most relevant to the conceptual overlap between imagery and empathic-concern. Those high on emotional-imagery can not only can vividly imagine the image of the suffering of others, but also feel the emotional pain of the other. The third factor is comprised of three items assessing the seeing of auras around people, feelings of being unreal in reaction to stress and the ability to intentionally create an external image such as seeing a cartoon on a wall. We termed this factor extra-sensory due to the alteration of images that are perceived external to the person.

The results from this prospective study provide support for the hypotheses that imagery and empathy represent risk factors for the development of traumatic stress symptoms after

exposure to a traumatic event. Imagery predicted traumatic stress response at the time of the event and six months later, providing strong prospective evidence for the role of imagery in the development of traumatic stress symptoms. Furthermore, imagery contributed unique variance above and beyond the relationship with empathy in predicting symptoms at the six month point. It appears that high imagery capacity represents a significant vulnerability factor for the subsequent development of traumatic stress symptoms when exposed to a traumatic event.

Higher empathy is also implicated as a vulnerability factor in manifesting traumatic stress symptoms when witnessing others experience traumatic events. In the present study empathy was the strongest predictor of traumatic stress at the time of the event, accounting for the most variance. However, the relationship between empathy and traumatic stress symptoms appears to be quite complex. Empathy likely represents both a vulnerability factor and a protective factor in regards to traumatic stress. Empathy is considered to be an important aspect of emotional intelligence (BarOn, 1997; Mehriabian, 2000) and therefore represents a positive strength and a coping ability. Furthermore, the ability to have empathy for others should enhance one's relationships and attachments to others and therefore ameliorate symptoms of distress over time. On the other hand, being strongly and emotionally connected to others is likely to manifest in more immediate distress when others are threatened.

One of the limitations of the study is that participants who had access to the major local newspaper self-selected to respond to the survey. It is possible that there is a bias in that the more distressed group may be more likely to respond as they see the survey as being more salient. However, in contrasting those who also responded at the six month time, that group was slightly older but not different in gender or level of immediate stress response in comparison to those who only responded at Time 1. The sampling bias of self-selection may have more to do with age, as an older sample is perhaps more likely to take an interest in reading newspaper articles and responding to surveys concerning world events. Therefore, potential sample bias may have more to do with maturity than distress level. A second limitation is that prior diagnosis of PTSD was based on self-report. However, the result that this variable prospectively predicted traumatic stress level six months later does suggest that self-reported prior diagnosis is an important variable. Furthermore, about 6% of participants in the present study reported receiving a prior PTSD diagnosis, consistent with the lifetime prevalence rates of 7.8% in Kessler et al.'s (1995) national survey.

#### Conclusion

Results of the present studies provide very good evidence for the psychometric properties of the IQ and the ECS. Both instruments correlate highly with other measures which have documented reliability and validity, indicating good convergent validity. The IQ and the ECS also have very good internal item reliability and test-retest reliability. Test-re-test correlations were .65 for the ECS and .69 for the IQ over a six-month period, indicating that the variables of empathy and imagery are quite stable over time and likely represent enduring personality traits, as hypothesized. These instruments are brief (5 to 10 minutes) to complete and the raw scores can be easily converted to gender-normed percentiles and categorized as high, average, or low to provide meaningful and useful feedback to the respondent.

In regards to treatment applications, it can be helpful for those with PTSD to become aware of tendencies to remember more vividly and more emotionally through the traits of imagery and empathy. There may also be preventative implications arising from the imagery and empathy model. We expect that it may be possible to “inoculate” those with high empathy or imagery so that they are less vulnerable to experiencing traumatic stress symptoms. For example, teaching those who are in high trauma exposure careers (i.e. military, police, paramedics) and who also have high imagery capacity, to use imagery to relax and to take control over traumatic imagery may result in increased resilience. This would be similar to teaching imagery and self hypnosis techniques to those about to undergo surgery or extensive dental procedures. Similarly, identifying those with high empathy capacity could serve to forewarn those individuals and allow for greater use of the empathy ability as a positive coping resource. Those who develop PTSD often become increasingly aloof and alienated from others as part of an avoidant coping style. However, if those individuals had a planned way of coping with traumatic stress that involved using social support, this may ameliorate some of the stress response.

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