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Chronic trauma effects on personality trait trajectory in police officers

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CHRONIC TRAUMA EFFECTS ON PERSONALITY TRAIT TRAJECTORY IN POLICE OFFICERS

By

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Chronic Trauma Exposure Effects on Personality Trait Trajectory in Police Officers

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The impact of chronic trauma exposure on personality trajectories over time was examined in a sample of urban police officers. Scores from a personality measure taken in pre-hire psychological evaluations were compared with follow up scores administered for this study five to ten years later. An urban police agency of approximately 1000 commissioned police officers agreed to allow its officers to be recruited as participants. The consulting psychologist who performed the agency's pre-hire psychological evaluations during the applicable period supplied historical data with participant consent and agency approval. Personality change between the two times was analyzed using hierarchical regression analysis, with the independent variables of interest including measures of exposure to potentially traumatic events (PTEs) and posttraumatic stress symptoms. The study tested the research hypothesis that cumulative exposure to PTEs measured by the Critical Incident History Questionnaire (CIHQ) and the Life Events Checklist (LEC) would explain a statistically significant portion of the variance in change over time between scores for the Wellbeing, Empathy, Independence, Good Impression, and Self-Control scales of the California Psychological Inventory (CPI) from baseline (pre-hire) and 5-10 years later. Higher PTE exposure scores were hypothesized to correlate with lower scores on all five measures of positive personality characteristics.

The results were significant for all of the traits except Empathy. However, the direction of the change in the remaining traits were counter to the hypothesis; higher CIHQ and LEC scores were correlated with a more *positive* trajectory in four of the scales when controlling for the effects of posttraumatic stress (PTS) symptoms as measured by the Posttraumatic Checklist (PCL). This apparently positive response to trauma exposure may be accounted for by selection and posttraumatic growth (PTG).

Acknowledgements

I would like to extend my since gratitude to the law enforcement community members that participated in this research. A heartfelt thank you goes to the police administrators and psychologists that supported the research, the staff that provided indispensable administrative support, the law enforcement mental health support staff that administered and facilitated gathering the data used in this research, and most importantly, a special thank you to the officers for their willingness to participate in the research and for the good work they do every day in their community.

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Introduction

The study of personality traits and how to determine levels of these traits in individuals has been an important focus of psychologists for at least 90 years (Allport, 1937; Allport & Allport 1921; Barenbaum & Winter, 2008). Understanding what makes individuals unique and using this knowledge to understand and predict behavior is an essential part of psychology. Researchers have also focused considerable effort to understand personality trait development, and the course of stability or change in personality over the life span (Costa, Herbst, McCrae, & Siegler, 2000; Duncan & Agronick; 1995, Helson, Kwan, John, & Jones, 2002; McCrae, Costa, Ostendor, Angleitner, Hřebíčková, Avia, & Smith, 2000). In particular, there is interest in how specific events and experiences might lead to changes in personality.

Trauma Exposure, Complex Trauma, and Police Officers

The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (*DSM-IV-TR*; American Psychiatric Association, 2000) defines trauma as: "…involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate (Criterion A1). The person's response to the event must involve intense fear, helplessness, or horror (or in children, the response must involve disorganized or agitated behavior) (Criterion A2, page 463)." Criterion A2 is being eliminated in the DSM-V (American Psychiatric Association, 2013), since evidence has shown that the subjective reaction to traumatic events is heterogeneous and the language in the DSM-IV-TR is overly restrictive in its emphasis on dissociative symptoms.

The DSM-IV-TR criterion A for PTSD, quoted above, assumes a discrete traumatic event associated with the onset of symptoms, with the content of re-experiencing the event, and as the focus of avoidance. However, mental health professionals increasingly recognize that multiple traumatic events and chronic dangerous and psychologically stressful environments, such as those encountered by law enforcement officers, are often associated with distinct clusters of traumatic stress symptoms. In addition, multiple incidences of trauma exposure, particularly physical and/or sexual abuse during childhood, can result in insecure or disorganized attachment styles leading to personality disorders (Courtois & Ford, 2009).

This distinction between PTSD symptoms as sequelae of multiple traumatic events or a chronically stressful environment, rather than of a discrete event, is a defining feature of complex Posttraumatic Stress Disorder (Ford & Courtois, 2009). Complex PTSD is not currently included as a classification in the DSM-IV-TR, but proposed revisions to the PTSD criteria to be included in the next DSM version (*Diagnostic and Statistical Manual of Mental Disorders,* 5th ed.; *DSM-5*) include expanding the language to allow for multiple events. C-PTSD is often associated with child abuse survivors, but it is also considered applicable to adults, such as police officers, subjected to chronically violent and traumatic environments (Rudofossi, 2011). The proposed DSM-5 includes criteria for chronic exposure and uses a specific example of first responders:

> "Experiencing repeated or extreme exposure to aversive details of the event(s) (e.g., first responders collecting body parts; police officers repeatedly exposed to details of child abuse); this does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related."

In addition to repeated direct exposure to adverse events, the new proposed DSM-5 PTSD criteria include indirect exposure, such as police officers investigating the details of child

abuse cases *(https://www.ptsdforum.org/c/gallery/-pdf/1-56.pdf)*. This repeated exposure to the minutiae of traumatic events through interaction with trauma survivors may result in what is termed *vicarious trauma* (VT) or *secondary traumatic stress* (STS) in individuals with the responsibility to help the survivors. Vicarious trauma is defined by Pearlman and Caringi (2009) as "the negative transformation in the helper that results from empathic engagement with trauma survivors and their trauma material, combined with a commitment or responsibility to help them." Mental health workers, medical personnel, social services providers, humanitarian assistance workers, and law enforcement officers are among those that have a primary responsibility to assist trauma survivors and who have a high potential to develop STS or VT (Caringi, 2007). Researchers have consistently found that these workers experiencing VT exhibit posttraumatic symptoms and show evidence of cognitive schemas that closely resemble those of complex trauma survivors (Bober, Regehr, & Zhou, 2006; Regehr, Goldberg & Hughes, 2002).

Police officers are among those whose occupation entails frequent exposure to violence, physical danger, severe injury and death of others, and engagement with traumatic incident victims and complex trauma survivors (Crank, 1998; Crank & Caldero, 1991; Territo & Vetter, 1981; Violanti & Aron, 1995), and they represent the population of interest in this study. They have been found to endorse higher rates of substance abuse, divorce, suicide, cynicism, burnout, job dissatisfaction, and low morale compared to members of other professions (Brown & Campbell, 1990; Gilmartin, 2002; Golemiewski & Kim, 1990; Niederhoffer, 1967; Violanti, 1996).

Posttraumatic Growth

In contrast to solely negative effects, there is a growing body of research showing that many trauma survivors perceive some good coming from the traumatic events they have

experienced (Calhoun, Cann, & Tedeschi et al., 2000; Laufer & Solomon, 2006; Tedeschi & Calhoun, 1996). Positive factors measured by the Posttraumatic Growth Inventory (PTGI: Tedeschi & Calhoun, 1996) include Relating to Others, New Possibilities, Personal Growth, Spiritual Change, and Appreciation of Life. These factors show some correlation with Big Five personality traits as measured by the NEO-PI-R (Costa & McCrae, 1992), and Tedeschi & Calhoun (1996) found that some NEO-PI-R facets were related to PTGI facets. For instance, the Extraversion facets of Activity and Positive emotions, and the Openness facet of Feelings were positively correlated with all PTGI scales.

Bayer-Topilsky, Itzhaky, Dekel, & Marmor (2013) posited that self-esteem, mastery, and social support may result in higher levels of posttraumatic growth (PTG). However, they found that the strongest predictors of PTG were the subjective experience of the event and initially higher levels of posttraumatic stress. The researchers speculated that this unexpected relationship may show that the level of PTG is in fact mediated by higher levels of distress immediately following the event. Ruminating about the event was also unexpectedly positively correlated with higher levels of PTG after some time had elapsed, a finding supported by Groleau, Calhoun, Cann, and Tedeschi (2012). (See also Pryzgoda & Schuldberg, 2004.) Groleau et al. (2012 also found that *centrality of event*, or the degree to which a person believes a negative event becomes a core part of their identity, contributes to both distress and PTG. People who were better able to find meaning in the event experienced greater PTG.

In a study of military medical personnel deployed in combat zones, McLean, Handa, Dickstein, Benson, Baker, Isler, and Litz. (2013) found a curvilinear relationship between healthcare stress exposure, PTSD, and PTG. Military medical personnel experienced the highest PTG when PTSD symptoms were mild to moderate. Unlike the linear relationship they found

between combat stress and PTSD, at higher levels of healthcare stress, PTSD increased curvilinearly, and PTG declined in an inverted-U. The researchers concluded that PTG is most likely to occur at moderate levels of PTS exposure and PTSD symptomatology, but the probability of growth appears to decrease at high levels of stress.

Biology of PTSD and Personality

Some researchers theorize that biological and genetic influences are the salient factors in personality development, as opposed to, or in addition to, social and cultural environments (McCrae et al., 2000). Personality change due to traumatic stress could also be biologically based; traumatic stress has consistently been linked to structural changes in the brain (Neylan, Mueller, Wang, Metzler, Lenoci, Truran, & Schuff, 2010). Neylan et al. (2010) also found that chronic insomnia associated with traumatic stress was even more closely related to hippocampal volume loss than the strength of other PTSD symptoms. A number of studies have related sleep disturbance to chronic PTSD in war veterans (Ross et al., 1989). Neurological changes due to traumatic exposure as well as subsequent sleep disturbance may affect personality as well. Chronic insomnia can decrease the brain's capacity for neurogenesis, which may account in part for the size reduction in hippocampal structures (Ehninger & Kempermann, 2008; Neylan et al., 2010) commonly observed both in sleep-deprived individuals and individuals suffering from PTSD. McCrae and Costa (2000) cite Nelson (1999) to conclude: "…life experience might affect personality through its effects on the brain".

Pharmacological intervention to reduce the physiological response to trauma is being investigated to prevent and treat PTSD. In several studies, beta-blockers were administered to trauma-exposed individuals before, or in different stages of memory consolidation following, traumatic exposure. Results have been mixed (Stein, Kerridge, Dimsdale, & Hoyt , 2007), but in

some studies, the moderation of sympathetic nervous system arousal has shown promise in the prevention of PTSD (Krauseneck, Padberg, Roozendaal, Grathwohl, Weis, Hauer, D., . . . Schelling, G., 2010).

In 2000, McCrae and Costa reviewed the findings of several studies that examined mean levels of traits, such as Conscientiousness, at different ages across cultures. Their findings supported a general pattern of trait change that occurs with maturation. Consistency of their findings across cultures led them to conclude that this intrinsic maturation may be biologically rather than culturally based. Although biologically based basic tendencies set the course for personality development, characteristic adaptations such as acquired habits, beliefs, roles, relationships, and societal and cultural influences help shape the way these biologically based tendencies are expressed (McCrae & Costa, 1994; McCrae & Costa, 1996; McCrae & Costa, 1999; McCrae & Costa, 2000). In addition, specific personality characteristics appear to follow a somewhat predictable path of development regardless of culture and environment. McCrae et al. (2000) found that after a period of development into adulthood traits remain somewhat stable between 30 and 80 years of age. While this paper does not address biological effects of stress exposure directly, its examination of change with time is consistent with a biological approach.

Personality Stability vs. Change

Despite this overall stability, the same researchers have found that personality traits also continue to change and develop in a relatively predictable manner during the entire life span (McCrae et al. 2000; McCrae & Costa, 1999; McCrae & Costa, 2000). A Big Five trait trajectory over the life span has been reported in several studies and some consistent patterns have been observed: Conscientiousness and Agreeableness tend to rise during early adulthood, where Neuroticism tends to decrease. Openness to Experience tends to rise in early adulthood, but

overall tends to decline somewhat through later adulthood. Findings regarding changes in Extraversion have been mixed (Roberts et al., 2006). Helson et al. (2002) found no support for amount of change in personality reaching a plateau in adulthood and traits remaining relatively stable afterward. They examined data from two different cohorts from two longitudinal studies, with personality trajectory assessed using the California Psychological Inventory (CPI; Gough, 1996), as will be done in the current study. Helson et al. (2002) includes graphs (Figures 3, 4,5,6) for all of the traits examined in this study except Wellbeing. There was some differential effect of being in specific cohorts, but the overall patterns of change were consistent: Rather than a period of change and growth followed by stability, these authors instead found evidence of a curvilinear or inverted u change patterns (Figures 3, 4, 5) for most traits.

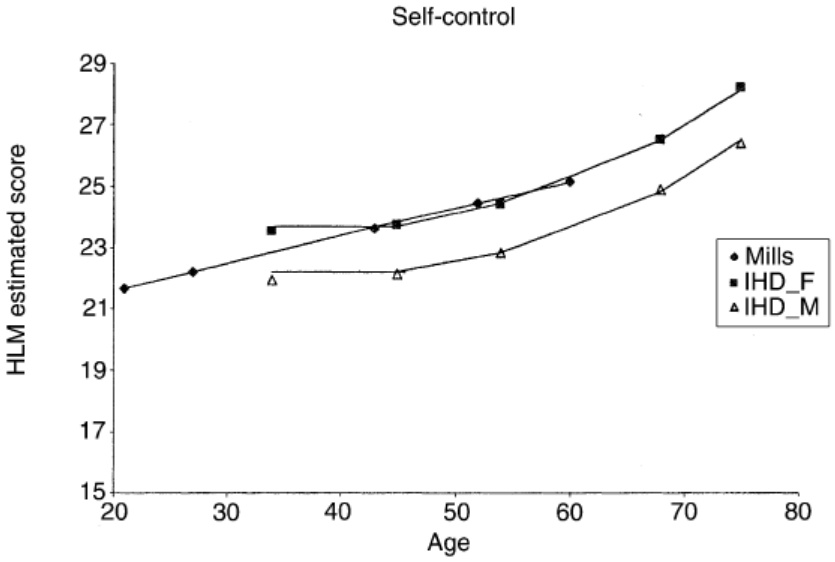


Figure 1. HLM estimated mean scores on CPI Self Control showing curvilinear ascending change. Source: Helson et al. (2002). Copyright by the American Psychological Association.

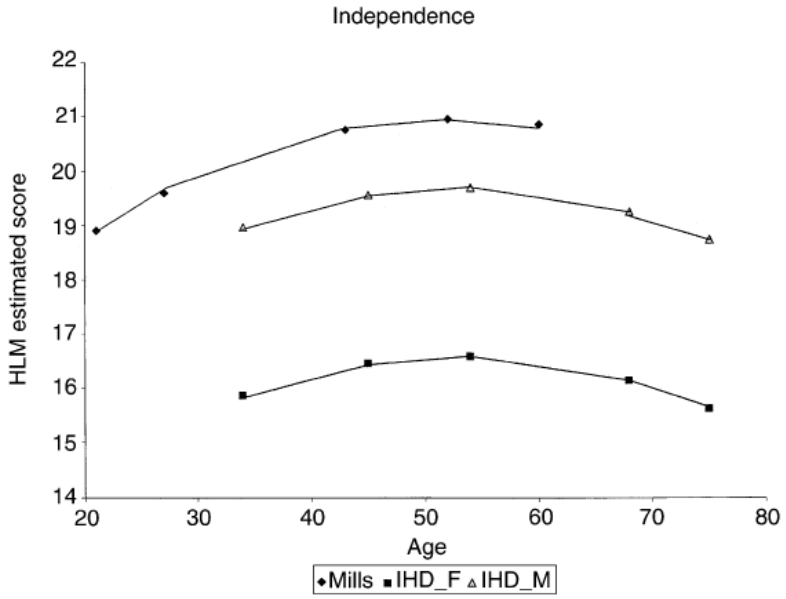


Figure 2. HLM estimated mean scores on CPI independence showing curvilinear (inverted-U) change with peaks in middle age for both the IHD and Mills longitudinal samples. *N*=424. Source: Helson et al. (2002). Copyright by the American Psychological Association.

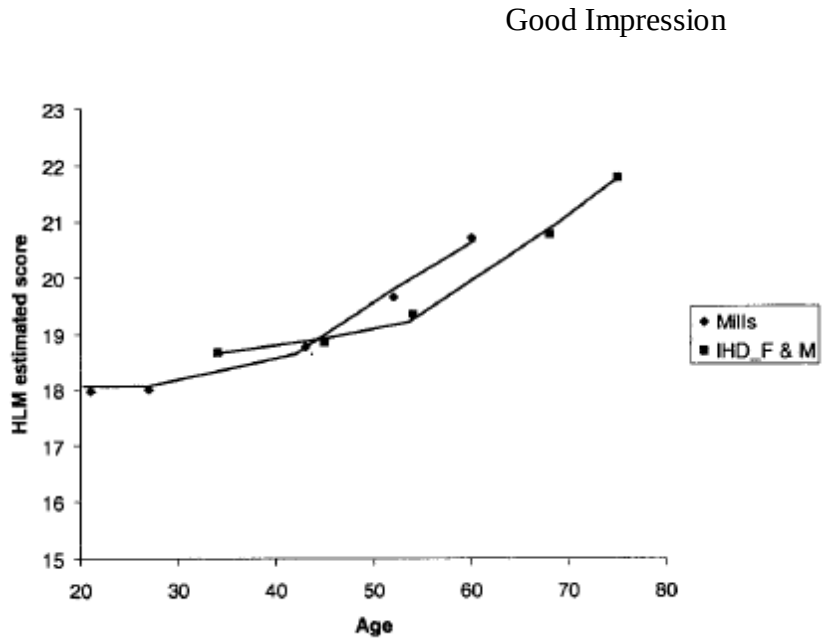


Figure 3. HLM estimated mean scores on CPI Good Impression showing curvilinear ascending change. Source: Helson et al. (2002). Copyright by the American Psychological Association.

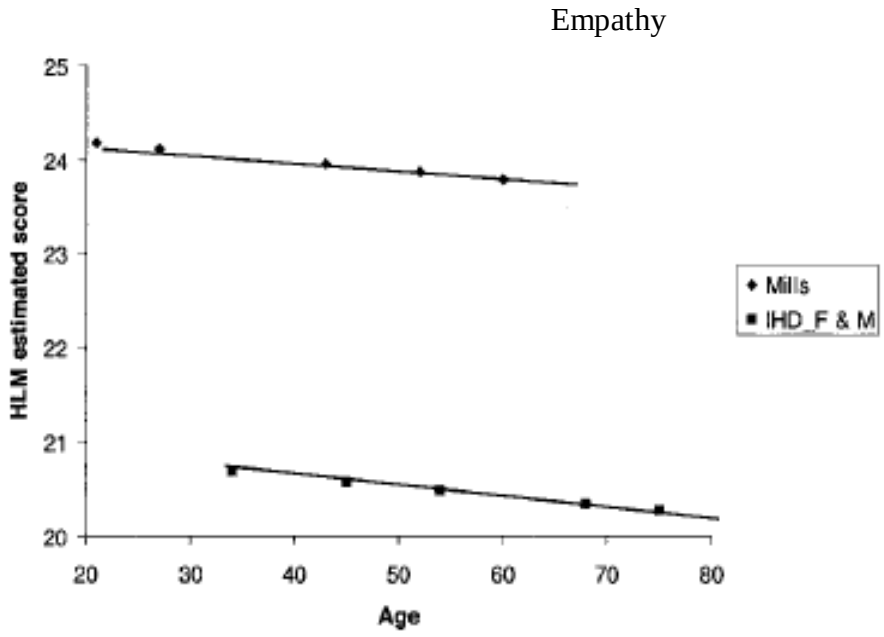


Figure 4. HLM estimated mean scores on CPI Empathy showing linear descending change. Source: Helson et al. (2002). Copyright by the American Psychological Association.

Empathy was the exception; in contrast to the curvilinear trajectory of other CPI traits, Empathy tends to decline with age in a linear fashion (Figure 6) in all of the samples used in the Helson et al. (2002) study. McCrae et al. (2000) had similar findings in Five Factor Model traits measured by the NEO-PI-R. This decline was observed in the present research as well, and the implications with respect to traits such as Authoritarianism are discussed in a later section.

Life Events and Personality

Costa et al. (2000) examined personality changes associated with life events. This study did not focus on extremely negative events but rather events such as marriage or job change that are nevertheless considered stressful by Holmes and Rahe (1967) and others. This study showed no significant correlation between number of life events and personality change, when both positive and negative life events were considered. However, there was a slight correlation

increase (from an average of .01 to .03) between negative life events and personality change. In addition, specific key events, such as divorce, promotion, or job loss, had significant effects on personality change ($p<.01$).

Duncan and Agronick (1995) found that societal and historical events occurring during early adulthood (such as World War II, the civil rights movement and the women's movement) were salient in identity and personality formation. They used the CPI Internality vector to test their hypotheses that participants, all of who were women, who found the women's movement personally meaningful, would show more assertive personality characteristics at midlife. People who score high on internality are described as inwardly oriented, shy, and reluctant to take action, while low scorers are externally oriented, poised, and enterprising. The results showed significant correlations (-.34 and -.23 for samples with important demographic differences) between low internality and endorsement of impact by the women's movement.

Allemand, Gomez, and Jackson (2010) studied whether psychological turning points influenced personality change in midlife. They conducted a repeated measures study with 892 participants (407 men and 485 women) between the ages of 40 and 60. Measurements of the Big Five personality traits were taken at T1 and T2, using 25 self-descriptive adjectives that the authors drew from other measures. The authors made a clear distinction between life events and a self-identified psychological turning point (SPTP).

Psychological turning points were defined as "…major changes in the ways people feel or think about an important part of their life, such as work, family, and beliefs about themselves and about the world. Turning points involve people changing their feelings about how important or meaningful some aspect of life is or how much commitment they give it." The seven categories that they used focused not on life events, but rather on the subjective experience of a

shift in world outlook. At T1, participants were asked whether they had experienced an SPTP from any of the categories during the last 12 months. The authors were interested in both the occurrence of particular SPTPs, as well as the overall number of experienced turning points. The authors found that although life events appeared to have some effect on personality change, subjective psychological turning points do not significantly impact personality.

Löckenhoff, Terracciano, Patriciu, Eaton, and Costa (2009) studied the effects of extremely adverse (traumatic) events on personality using data from the Baltimore Epidemiological Catchment Study. The 458 participants were assessed twice, approximately eight years apart. Twenty-five percent of this urban sample experienced some type of very adverse event within two years of the second assessment. Examples of such events included: experiencing or witnessing an accident, being a victim or witness of a crime, losing a close friend, and reacting to severe worldwide events. They found that experiencing such a traumatic event was associated with specific personality trait patterns of change. They used the NEO-PI-R (Costa & McCrae, 1992) to assess Big Five personality traits. Individuals exposed to extremely adverse events showed an increase in Neuroticism, especially the N:2 facet (angry hostility); they were less likely to deescalate and cooperate during interpersonal conflict. Openness to values (O:6) declined, which the authors saw as representing awareness of mortality causing one to embrace dogma and a particular cultural worldview while rejecting alternative opinions. Löckenhoff et al. (2009) saw their results as consistent with the clinical presentation of Posttraumatic Stress Disorder (PTSD). Some of the changes in neuroticism scores match clinical symptoms listed in the DSM-IV-TR, including irritability, angry outbursts, and interpersonal estrangement. For this reason, the present study used a measure of PTSD symptoms to control for the effects of active PTSD symptoms.

Personality change over the career of police officers

The question of personality trait changes in police officers due to social influences on the job has been a subject of inquiry for decades and has been discussed in an earlier sociological literature on the development of a "working personality" in police officers (Skolnick, 1966/2010) and the trait of authoritarianism. Owen & Wagner (2008) conducted a review of previous research on the trait of authoritarianism in police officers from 1967 to 1995.The studies examined had mixed conclusions; some suggested that police officers had lower or comparable levels of authoritarianism compared with other groups; some studies concluded that authoritarianism was higher in police officers. Two of the studies (Genz & Lester, 1976, and Farmer, 1978) looked at change in levels of Authoritarianism over time. Gentz and Lester (1976) found that years of service was generally unrelated to Authoritarianism, but police officers with one or more years of service were more authoritarian than new recruits. The conclusion that education and training lowered, at least temporarily, levels of the trait of authoritarianism was consistent across several studies (Coleman & Gorman, 1982; Dalley, 1975; Wortley & Hormel, 1995). Farmer (1978) found a significant increase in authoritarianism among students completing a criminal justice internship.

The decline of the trait of Empathy over time in several non-law enforcement populations (Helson et al.,2008) as illustrated in Figure 6, as well as Löckenhoff's findings, may be related to and even account for findings in this earlier literature that authoritarianism changes, possibly increases, over the course of a law enforcement career. This is also an area potentially important for intervention and policy directed at supporting officers over the course of their careers in preventing burnout, enhancing job performance, and maintaining overall quality of life.

After reviewing the literature, Owen and Wagner (2008) conducted their own study of the personality trait of authoritarianism in police officers using criminal justice majors as participants. The researchers sought to determine whether authoritarianism was higher in individuals seeking employment in the criminal justice system, or whether higher levels of authoritarianism might rather develop over time as a result of socialization on the job. They utilized the Right Wing Authoritarianism scale (RWA; Altemeyer, 1996) to groups of criminal justice majors and non-criminal justice majors. They concluded that male criminal justice majors exhibited significantly higher levels of authoritarianism than females or non-criminal justice majors. They also concluded that levels of authoritarianism decreased as time in college increased, consistent with earlier studies. The suggestion was that authoritarianism may already be present in people pursuing law enforcement careers.

Lefkowitz (1995) points out the methodological difficulties that limit assessment of the developmental contributions of self-selection, organizational selection, selective attrition, SES determinants, role-specific behaviors, and socialization in law enforcement careers. Despite the conflicting findings in this literature, potential career changes in officers' personality is a worthwhile area of study, and the present research specifically investigates this in relation to trauma exposure in and outside of work.

Personality traits studied in the present research

The literature reviewed thus far address effects of recent traumatic events, neurological changes due to trauma, psychological turning points, and life events on personality, but it does not examine the chronic exposure to significant traumatic events that frequently occurs over long periods of time in public safety, military, and emergency medical occupations. The present study examined effects of chronic trauma exposure on personality traits. The CPI traits selected for this

study were selected based on prior research and the domain expertise of a police psychologist with 35 years of experience conducting pre-hire assessments and therapeutic support for law enforcement personnel. Of the studies reviewed above, the Löckenhoff et al. (2009) study was most similar to the present research in that it focused on traumatic events as predictors for personality change. The study found statistically significant variation accounted for by recent exposure to severe events. The FFM traits and subtraits that were correlated with traumatic event exposure were: Neuroticism (increased, specifically in Angry Hostility); Openness (decreased, specifically in Values); and Agreeableness (decreased specifically in Compliance).

The California Psychological Inventory scores were available as historical data from the participating police agency (time one of the present study). The CPI was chosen rather than the MMPI-2 (which was also administered during the pre-hire psychological evaluation) because the CPI measures positive traits as opposed to psychopathology. CPI scales do not explicitly measure FFM traits, so the significant traits in Löckenhoff et al. (2009) could not be directly tapped using the CPI. However, a 1993 study analyzed correlations between the CPI scales and NEO-PI scales (McCrae, Costa, & Piedmont, 1993). These findings were used to identify CPI scales relating to previously mentioned FFM traits that showed significant change in Löckenhoff et al. (2009). These CPI scales corresponding the most closely to the FFM traits that were found to be significant in the 2009 Löckenhoff study were chosen for analysis in the present study. Wellbeing (Wb) is highly (-.45) correlated to Neuroticism. This scale was also proposed by the pre-hire psychologist as being one of the most likely scales to be negatively affected by traumatic exposure. Good Impression (Gi) and Independence (In) are also highly negatively correlated with Neuroticism (-48, -.42), and Gough (2005 Administration manual) incorporates compliance into the description of intentions for the Gi scale. Self-Control (Sc) is also correlated

(-.37) with Neuroticism, it intuitively correlates with Angry Hostility (also a FFM facet of Neuroticism), and is another scale proposed by the original assessor that might be affected by traumatic stress symptoms. Empathy (Em) is most highly correlated with both Extraversion and Openness in the McCrae (1993) study (.51, .43). The high correlation between Empathy and Extraversion is intuitively consistent with the manual description of people scoring high on Empathy: "Assessees with high scores on Em were seen as lively, humorous, socially poised, and verbally fluent." Based on Helson et al. (2002), the "shapes" of CPI trait trajectories in the general population are mixed. Table 1 provides a summary of expected trait trajectories, as well as the FFM and CPI trait correlations.

CPI Scale in this study	**Corresponding FFM Factor/Facet**	**Expected change in response to trauma**	**Expected change with time in the general population** (according to Helson, 2002)
Wb Wellbeing	Neuroticism (negative correspondence)	Decrease	Static
Gi Good Impression	Neuroticism (negative correlation), Agreeableness (especially Compliance)	Decrease	Increase
In Independence	Neuroticism	Decrease	Increase
Sc Self-control	Neuroticism (especially Angry Hostility)	Decrease	Mixed, depending on sample; increase in some samples; in others, static or slight decrease until approximately age 45, then increase
Em Empathy	Extraversion, Openness	Decrease	Decrease

Table 1: CPI scales' relationship to FFM traits, and trajectory over time.

The present study specifically examined these five California Psychological Inventory (CPI; Gough, 1996) trait scales over time in law enforcement personnel, using the Critical Incident History Questionnaire (CIHQ; Weiss, Brunet, Best, Metzler, Liberman, Pole, Fagan, & Marmar, 2010) and the Life Events Checklist (LEC; as subjective self-report measures of trauma exposure. It was hypothesized that more negative (downward sloping) trajectories between scores from T1 to T2 on all five scales will be associated with higher CIHQ and LEC scores.

Methods

Participants

The participants were 40 police officers with 5-10 years of service. The participants were recruited from an urban police department employing approximately 1000 commissioned officers. To meet the requirements for years of service, the participants had hire dates between January 2001 and December 2006, resulting in a minimum of five years of service at the time two assessment. The pre-hire CPI could not be located for one participant, resulting in a final *n*=39; Demographic information is as follows: 30 men and 9 women, including 29 Caucasians, 6 Hispanics, two White and Hispanic, and two participants of unknown race, with an mean age of 34.5, and a mean of 7.65 years of service. Five of the officers (12.5%) indicated that they had experienced combat or exposure to a war zone.

Procedure

As part of the hiring process at the participating police agency, police officer candidates considered for employment complete a psychological assessment consisting of: a Wonderlic Cognitive Ability Questionnaire, the California Psychological Inventory 434 (CPI; Gough, 1996), a general background questionnaire, the Minnesota Multiphasic Personality Inventory-2 (MMPI-2, Graham, 2006), and an interview by a psychologist. The interview could occur within

two hours of the test administrations, or it was sometimes delayed as much as two days. The written assessments may be completed in a group or individually. One psychologist completed the majority of pre-hire assessments during the identified hiring period. He provided the pre-hire CPI test results (blinded to the researcher) with the agency's approval and individual participant consent.

In the current study a new CPI 434 was administered to each of the participants. The inventories were electronically scored by Consulting Psychologists Press and scores were returned in electronics form. In addition, the participants completed the CIHQ, to assess cumulative critical incident exposure; the Police Stress Questionnaire-Operational (PSQ-Op) and the Police Stress Questionnaire-Organizational (PSQ-Org; McCreary & Thompson, 2006), which are measures of police work environment stress; the Life Events Checklist (Gray, Litz, Hsu, & Lombardo, 2004) to allow control for effects of non-work related life events; and the Posttraumatic Symptom Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993), to allow control for active posttraumatic stress symptoms. All six measures were administered in a single session to minimize attrition and incomplete completion of the measures. To encourage participation, participants in the study were eligible for several cash drawings. The completion time for all four measures was approximately 1 ½-2 hours.

Confidentiality Considerations

Confidentiality for the participants was particularly important; the possibility existed for them to be acquainted with the principle investigator. In addition, there was some chance they might be concerned that their answers could result in negative consequences for their jobs. Participants' scores were blinded from the primary researcher in the following manner: The participants' names did not appear on the completed measures, and numbers were randomly

generated for the entire participant pool before the measures were administered. These were printed on labels that were given to the officers when they filled out the measures. A staff person at the participating agency generated the numbers in an Excel spreadsheet that contained the names and demographic information for 208 officers that had the targeted range of years of service and were still employed as commissioned officers. Identifying data stored are limited to this table, which is stored on a flash drive and on paper in a confidential file of the agency's psychologist.

All potential participants were identified from agency personnel rosters. Information about the study, a letter from the primary researcher, and support letters from the Chief of Police and the city's police union president were delivered via interoffice mail to qualifying employees. The letters clearly stated that the identity of participants would not be passed on to peers or to supervisory and command personnel. Support letters also clearly stated that participation or lack of participation would in no way influence future performance assessments or evaluations.

When the packets were mailed, the administration dates were uncertain due to an agency-wide new computer system implementation. The potential participants were notified that they would be advised later of the location and available times for participation. The administrators for the measures were two sergeants assigned to the agency's psychological support unit. These sergeants are given special training as peer counselors and have a higher expectation for building trust and honoring confidentiality of private information than officers in most other assignments. The chosen location was the office for the psychological support unit, which is a facility near but not attached to one of the agency's substations. The facility was constructed for access that promotes privacy for officers utilizing psychological services. The primary researcher was not present during administration and remained blind to who actually participated in the study.

During testing, the psychological services sergeants used the Excel table to find the appropriate ID numbers for the individual participant and placed the numbers on each of the participant's test measures and on the release of information to the psychologist who conducted the pre-hire evaluations. When not in the immediate control of the sergeants, the Excel spreadsheet was kept in the psychological services office in a secure area. An electronic copy of the table and the paper copy are now stored in the unit's locked confidential files. The number was not placed on the informed consent form that is being stored by the principal investigator. The only place that the participant's name appeared with their number during the session is on the consent form to the pre-hire assessing psychologist. The participants were provided with an envelope with prepaid postage addressed to the principal investigator. Upon signing the informed consent form and the release of information form, and upon completion of the questionnaires, the participants placed the six newly completed measures in the envelope addressed to the principal investigator and placed the release forms in a separate envelopes. The participants had the option to place their sealed postage paid envelopes directly in the outgoing mailbox in the nearby police facility, which is a pickup location for the U.S. Postal Service, or to have the envelope placed in the mail by the sergeant. All of the officers opted for the convenience of giving their envelopes to the sergeants, who immediately took the envelopes to the nearby substation and placed them in the mail. The sergeants also collected the signed informed consent forms in a single package and mailed them to the principle investigator, and collected the release of information forms for the pre-hire psychologist to be delivered later. The informed consent forms are now stored in the PI's faculty advisor's private locked files. Staff delivered the release of information forms en masse to the pre-hire psychologist when the new assessments were complete.

When the pre-hire assessing psychologist received the release of information forms, he applied the assigned numbers to the historical (pre-hire) CPI data and interpretive reports and removed all identifying information from them, then mailed the pre-hired CPI reports to the principal investigator. The names did not appear on the data after leaving his control and were identified only by the assigned ID number. He retained the release forms for his records. The principal investigator used these assigned numbers on the pre-hire CPI information to match the original assessment data with the new assessment data for each participant.

Administration of measures

The measures were placed in the envelope to be completed in the following order: The CPI, the PSQ-Org, the PSQ-Op, the CIHQ, the Life Events Scale, and the Posttraumatic Check List; these instruments are described below. This order approximates as closely as possible the order in which the original pre-hire measures were administered; the pre-hire battery is administered in the order of least to most likely to provoke emotional response, and this concept was used when capturing the new data. Since the CPI items relate to social functioning rather than psychopathology, they include relatively minor emotional content and were administered first. The PSQ measures do not contain items related to critical event exposure, so they were placed second in the administration packet. The CIHQ, the Life Events Scale, and the PCL contain the most potentially emotion-related content, so they were administered last in that order.

At the data gathering sessions participating officers were reminded about available resources if they needed psychological support following the test administration. Officers currently have access to designated peer support personnel, the psychological services unit sergeants, the agency's psychologist, the city's Employee Assistance Program, or private psychological services covered by their medical insurance plans.

Method

Measures

The measures for this research included the California Psychological Inventory 434 (CPI: Gough, 1996), the Police Stress Questionnaire-Operational (PSQ-Op: McCreary and Thompson, 2006), the Police Stress Questionnaire-Organizational (PSQ-Org: McCreary and Thompson, 2006), the Critical Incident History Questionnaire (CIHQ; Weiss et al., 2010), the Life Events Scale (LEC; Gray, Litz, Hsu & Lombardo, 2004), and the Posttraumatic Checklist-Civilian (PCL-C; Weathers et al., 1993).

The California Psychological Inventory-434 (CPI; Gough, 1996). The CPI was developed to assess personality variables that predict criteria of general social importance. This version of the inventory has 434 items making up 20 scales that describe interpersonal and intrapersonal behavior and dispositions selected for their value in social life. There are also 6 work-related scales and three higher-order measures. Unlike instruments such as the Minnesota Multiphasic Personality Inventory (MMPI and MMPI-2; Hathaway & McKinley, 1943, 1987) and the various versions of the Millon Clinical Multi-Axial Inventory (MCMI; Millon, 1987), the CPI was not intended as an instrument for use in clinical settings for assisting in diagnoses of psychopathology. The CPI is instead intended to measure personality characteristics that would be relevant and valuable in personnel assessment and in other settings where the emphasis is on positive, life-enhancing attributes and dispositions.

The CPI scales were designed in part to capture cross-cultural and easily understood personality themes that are intuitive to a lay observer, the so-called “folk” scales. In this way the test developers tried to identify personality factors that are universal to some degree in all humans and which provide a picture of relatively stable characteristics and tendencies. The 29

scales are grouped into six categories. The category Dealing with Others includes: Dominance (Do), Capacity for Status (Cs), Sociability (Sy), Social Presence (Sp), Self-acceptance (Sa), Independence (In), Empathy (Em). The Self-Management category includes: Responsibility (Re), Social Conformity (So) Self-control (Sc), Good Impression (Gi), Communality (Cm), Well-being (Wb), and Tolerance (To). The Motivations and Thinking Style category includes: Achievement via Conformance (Ac), Achievement via Independence (Ai), and Conceptual Fluency (Cf). The Personal Characteristics category includes: Insightfulness (Is), Flexibility (Fx), and Sensitivity (Sn). The Work-Related Measures category includes Managerial Potential (Mp), Work Orientation (Wo), Creative Temperament (Ct), Leadership (Lp), Amicability (Ami), and Law Enforcement Orientation (Leo). The Higher-Order Measures category includes: Vector 1 (v.1; Orientation Toward Others), Vector 2 (v.2; Orientation Toward Societal Values, and Vector 3 (v.3; Orientation Toward Self).

Internal consistency (*alpha*) coefficients for the CPI scales have been calculated from 3 samples: from the U.S., the U.K., and from a sample of 6,000 randomly selected records sent in by practitioners. Some scales, such as Dominance, show coefficients from .83 to .87. The scale with the lowest internal consistency coefficient was Sensitivity, with *alpha*s ranging from .33 to .67 across the three samples. Test-Retest correlations have been calculated for 1, 5, 10, and 25 years between tests. The lowest test-retest correlation was .18 for women at 5 years between tests on the Communality subscale. The correlation for this validity scale appeared to be an outlier, as all other test-retest correlations for all subscales ranged between .36 and .86.

Test-retest correlations for the five scales chosen for this study were as follows: Wellbeing (.66), Good Impression (.65), Independence (.61), Self-Control (.71), and Empathy (.55). Moderate test-retest correlations are not unexpected, as very high test-retest correlations

would contradict research findings that traits do change over time. The moderate values also suggest that levels of the traits may also be sensitive to external events, as examined in this study.

The 434 CPI items are in a true/false response format. Some sample questions include:

1. I enjoy social gatherings just to be with people.

26. It's a good thing to know people in the right places so you can get traffic tags, and such things, taken care of.

51. Every family owes it to the city to keep its sidewalks cleared in the winter and its lawn mowed in the summer.

73. Maybe some minority groups do get rough treatment, but it's no business of mine.

The CPI incorporates three validity scales to identify profiles that may be invalid: Fake Good, Fake Bad, and Random. The scores are calculated based on an empirically supported formula that incorporates scores from six scales: Dominance, Wellbeing, Good Impression, Communality, Sociability, and Flexibility. Scoring outside the threshold scores results in a dichotomous flag (0 for within normal limits, 1 for exceeding the Fake Good or Random thresholds, or being below the Fake Bad threshold), alerting the assessor that the profile may show excessive impression management, random answering, or over-reporting of distress.

The Critical Incident History Questionnaire (Weiss et al., 2010). The CIHQ provides a quantitative estimate of cumulative exposure to critical incidents. The Department of Health and Human Services, Federal Occupational Health Agency, describes critical incidents as: "…highly stressful situations. Simply put, a critical incident is a traumatic event (or perceived life-threatening event) that has sufficient power to overwhelm an individual's ability to cope" (www.foh.dhhs.gov). The CIHQ is derived from a checklist of critical incidents potentially

experienced in the domain of police work. The total score incorporates the frequency of exposure, written in if the number of incidents experienced was under ten, and above that as ranges from 10 to 20, 21 to 50, and 51 plus (see Appendix A1). The score also incorporates a rating of coping difficulty or stressfulness associated with each item. Two different coping difficulty ratings were scored; an ideographic rating from 0 to 4 of the coping difficulty endorsed by the individual officer, and a nomothetic score captured by Weiss et al., (2010) of the mean officer ratings of coping difficulty for each item as rated by over 700 officers. The nomothetic score was used in the statistical analysis, as it was deemed somewhat less subjective than individual ratings. The final score was the coping difficulty multiplied by the average number of occurrences summed across items. The 34-item questionnaire is included in Appendix A1.

Test-retest reliability for the CIHQ was calculated by Weiss et al. (2010) for six indices, including: the actual frequency of exposure, a recoded frequency (a strategy the authors used to normalize the wide range of occurrence frequencies), variety, nomothetic severity, idiographic severity, and actual x nomothetic severity. The test-retest coefficients range from .56, for Actual Frequency x Nomothetic Severity, to .66 for Variety (an index of the variety of types of incidents to which the officer had been exposed). Content validity for the items was analyzed using ratings from 52 police psychologists. To assess the level of agreement of these expert ratings, the reliability of ratings from the police psychologists was first calculated; results were .94 for consistency of ratings across judges and .90 when using a more conservative estimate that used differences in the mean rating among the judges.

In the Weiss et al. (2010) study the nomothetic severity weight for each item was calculated based on the responses from all of the officers who served as judges. Not all officers endorsed having experienced the situations described in each item, but there was strong

agreement in ratings whether or not the officer experienced the situation firsthand. The following is an example of the mean frequency and the severity ratings for the first four items: Full results from Weiss et al. (2010) are included in Appendix A2.

Abbreviated Item	***n***	**Frequency of exposure**					**Nomothetic severity Rating**
		0	1-9	10-20	21-50	50+	
Mistake that injures/kills colleague	717	97.8	2.2	0.0	0.0	0.0	3.81
Colleague killed intentionally	714	79.0	20.3	0.6	0.0	0.0	3.76
Mistake that injures/kills bystander	640	97.5	2.3	.2	0.0	0.0	3.67
Colleague killed accidentally	710	87.6	12.1	0.0	0.0	0.0	3.51

Table 2. Example of Weiss et al. (2010) findings.

The most commonly endorsed items in the present study included: Encountering the body of someone recently dead. (97.5%) and encountering a decaying corpse, (95%); four items were not endorsed at all by the participants: Having to shoot at someone in the line of duty without injuring them, making a mistake that lead to the serious injury or death of a fellow officer, making a mistake that lead to the serious injury or death of a bystander, and being taken hostage.

Police Stress Questionnaires-operational and organizational (McCreary & Thompson, 2006). McCreary and Thompson (2006) developed the Police Stress Questionnaire-Organizational (PSQ-Org, Appendix B) and the Police Stress Questionnaire-Operational (PSQ-Op, Appendix C) to provide measures of work-related stress specific to police officers. The PSQ-Org measures stressors originating from the organizational environment, and the PSQ-Op measures stressors encountered during actual performance of the job. Three different studies were conducted on the questionnaire to assess reliability, construct validity, discriminant validity and concurrent validity (compared with job satisfaction measures).

A reliability analysis resulted in Cronbach *alpha*s of .90 for the PSQ-Op and .89 for the PSQ-Org. An analysis of construct validity was designed to measure the relationship between frequency of law enforcement occupational stressors and perceived stress, and the level of overlap between the two measures to ensure they are measuring different constructs. Discriminant validity was assessed by analyzing the shared variances between the two measures and three other measures of stress unrelated to police work. The amount of shared variance was low, suggesting that the PSQ-Op and PSQ-Org possess excellent discriminant validity with regard to these general stress constructs. Two measurements of job satisfaction, the Job Satisfaction Survey (JSS; Spector, 1985), and the Job-related Affective Wellbeing Scale (JAWS; Van Katwyk, Fox, Spector, & Kelloway, 2000) were used to assess concurrent validity. Concurrent validity for the PSQ-Op and PSQ-Org was demonstrated by the correlations between stress ratings for the PSQ items and ratings on the JSS and the JAWS. In all but one instance (negative work-related emotions), higher scores on the PSQ scales were associated with lower job satisfaction.

The PSQ-Op and PSQ-Org are scored on 7-point scales from 1 (“no stress at all”) to 7 (“a lot of stress”). Some of the PSQ-Op items include doing shift work, working alone at night, over-time demands, and risk of being injured on the job. Some PSQ-Org items include dealing with co-workers, excessive administrative duties, constant changes in policy/legislation, and staff shortages. The PSQ-Op and PSQ-Org ultimately were not included in the analysis, for reasons discussed in the Results section.

The Life Events Checklist (LEC; Gray, Litz, Hsu & Lombardo, 2004). The LEC is a measure of exposure to potentially traumatic life events, developed at the National Center for Posttraumatic Stress Disorder (PTSD). The LEC was developed concurrently with the Clinician

Administered PTSD Scale (CAPS; Blake et al., 1990) and is now embedded within the CAPS to facilitate the diagnosis of PTSD. The LEC was initially administered in the present study to control for effects of severe life events that may occur outside the work environment. However, the LEC contained several of the same items as the CIHQ and describes potentially traumatic events that may occur both in the course of police work and in private life, so the two measures were used in conjunction during the analysis.

Gray et al. (2004) analyzed the psychometric properties of the LEC using two samples of participants; college undergraduates and combat veterans. The LEC demonstrated good convergence with the Traumatic Life Events Questionnaire (TLEQ; Kubany, Leisen, Kaplan, Watson, Haynes, & Burns, 2000), which is a well-established and empirically supported measure of trauma history. The LEC also demonstrated adequate temporal stability.

The LEC captures multiple types of exposure to each potentially traumatic event (PTE). For each PTE, the respondents rate their type of exposure to that event on a 5-point scale (1 = happened to me , 2 = witnessed it , 3 =learned about it , 4 = not sure , and 5 = does not apply). In the present study, the experiences were weighted by the type of exposure; direct experience received a score of 1 per event, witnessing the event received a score of .5, and learning about an event was weighted at .25; the scores were then summed across all 17 items. See Appendix D1 for the full LEC, as well as Appendix D2 for the frequencies with which individual items were endorsed.

The Posttraumatic Check List Civilian (PCL-C; Weathers et al., 1993). The PCL was administered to capture symptoms of traumatic stress that may be correlated to changes in personality traits since Löckenhoff et al. (2009) found that PTSD was associated with specific, but possibly short-term, changes in personality. Weathers et al., (1993) conducted validity

studies of the PCL with 123 male Vietnam veterans who were either seeking clinical services and/or offering to be research participants at the National Center for PTSD. Mean PCL scores were 63.6 (SD= 14.1) for PTSD subjects and 34.4 (SD= 14.1) for non-PTSD subjects. Test-retest reliability was .96; Internal consistency (alpha coefficient) was .93 for PTSD Criteria B symptoms (American Psychiatric Association, 2000), .92 for Criteria C symptoms, .92 for Criteria D symptoms, and .97 for all 17 symptoms. Item-scale total correlations ranged from .62-.87. Diagnostic utility was determined by using PCL scores to predict PTSD diagnoses derived from the Structured Clinical Interview D (SCID D; Steinberg, 1994). The optimally efficient cutoff score was 50, which yielded a sensitivity of .82, a specificity of .83, and a kappa of .64. Consistent with Löckenhoff et al. (2009), PTSD symptoms measured by this instrument were found to have important relationships with four of the five selected CPI traits.

The Veteran's Affairs Administration's National Center for PTSD provides guidelines for cutoff values based on the context in which the PCL is used. These guidelines are as follows:

Estimated Prevalence of PTSD	**Typical Setting**	**Suggested PCL Cutoff point scores**
15% or Below	e.g. civilian primary care, Department of Defense screening, or general population samples	30-35
16%-39%	e.g. specialized medical clinics (such as TBI or pain) or VA primary care	36-44
40% or Above	e.g. VA or civilian specialty mental health clinics	45-50

Table 3. Cutoff values for PCL in different contexts.

Approximately 28% of the participant group reached the cutoff score of 30 indicated in a civilian primary care setting, Department of Defense screening, or a general population sample; 10% scored higher than the cutoff value of 36 indicated for specialized medical clinics; and 5% scored higher than the cutoff value of 45 indicated for a VA or specialty mental health clinic. The PCL is included in Appendix E.

Results

Separate hierarchical regression analyses were conducted for each of the five selected CPI trait scales using the time two score as the dependent variable; the traits were not evaluated with respect to each other nor included in a multivariate analysis. The trait score taken at Time one (pre-hire) was used in the first block as a control variable following the procedures of Löckenhoff, et al. (2010) and the recommendations of Roberts and Chapman (2000). Scores from the PCL were entered the second block, since there was a significant negative correlation between all of the selected CPI traits and the PCL scores. The CIHQ and LEC were combined in a third block. The rationale for this was that the two measures measure the same construct (exposure to potentially traumatic events), and some individual items overlap.

		PCL Total	**LEC Weighted**	**CIHQ Nomo**
PCL Total	Pearson's	1	.269	.269
	Sig (2 tailed)		.09	.098
LEC Weighted	Pearson's	.269	1	.463
	Sig (2-tailed)	.097		.003
CIHQ Nomothetic	Pearson's	.269	.463	1
	Sig. (2 tailed)	.098	.003	

Table 4. Intercorrelations of study variables (n = 39).

The PSQ-Op and PSQ-Org were initially included, but excluded from the final analyses, as the scores did not appear to account for much variance in personality change and were superfluous. Adjusted R^2 was used to examine effect size, and the significance of the F change in each block was used to determine if the scores on measures were significantly related to the time 2 independent variable.

Trauma exposure as measured both by the CIHQ and LEC was the independent variable of most interest. As previously mentioned, the two scores were combined in a single block. The CIHQ quantifies traumatic event exposure specific to police work, but does not account for some potentially traumatic events that may have occurred outside of the law enforcement occupation. Conversely, the LEC does account for potentially traumatic life events that may occur in any setting, public or private that are important in the present study.

All scores were entered in the regression equations as continuous variables. Gender has not been associated with different trait trajectories, and was not a significant predictor of Time 2 traits in the analyses. Age and the length of time the officer had been in service also did not prove to be significant factors. These demographic variables are used to describe the participant group but are not used in the analysis.

Mean CPI trait scores were also plotted in Excel for all of the traits and scales at Time 1 and Time 2 (Figure 5) and for the selected traits (Figure 6) to determine the general direction of trait change trajectories. All of the scales scores either declined or stayed the same for the group over time; trait trajectories were on average negative. Declines in Wellbeing, Good Impression, and Sociability were counter to the results found by Helson et al. (2002), who found increases in these scales over time. Declines in Empathy and Self-Control over time were seen in some of the samples used by Helson et al. (2010); consequently, decreases in Empathy scores in the present study may not be particularly remarkable, as they are not confined to a police population. However, these may be related to the literature on Authoritarianism in police officers, as the two constructs may be related. The findings on empathy here in combination with those of Helson et al. (2010) weaken the already disputed link (see Balch, 1972) between time on the job and personality in police officers. Helson et al.' s finding suggest that empathy decreases (and hence

authoritarianism as measured on some instruments may increase), in the general population, regardless of career. However, the data in the present study suggest that trauma exposure specifically measured by the CIHQ, as opposed to the LEC, may be related to a negative trajectory in Empathy, as discussed in the Results section.

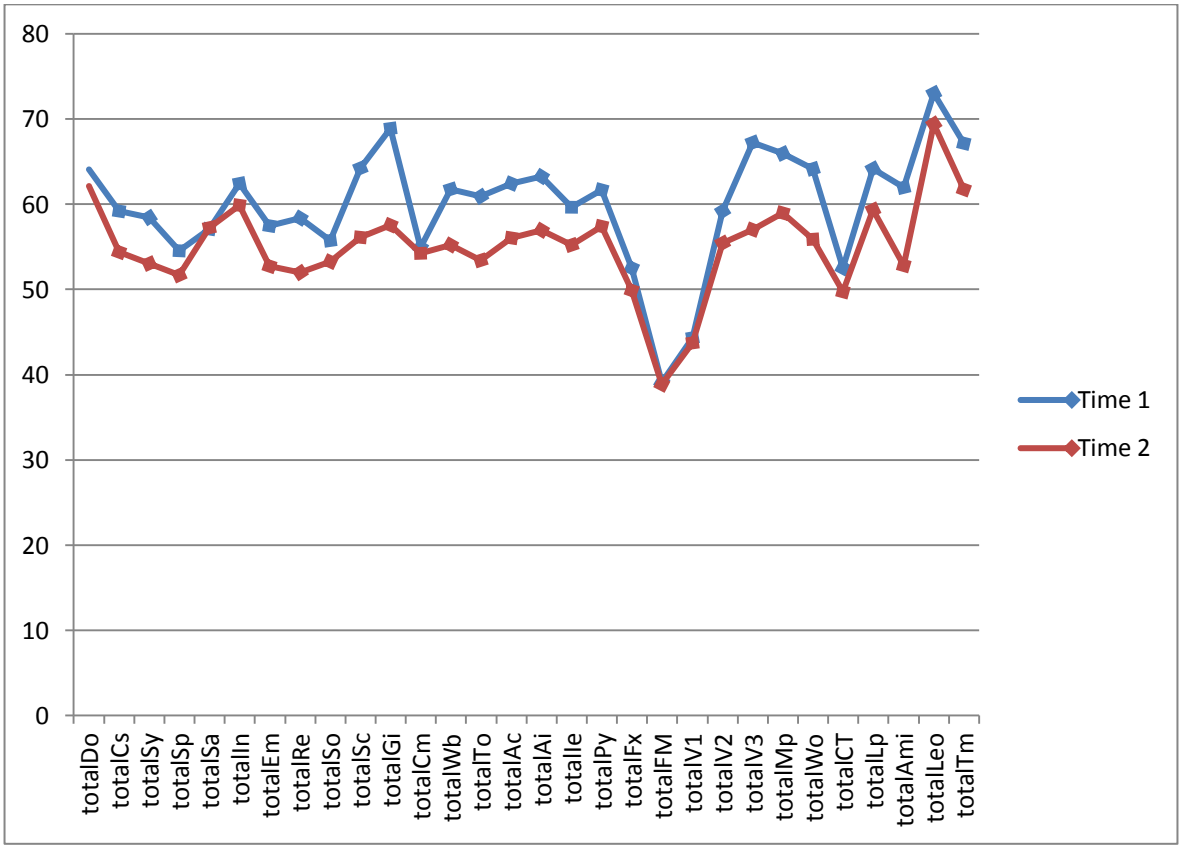


Figure 5. All CPI trait scores at time 1 and time 2.

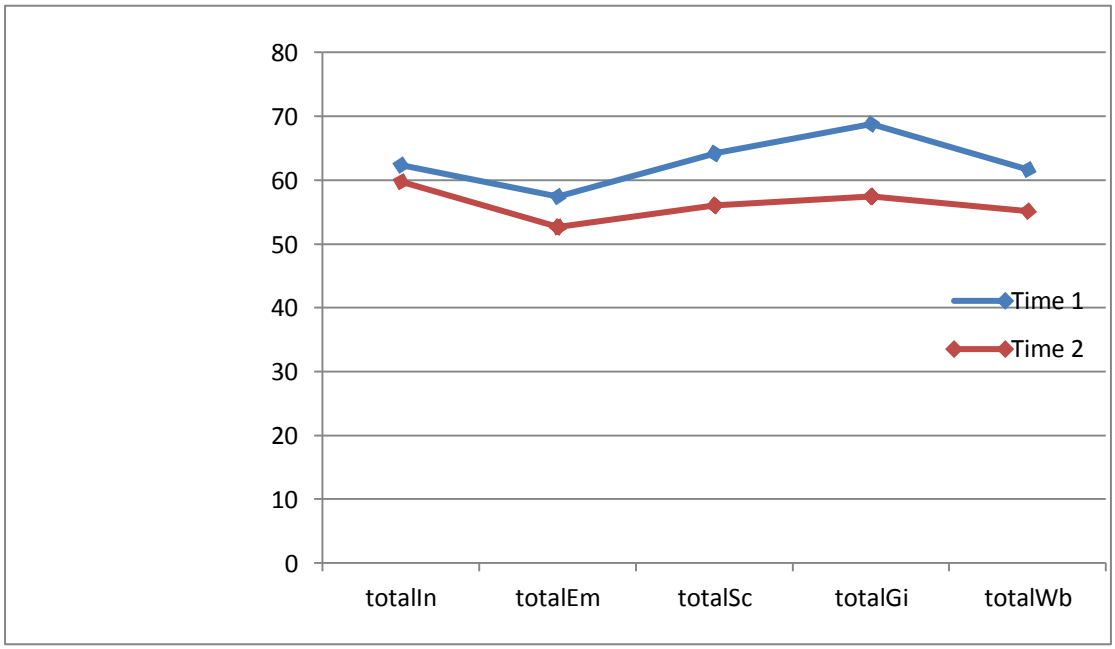


Figure 6, Selected CPI trait scores at time 1 and time 2.

The CPI scales also include vector scales. Vector scale 3 (V3) is intended to be a measure of overall psychological health. The scale represents "the respondent's own view of fulfillment, the degree to which the person has realized his or her own potentialities" (Gough & Bradley, 1996, p. 29). The V3 has been shown to be a reliable and valid measure of psychological health (Jones, Livson, & Peskin, 2006; Weiser & Meyers, 1993). The mean V3 at time 1 for the total group was 67.3, with a standard deviation of 5.5. At time 2, the group mean dropped to 57.0 with a standard deviation of 7.7. Despite the nonsignificant difference, the effect size for the change decrease within subjects was calculated to be .69, which is considered a very substantial effect size according to the criteria of Kirk (1996); this indicates that the study was underpowered.

In four out of the five trait models, Wellbeing, Good Impression, Independence, and Self-Control, exposure to potentially traumatic events measured by the CIHQ and LEC accounted for a statistically significant portion of the variance in CPI trait scores at time two when PCL scores were used as a control variable (see Table 5). Surprisingly however, the relationship was found

to be in the opposite direction than expected. When posttraumatic symptoms were controlled for using the PCL, higher scores on the CIHQ and LEC resulted in less negative CPI trait trajectories in those four traits. In the fifth trait model, Empathy, neither posttraumatic symptoms as measured by the PCL, nor critical incidents or life events as measured by the CIHQ and LEC had any significant effect, although the time 1 CPI score was a significant predictor of time 2 CPI scores.

PCL scores were an important variable in the analysis. Scatterplot charts were generated in Excel to illustrate the relationship between posttraumatic symptoms and changes in CPI scores. PCL scores were plotted on the Y-axis with time 2 scores on the X-axis for each of the target traits. Higher PCL scores were associated with decreases in time 2 trait scores on all of the scales except Empathy (See Appendix F).

The variances accounted for by the three blocks are displayed in Table 5. For the Wellbeing (Wb) trait, the PCL score accounted for 44% of the variance in the time two Wb score with a significance of .00. The combined LEC and CIHQ (nomothetic) score accounted for an additional 14% of the variance, a significance level of .01.

In the Good Impression (Gi) trait, the PCL score accounted for 24% of the variance in the time two Gi score with a significance of .004. The combined LEC and CIHQ (nomothetic) score accounted for an additional 13% of the variance, a significance level of .045.

In the Independence (In) trait, the PCL score accounted for 41% of the variance in the time two In score with a significance of .000. The combined LEC and CIHQ (nomothetic) score accounted for an additional 12% of the variance, a significance level of .023.

In the Self Control (Sc) trait, the PCL score accounted for 25% of the variance in the time two Sc score with a significance of .002. The combined LEC and CIHQ (nomothetic) score accounted for an additional 13% of the variance, a significance level of .044.

The results in the Empathy (Em) trait were insignificant for all measures except for the time one Em score, which was very significant; the variance accounted for by time one scores was 37%, with a significance level of .000. The PCL score accounted for virtually none of the change in the time two Em score with a significance of .951. The combined LEC and CIHQ (nomothetic) score accounted for an additional 6.1% of the variance, a significance level of .180. The negative correlation between Em and the CIHQ scores was not statistically significant, but further investigation to determine whether burnout might be a factor in decreased Em scores may be warranted. This is also an area for potential intervention at the departmental level. However, as previously noted, a modest decline in Empathy over time has been noted in non-law enforcement populations as well (Helson, 2008).

	Standardized *B*	**Adj. R^2**	**R^2 Change**	**Sig. *F* Change**
Wb Block 1 (T1 Wb)	.158	--	.025	.335
Wb Block 2 (PCL)	.106 -.642	.404	.410	.000
Wb Block 3	T1 Wb =.115 PCL=-.762 LEC=.299 CIHQ=.150	.524	.139	.008
	Standardized *B*	**Adj. R^2**	**R^2 Change**	**Sig. *F* Change**
Gi Block 1 (T1 Gi)	.185	.008	.034	.261
Gi Block 2 (PCL)	.215 -.451	.194	.203	.004
Gi Block 3	T1 Gi=.248 PCL=-.569 LEC=.119 CIHQ=.306	.284	.128	.045
	Standardized	**Adj. R^2**	**R^2 Change**	**Sig. *F***

	B			**Change**
In Block 1 (T1 In)	.148	--	.022	.369
In Block 2 (PCL)	.277	.377	.388	.000
	-.636			
In Block 3	T1 In=.230	.471	.117	.023
	PCL=-.723			
	LEC=.360			
	CIHQ=-.001			
	Standardized *B*	**Adj. R^2**	**R^2 Change**	**Sig. *F* Change**
Sc Block 1 (T1 Sc)	.055	--	.003	.741
Sc Block 2 (PCL)	.073	.204	.243	.002
	-.493			
Sc Block 3	T1 Sc=.126	.299	.127	.044
	PCL=-566			
	LEC=-.148			
	CIHQ=.411			
	Standardized *B*	**Adj. R^2**	**R^2 Change**	**Sig. *F* Change**
Em Block 1 (T1 Em)	.607	.351	.368	.000
Em Block 2 (PCL)	.608	.333	.000	.951
	.008			
Em Block 3 (CIHQ, LEC)	T1 Em=.525	.362	.061	.180
	PCL=-.032			
	LEC=.292			
	CIHQ = -.172			

Table 5. Regression results.

Two of the CPI profiles were flagged by the CPP scoring system as possibly invalid (a dichotomous "1" or "0" flag indicates Fake Bad or Fake Good); one profile had a Fake Good score that was .467 over the cutoff score of 60.50 and other was flagged as being below the Fake Bad cutoff score, indicating possible over-reporting of distress. However, a high percentage police officer candidate profiles have been shown to exceed this Fake Good threshold (up to 10% in some male candidate samples), and the CPI manual urges further assessment to determine whether excessive impression management is occurring. The scales used in the calculations are scales that are desirable for officer candidates; police candidates are selected for higher than average psychological health, sociability, and honesty. The officer whose profile slightly

exceeded the Fake Good threshold exceeded that threshold at hiring, and was recommended for employment. Consequently, that profile was included in the participant data, although it was removed as an outlier from the second regression analysis. Figure 7 illustrates the officer's profile in relationship to the group means at time 1 and time 2.

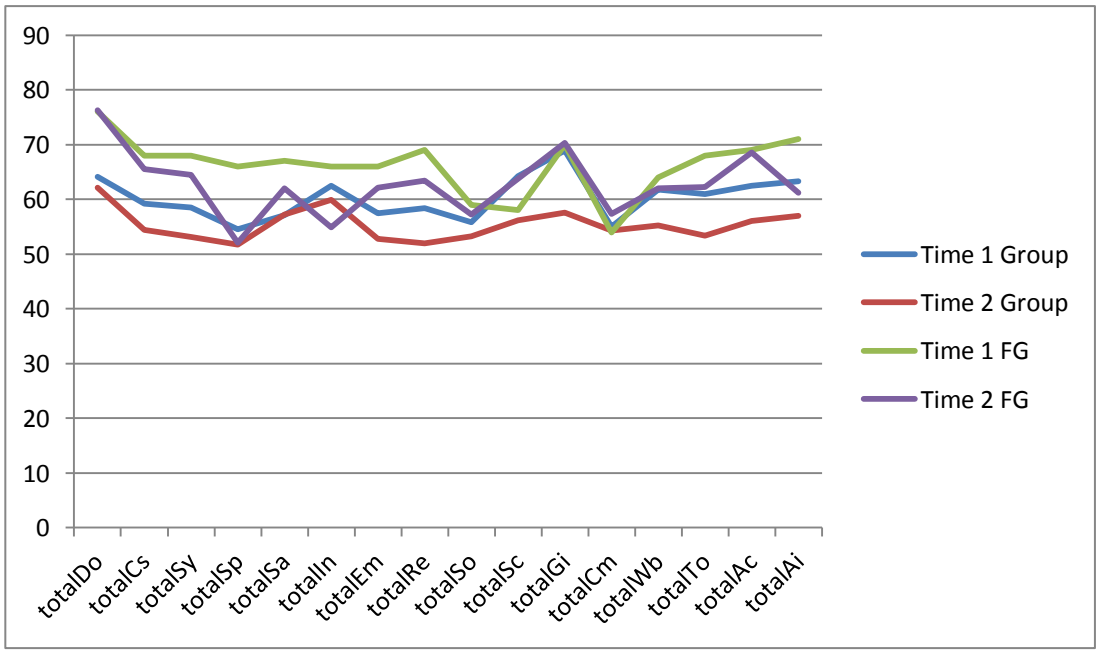


Figure 7. Profile flagged as "Fake Good" at T1 and T2.

The officer who was an outlier, whose profile was flagged as Fake Bad, also endorsed the most severe PTSD symptoms in the participant group, and that officer's PCL score indicates a high likelihood of meeting a PTSD diagnosis. A high report of distress on that person's CPI is consistent with the endorsement of trauma-related distress, and the profile was consequently deemed a valuable data point and included in the study as well, although it was dropped in the second regression analysis.

Figure 8 illustrates this officer's time 1 and time 2 profiles in comparison with group means.

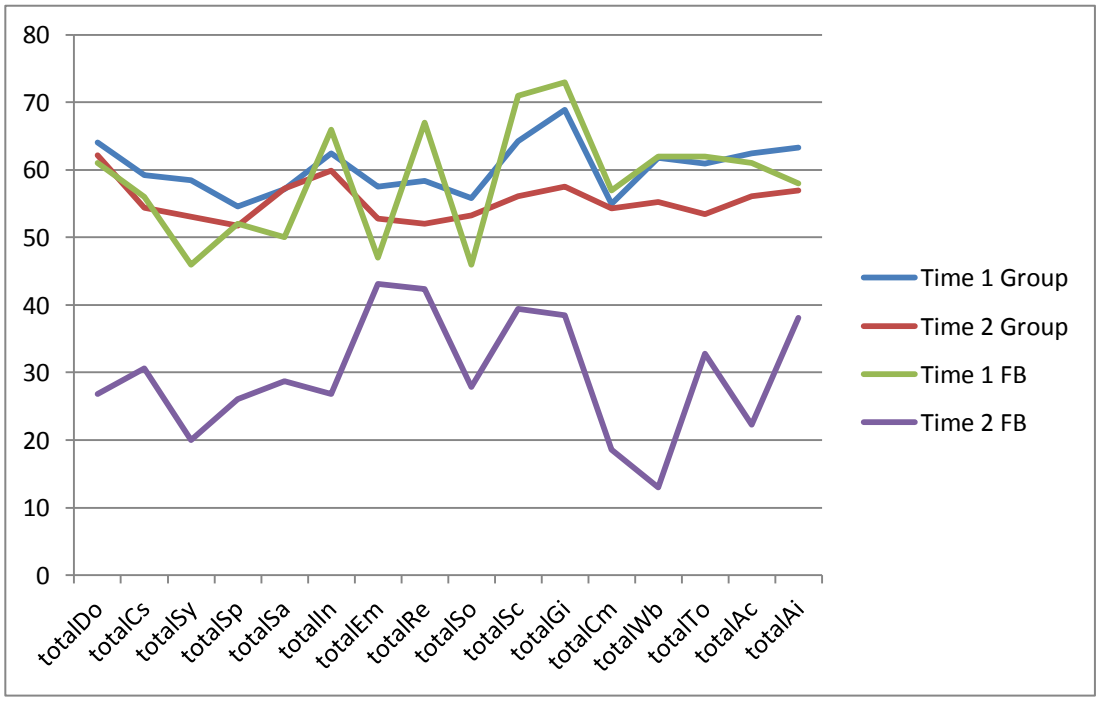


Figure 8. Profile flagged "Fake Bad" at T1 and T2.

To test the effect of removing both the Fake Good outlier and the Fake Bad outlier, both were removed in a second set of regressions. Table 6 contains the statistical results of the regression analysis with the two outliers removed.

	Standardized *B*	**Adj. R^2**	**R^2 Change**	**Sig. *F* Change**
Wb Block 1 (T1 Wb)	.240	--	.058	.153
Wb Block 2 (PCL)	.179 -.355	.131	.122	.031
Wb Block 3	T1 Wb =.187 PCL=-.401 LEC=.190 CIHQ=-.174	.122	.040	.447
	Standardized *B*	**Adj. R^2**	**R^2 Change**	**Sig. *F* Change**
Gi Block 1 (T1 Gi)	.261	--	.068	.118
Gi Block 2 (PCL)	.256 -.361	.152	.130	.025
Gi Block 3	T1 Gi=.254 PCL=-.403 LEC=.137 CIHQ=-.106	.119	.018	.698

	Standardized *B*	Adj. R^2	R^2 Change	Sig. *F* Change
In Block 1 (T1 In)	.364	--	.133	.027
In Block 2 (PCL)	.389 -.226	.135	.050	.157
In Block 3	T1 In=.383 PCL=-.385 LEC=.196 CIHQ=-.001	.138	.051	.356

	Standardized *B*	Adj. R^2	R^2 Change	Sig. *F* Change
Sc Block 1 (T1 Sc)	.173	--	.030	.305
Sc Block 2 (PCL)	.139 -.451	.187	.202	.005
Sc Block 3	T1 Sc=.130 PCL=-.449 LEC=-.125 CIHQ=.199	.178	.037	.450

	Standardized *B*	Adj. R^2	R^2 Change	Sig. *F* Change
Em Block 1 (T1 Em)	.577	--	.333	.000
Em Block 2 (PCL)	.577 .012	.294	.000	.930
Em Block 3 (CIHQ, LEC)	T1 Em=.378 PCL=-.084 LEC=.407 CIHQ=-.372	.413	.144	.020

Table 6. Results with 2 outliers removed.

Removing the outliers substantially changes the results. Statistically significant effects of posttraumatic symptoms as measured by the PCL remain for Wb, Gi, and SC, but do not for the stress exposure measures. The CIHQ and LEC become significant factors in changes in Empathy, but the direction of change is different for each measure (positive for the LEC, negative for the CIHQ) leading to the possibility that specific experiences that are not common to the two measures may impact Empathy.

Appendix A2 and Appendix D2 contain the percentage of officers that endorsed each item in the CIHQ and LEC. Further analysis will be necessary to determine item overlap and the significance of individual item contributions.

Discussion

These surprising results may be indications of two factors at play: selection, and the factors that influence PTG. First, police officers in the participating agency have been screened, tested, and selected for the ability to work under stress, physical health, psychological stability, and personality traits that are conducive to law enforcement work. Officers attend basic and advanced police academies, and subsequently go through a field-training program in which they receive further training before they work on their own. During a year probationary period, their performance is closely monitored, and any officers that do not meet minimum performance requirements are terminated in their probationary year.

Some officers further select out of the job in the first few years following their probationary period due to many reasons, including physical or psychological problems from stressors encountered on the job. Officers that remain after five years have already shown a high level of coping and resilience. Further selection for a homogeneous sample may even occur as a result of the voluntary recruitment process; it is possible that individuals who were willing to volunteer for the study had common traits or attributes. This extended selection and self-selection process may be particularly effective in narrowing the participant pool to a comparatively elite and high-functioning group with respect to their ability to cope with stressful events. In addition, the more resilient and positive individuals may work more productively and respond to a higher overall number of calls for service, increasing their likelihood for experiencing PTEs on the job. As previously noted, Lefkowitz (1995) pointed out the potential

contributions of some of these factors and the methodological difficulties in assessing these contributions.

The extended period of time between the time one and time two assessments may also have given the participants the opportunity to experience PTG through finding something meaningful in their experiences, to some extent offsetting the effects of the PTE exposure. Further research might show whether the officers experienced initially high levels of distress and rumination following traumatic incident exposure, followed by PTG, as Bayer-Topilsky et al. (2013) suggest. Additional data may also shed light on whether the extensive intentional and de facto selection process contributing to survival on the job results in a pool of individuals with specific personality profiles primed to experience PTG. The negative impact of high levels of PTSD symptoms as measured by the PCL confirm the findings of McLean et al. (2013), in that the higher levels of PTSD predict more negative personality trajectories. Further research into baseline personality traits may shed light on whether specific personality profiles contribute to high levels of PTSD symptoms that result in less likelihood of PTG.

Two of the traits, Self-Control and Good Impression, have a limited range of scores that are considered adaptive; at some point, higher may cease to be better. Very high levels of self-control may indicate over-control, and high levels of Good Impression are associated with increasingly less adaptive concerns about the reactions of others. At higher levels of Gi, scorers may become increasingly formal, conservative, moralistic, and ingratiate themselves with superiors at the expense of their own subordinates. Further analysis may be needed to determine if the positive influence on trajectory and current levels of these two traits are in fact adaptive or desirable in all cases. Research to determine the presence of a relationship between Gi and

authoritarianism may also build on Owen et al. (2008) to suggest whether increased Gi equates to increases in authoritarianism.

Although personality traits in Löckenhoff et al. (2009) were Five Factor Model traits measured by the NEO-PI-R, the effect sizes for similar constructs from the CPI scales were used in the power calculation. Using G*Power 3, with a .25 effect size, 2 tailed test with *alpha* at .05, .85 power with 6 predictors, the minimum sample size required for the study was 31 participants, so 39 participants were adequate for the statistical analysis.

The high PCL outlier profile in particular illustrated that at high levels, PTSD predicts lower PTG as McLean et al. (2013) concluded. They found that at higher levels of healthcare stress, PTSD increased curvilinearly, and PTG declined (see Figure 11).

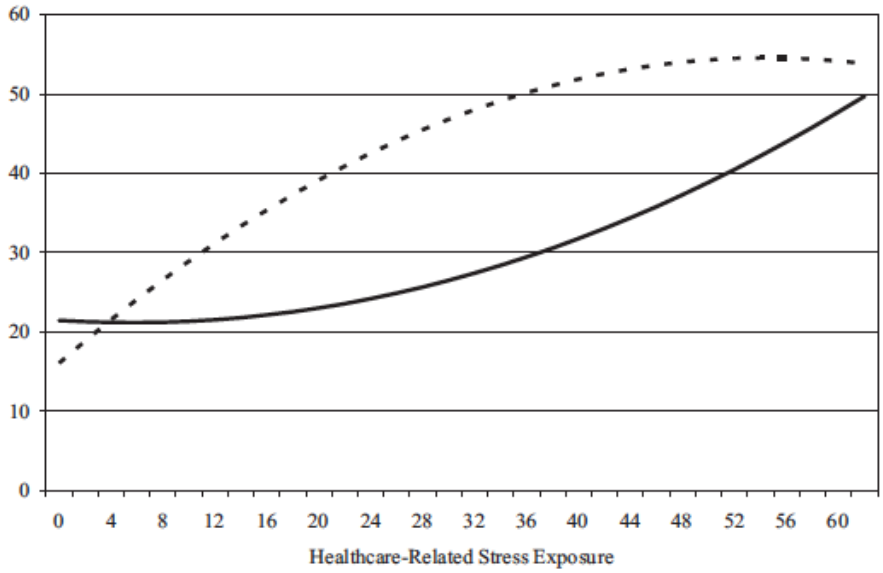


Figure 9. Healthcare-related stress exposure. Source: McLean et al. (2013)

In spite of meeting the sample size indicated by the power analysis, during the statistical analysis it was discovered that the results were particularly affected by these specific profiles, illustrated by the significant effects (loss of significance for stress measures influence on trajectory in most traits) when outliers were removed as was discussed in detail in the Results

section. Some of this sensitivity may be due to a restricted range of profiles caused by selection; additional samples from different regions, agencies, and population densities could alleviate this problem. Officers that select out of large urban agencies regularly seek employment with smaller agencies where the call volume and work environment may be less intense and stressful. Additional data from different agencies in rural or suburban areas would help to broaden the participant sample and render the results more conclusive. Critical incident exposure as measured by the Critical Incident History Questionnaire (CIHQ) and the Life Event Checklist (LEC) does explain a statistically significant portion of the variance in change over time between scores for the Wellbeing, Independence, Good Impression, and Self-Control scales of the California Psychological Inventory (CPI) at baseline (pre-hire) and 5-10 years later. However, higher exposure to PTE was hypothesized to correlate with more negative (decreasing) score trajectories on all five scales. The unexpected direction of this relationship showed that traumatic experiences in fact may be predictive of PTG or psychological resilience, in part offsetting the negative psychological consequences of trauma in four of the five selected traits.

The impact of this study is significant, as police officers represent an important representative group to study the effects of chronic trauma exposure. Trauma and personality research with law enforcement participants may generalize to other populations of interest, such as emergency medical and military personnel, or even residents of high-crime, high-poverty inner city neighborhoods. Conveniently, historical data is often available as a result of psychological screening and evaluation during hiring. Further research with larger, more diverse samples may identify positive predictors of coping and PTG to make informed decisions for hiring in occupations with a high likelihood of trauma exposure.

Understanding the long-term effects of chronic trauma exposure on personality may improve response and treatment by mental health professionals serving law enforcement officers and other emergency responders. In turn, these mental health professionals may provide vital information to administrators as they seek to make informed hiring decisions, and to maintain the long-term health and productivity of critical personnel.

References

Adkins, J. W., Weathers, F. W., McDevitt-Murphy, M., & Daniels, J. B. (2008). Psychometric properties of seven self-report measures of posttraumatic stress disorder in college students with mixed civilian trauma exposure. *Journal of Anxiety Disorders, 22*(8), 1393-1402. doi:http://dx.doi.org/10.1016/j.janxdis.2008.02.002

Allemand, M., Gomez, V., & Jackson, J. J. (2010). Personality trait development in midlife: Exploring the impact of psychological turning points. *European Journal of Ageing, 7*(3), 147-155. doi:10.1007/s10433-010-0158-0

Allport, F.H. & Allport, G.W. (1921). Personality traits: Their Classification and Measurement. *Journal of Abnormal and Social Psychology, 16*, 1-40.

Allport, G.W. (1937). Personality: A psychological interpretation. New York: Henry Holt and Company.

Altemeyer, B. (2004). Highly dominating, highly authoritarian personalities. *Journal of Social Psychology, 144*, 421-447.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th ed., text rev.)*. Washington, DC, American Psychiatric Association. doi:10.1176/appi.books.9780890423349.

American Psychiatric Association, (2013). Highlights of changes from DSM-IV-TR to DSM-V. American Psychiatric Publishing. 9.

Balch, R. W. (1972). The Police Personality: Fact or Fiction. *Journal of Criminal Law, Criminology & Police Science, 63*(1), 106-119.

Barenbaum, N.B. & Winter, D.G. (2008). History of modern personality theory and research. *Handbook of Personality: Theory and Research,* 3rd Ed., 3-26.

Bayer-Topilsky, T., Itzhaky, H., Dekel, R., & Marmor, Y.N. (2013): Mental Health and Posttraumatic Growth in Civilians Exposed to Ongoing Terror, *Journal of Loss and Trauma: International Perspectives on Stress & Coping, 18*(3), 227-247. doi: 10.1080/15325024.2012.687325

Blake, D. D., Weathers, F. W., Nagy, L. M., Kaloupek, D. G., Klauminzer, G., Charney, D. S., & Keane, T. M. (1990). A clinician rating scale for assessing current and lifetime PTSD: The CAPS-1. *Behavior Therapist, 13*, 187–188.

Bober, T., Regehr, C., & Zhou, Y. R. (2006). Development of the coping strategies inventory for trauma counselors. *Journal of Loss and Trauma, 11*(1), 71-83. doi:10.1080/15325020500358225

Brown, J. M., & Campbell, E. A. (1990). *Stress and policing: Sources and strategies*. Chichester, UK: Wiley.

Calhoun, L.G., Cann, A., Tedeschi, R.G., & McMillan, J., (2000). A Correlational Test of the Relationship Between Posttraumatic Growth, Religion, and Cognitive Processing. *Journal of Traumatic Stress, 13*, (3), 521-527.

Caringi, J. C. (2007). Secondary traumatic stress in New York state child welfare workers. State University of New York at Albany. *ProQuest Dissertations and Theses, 134*. Retrieved from http://search.proquest.com/docview/304747482?accountid=14593. (304747482).

Costa, P. T., Herbst, J. H., McCrae, R. R., & Siegler, I. C. (2000). Personality at midlife: Stability, intrinsic maturation, and response to life events. *Assessment, 7*(4), 365-378. doi:10.1177/107319110000700405

Courtois, C. A., & Ford, J. D., (2009). *Treating Complex Traumatic Stress Disorders*. New York, NY, US: Guilford Press.

Crank, J. (1998). *Understanding police culture*. Cincinnati, OH: Anderson.

Crank, J., & Caldero, M. (1991). The production of occupational stress in medium-sized police agencies: A survey of line officers in eight municipal police departments. *Journal of Criminal Justice,* (*19*), 339-349.

Dalley, A.F. (1975). University vs. non-university graduated policemen; a study of police attitudes. *Journal of Police Science and Administration. 3*(4),11.

Donovan, E. (2010). Propranolol use in the prevention and treatment of posttraumatic stress disorder in military veterans: Forgetting therapy revisited. *Perspectives in Biology and Medicine, 53*(1), 61-74. doi:http://dx.doi.org/10.1353/pbm.0.0140

Duncan, & Agronick (1995). The Intersection of Life Stage and Social Events: Personality and Life Outcomes. *Journal of Personality and Social Psychology*, *69* (3), 558-568.

Ehninger, D., & Kempermann, G. (2008). Neurogenesis in the adult hippocampus. *Cell and Tissue Research, 331*(1), 243-250. doi:10.1007/s00441-007-0478-3

Farmer, R.E., (1978). Internships in police higher education. *Journal of Police Science and Administration, 6,* 452-461.

Ford, J. D., & Courtois, C. A., (2009). Defining and Understanding Complex Trauma and Complex Traumatic Stress Disorders. *Treating Complex Traumatic Stress Disorders,* (12-31). New York, NY, US: Guilford Press.

Genz, J.L., Lester, D., (1976) Authoritarianism in policemen as a function of experience. *Journal of Police Science and Administration, 4*(5).

Gilmartin, K. M. (2002). *Emotional survival for law enforcement: A guide for officers and their families*. Tucson, AZ: E-S Press.

Golembiewski, R. T., & Kim, B.S. (1990). Burnout in police work: Stressors, strain, and the phase model. *Police Studies, 13,* 74-80.

Gough, H. G., & Bradley, P. (1996). *California Psychological Inventory manual*. Palo Alto, CA: Consulting Psychologists Press.

Graham (2006). The MMPI-2: *Assessing personality and psychopathology* (4th ed.). New York: Oxford.

Gray, M.J., Litz, B.T., Hsu, J.L., & Lombardo, T.W., (2004). Psychometric Properties of the Life Events Checklist. *Assessment, 11,* 330. doi: 10.1177/1073191104269954

Groleau, J. M., Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2012, August 13). The Role of Centrality of Events in Posttraumatic Distress and Posttraumatic Growth. *Psychological Trauma: Theory, Research, Practice, and Policy*. Advance online publication. doi: 10.1037/a0028809

Helson, R., Kwan, V. S. Y., John, O. P., & Jones, C. (2002). The growing evidence for personality change in adulthood: Findings from research with personality inventories. *Journal of Research in Personality, 36*(4), 287-306. doi:10.1016/S0092-6566(02)00010-7

Hocking, L. B., & Koenig, H. G. (1995). Anxiety in medically ill older patients: A review and update. *International Journal of Psychiatry in Medicine, 25*(3), 221-238. Retrieved from http://search.proquest.com/docview/618938604?accountid=14593

Holmes, T. H., & Rahe, R. H. (1967). The Social Readjustment Rating Scale. *Journal of Psychosomatic Research, 2,* 213-218.

Jones, C., Livson, N., & Peskin, H. (2003). Longitudinal Hierarchical Linear Modeling Analyses of California Psychological Inventory Data from Age 33 to 75: An Examination of Stability and Change in Adult Personality. *Journal of Personality Assessment 80,* 294-308.

Jones, C., & Peskin, H., (2009).Americans' Psychological Health Trajectories: Analyses of Survey Data from the Intergenerational Studies. *Historical Social Research, 34*(1), 127,

Kandler, C., Bleidorn, W., Riemann, R., Spinath, F. M., Thiel, W., & Angleitner, A. (2010). Sources of cumulative continuity in personality: A longitudinal multiple-rater twin study. *Journal of Personality and Social Psychology, 98*(6), 995-1008. doi:10.1037/a0019558

Kirk, R. E. (1996). Practical significance: A concept whose time has come. *Educational and Psychological Measurement, 56*(5), 746-759.

Krauseneck, T., Padberg, F., Roozendaal, B., Grathwohl, M., Weis, F., Hauer, D., . . . Schelling, G. (2010). A β-adrenergic antagonist reduces traumatic memories and PTSD symptoms in female but not in male patients after cardiac surgery. *Psychological Medicine, 40*(5), 861-869. doi:http://dx.doi.org/10.1017/S0033291709990614

Kubany, E. S., Leisen, M. B., Kaplan, A. S., Watson, S. B., Haynes, S. N., Owens, J. A., & Burns, K. (2000). Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The traumatic life events questionnaire. *Psychological Assessment, 12*(2), 210-224. doi:http://dx.doi.org/10.1037/1040-3590.12.2.210

Löckenhoff , C. E., Terracciano, A., Patriciu, N. S., Eaton, W. W., & Costa, P. T., Jr. (2009). Self-reported extremely adverse life events and longitudinal changes in five-factor model personality traits in an urban sample. *Journal of Traumatic Stress, 22*(1), 53-59. doi:10.1002/jts.20385

Lefkowitz, J. (1975). Psychological Attributes of Policemen: A Review of Research and Opinion. *Journal Of Social Issues, 31*(1), 3-26.

McLean, C. P., Handa, S., Dickstein, B. D., Benson, T. A., Baker, M. T., Isler, W. C., Litz, B. T. (2013). Posttraumatic growth and posttraumatic stress among military medical personnel.

Psychological Trauma: Theory, Research, Practice, and Policy, 5(1), 62-68. doi: 10.1037/a0022949

McCrae, R. R. (2002). The maturation of personality psychology: Adult personality development and psychological well-being. *Journal of Research in Personality, 36*(4), 307-317. doi:10.1016/S0092-6566(02)00011-9

McCrae, R. R., & Costa, P. T. (1994). The stability of personality: Observation and evaluations. *Current Directions in Psychological Science, 3*(6), 173-175. doi:10.1111/1467-8721.ep10770693

McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hřebíčková, M., Avia, M. D., Smith, P. B. (2000). Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology, 78*(1), 173-186. doi:10.1037/0022-3514.78.1.173

McCreary, D.R., Thompson, M. M., (2006). Development of Two Reliable and Valid Measures of Stressors in Policing: The Operational and Organizational Police Stress Questionnaires. *International Journal of Stress Management, Vol. 13*(4), 494–518. doi: 10.1037/1072-5245.13.4.494

Millon, T. (1987). *Manual for the Millon Clinical Multiaxial Inventory-II* (2nd ed.). Minneapolis, MN: National Computer Systems.

Mohr, D., Vedantham, K., Neylan, T., Metzler, T. J., Best, S., & Marmar, C. R. (2003). The mediating effects of sleep in the relationship between traumatic stress and health symptoms in urban police officers. *Psychosomatic Medicine, 65*(3), 485-489.

Monti, J. M. (2010). The role of dorsal raphe nucleus serotonergic and non-serotonergic neurons, and of their receptors, in regulating waking and rapid eye movement (REM) sleep. *Sleep Medicine Reviews, 14*(5), 319-327. doi:10.1016/j.smrv.2009.10.003

Morizot, J., & Le Blanc, M. (2003). Continuity and change in personality traits from adolescence to midlife: A 25-year longitudinal study comparing representative and adjudicated men. *Journal of Personality, 71*(5), 705-755. doi:10.1111/1467-6494.7105002

Nelson, C. A. (1999). Neural plasticity and human development. *Current Directions in Psychological Science, 8*, 42-45.

Neylan, T. C., Mueller, S. G., Wang, Z., Metzler, T. J., Lenoci, M., Truran, D., . . . Schuff, N. (2010). Insomnia severity is associated with a decreased volume of the CA3/dentate gyrus hippocampal subfield. *Biological Psychiatry, 68*(5), 494-496. doi:10.1016/j.biopsych.2010.04.035

Niederhoffer, A. (1967). *Behind the shield*. Garden City, NY: Doubleday.

Noftle, E. E., & Fleeson, W. (2010). Age differences in big five behavior averages and variabilities across the adult life span: Moving beyond retrospective, global summary accounts of personality. *Psychology and Aging, 25*(1), 95-107. doi:10.1037/a0018199

Owen, S. S., & Wagner, K. (2008). The specter of authoritarianism among criminal justice majors. *Journal of Criminal Justice Education, 19*(1), 30-53. doi:10.1080/10511250801892748

Pearlman, L.A., Caringi, J. (2009). Living and Working Self-Reflectively to Address Vicarious Trauma. *Treating Complex Traumatic Stress Disorders*, 202-224. New York, NY, US: Guilford Press.

Pryzgoda, J. & Schuldberg, D. (2004).Thought suppression, self-reflection, and posttraumatic thought: An examination of proposed pathways to growth. Presented to the 38th annual AABT meetings, New Orleans, LA, November 18-21, 2004.

Regehr, C., Goldberg, G., & Hughes, J. (2002). Exposure to human tragedy, empathy, and trauma in ambulance paramedics. *The American Journal of Orthopsychiatry, 72*(4), 505-513.

Roberts, B. W., Helson, R., & Klohnen, E. C. (2002). Personality development and growth in women across 30 years: Three perspectives. *Journal of Personality, 70*(1), 79-102. doi:10.1111/1467-6494.00179

Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science, 17*(1), 31-35. doi:10.1111/j.1467-8721.2008.00543.x

Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins & L. A. Pervin (Eds.), *Handbook of personality psychology: Theory and research (3rd ed.).* 375-398. New York, NY, US: Guilford Press.

Rudofossi, D. (2011). Police and Public Safety Complex Trauma and Grief: An Eco-Ethological Existential Analysis. *Handbook of Police Psychology*, 437-468.

Scully, J. A., Tosi, H., & Banning, K. (2000). Life event checklists: Revisiting the social readjustment rating scale after 30 years. *Educational and Psychological Measurement*, *60*(6), 864-876. doi:10.1177/00131640021970952

Skolnick, J. H. (1966/2010). A sketch of the policeman's "working personality" (1966). In S. K. Rice & M. D. White (Eds.), *Race, Ethnicity, and Policing: New and Essential Readings* (pp. 15-31). NY: NYU Press.

Spector, P. E. (1985). Measurement of human service staff satisfaction: Development of the Job Satisfaction Survey. *American Journal of Community Psychology, 13*, 693–713.

Stein, M. B., Kerridge, C., Dimsdale, J. E., & Hoyt, D. B. (2007). Pharmacotherapy to prevent PTSD: Results from a randomized controlled proof-of-concept trial in physically injured patients. *Journal of Traumatic Stress, 20*(6), 923-932. doi:http://dx.doi.org/10.1002/jts.20270

Steinberg, M. (1994). *Interviewers Guide to the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D)*. Washington, DC, American Psychiatric Press.

Territo, L., & Vetter, H. (1981). Stress and police personnel. *Journal of Police Science and Administration, 9,* 195-208.

Van Katwyk, P. T., Fox, S., Spector, P. E., & Kelloway, E. K. (2000). Using the Job-related Affective Well-being Scale (JAWS) to investigate affective responses to work stressors. *Journal of Occupational Health Psychology*, *5*, 219–230.

Violanti, J. (1996). *Police suicide: Epidemic in blue*. Springfield, IL: Charles C. Thomas.

Violanti, J., Andrew, M., Burchfiel, C., Hartley, T., Charles, L., & Miller, D. (2007). Post-traumatic stress symptoms and cortisol patterns among police officers. *Policing*, *30*, 189-202.

Violanti, J., & Aron, F. (1995). Police stressors: Variations in perception among police personnel. Journal of Criminal Justice, 23, 287-294.

Wortley, R., Homel-Ross, J., (1995). Police prejudice as function of training and out-group contact: A longitudinal investigation. *Law and Human Behavior, 19*(3), 13.

Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993). The PTSD checklist (PCL); reliability, validity, and diagnostic utility. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, San Antonio, TX.

Weiser, N, & Meyers, L., (1993). Validity and Reliability of the Revised California. Psychological Inventory's Vector 3 Scale. *Educational and Psychological Measurement, 53*. 1045-1054.

Weiss, D., Brunet, A., Best, S. R., Metzler, T. J., Liberman,A., Rogers, C., et al. (2001). The Critical Incident History Questionnaire: A method for measuring total cumulative exposure to critical incidents. Unpublished manuscript.

Weiss, D., Brunet, A., Best, S. R., Metzler, T. J., Liberman,A., Pole, N., Fagan, J., Marmar, C., (2010). Frequency and Severity Approaches to Indexing Exposure to Trauma: The Critical Incident History Questionnaire for Police Officers. *Journal of Traumatic Stress*, *23* (6), 734–743

Appendix A1

CRITICAL INCIDENT HISTORY QUESTIONNAIRE (CIHQ)

INSTRUCTIONS: Below is a list of critical incidents to which police officer may be exposed at some point during their career. Please read each item and in the left-hand column, give your best estimate of the number of times that you have personally experienced that incident ***in the line of duty***. Next, in the right-hand column, please give your opinion about how difficult it would be for police officers to cope with each type of incident, ***not how difficult it would be for you personally***. Please make an estimate for each incident, even if you have never been exposed to it.

Please indicate how many times you have experienced each incident in the line of duty by writing in the box the number if it is between 0 and 9, OR if it is more than 10, by circling the appropriate numeric range.	**In your opinion, how difficult would it be for police officers to cope with this type of incident?**				
	Not at all	**A little bit**	**Mod-erately**	**Quite a bit**	**Extre-mely**
1. Being seriously injured intentionally.	0	1	2	3	4
Write in if from 0 - 9 ∋ 10 – 20 21 – 50 51+					
2. Being seriously injured accidentally.	0	1	2	3	4
Write in if from 0 - 9 ∋ 10 – 20 21 – 50 51+					
3. Being present when a fellow officer was killed intentionally.	0	1	2	3	4
Write in if from 0 - 9 ∋ 10 – 20 21 – 50 51+					
4. Being present when a fellow officer was seriously injured intentionally.	0	1	2	3	4

Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
5. Being present when a fellow officer was seriously injured accidentally.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
6. Being present when a fellow officer was killed accidentally.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
7. Being seriously beaten.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
8. Being taken hostage.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
9. Receiving threats towards your loved ones as retaliation for your police work.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
10. Being shot at.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
11. Being threatened with a gun.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				
12. Being threatened with a knife or other weapon.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+				

13. Being trapped in a potentially life-threatening situation.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					
14. Being exposed to serious risk of AIDS or other life-threatening diseases.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					
15. Having your life threatened by an aggressive and dangerous animal.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					
16. Being exposed to a life-threatening toxic substance.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					
17. Having to kill or seriously injure someone in the line of duty.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					
18. Having to shoot at someone in the line of duty, without injuring them.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					
19. Making a mistake that lead to the serious injury or death of a fellow officer.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					
20. Making a mistake that lead to the serious injury or death of a bystander.					0	1	2	3	4
Write in if from 0 - 9	Ǝ	10 – 20	21 – 50	51+					

21. Being involved in a high-speed chase where lives were in danger.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
22. Seeing someone dying.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
23. Encountering the body of someone recently dead.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
24. Encountering a decaying corpse.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
25. Encountering a mutilated body or human remains.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
26. Making a death notification.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
27. Encountering a child who had been sexually assaulted.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
28. Encountering a child who had been badly beaten.					0	1	2	3	4
Write in if from 0 - 9	Ə	10 – 20	21 – 50	51+					
29. Encountering an adult who had been sexually assaulted.					0	1	2	3	4

Write in if from 0 - 9	Ɜ	10 – 20	21 – 50	51+					
30. Encountering an adult who had been badly beaten.					0	1	2	3	4
Write in if from 0 - 9	Ɜ	10 – 20	21 – 50	51+					
31. Encountering a child who was severely neglected or in dire need of medical attention because of neglect.					0	1	2	3	4
Write in if from 0 - 9	Ɜ	10 – 20	21 – 50	51+					
32. Seeing animals that had been severely neglected, intentionally injured, or killed.					0	1	2	3	4
Write in if from 0 - 9	Ɜ	10 – 20	21 – 50	51+					
33. Having your life endangered in a large-scale man-made disaster.					0	1	2	3	4
Write in if from 0 - 9	Ɜ	10 – 20	21 – 50	51+					
34. Having your life endangered in a large-scale natural disaster.									
Write in if from 0 - 9	Ɜ	10 – 20	21 – 50	51+					

Appendix A2.

Endorsement Frequencies for CIHQ Questions

Item	% Endorsing
1. Being seriously injured intentionally.	27.5
2. Being seriously injured accidentally.	30
3. Being present when a fellow officer was killed intentionally.	17
4. Being present when a fellow officer was seriously injured intentionally.	32.5
5. Being present when a fellow officer was seriously injured accidentally.	35
6. Being present when a fellow officer was killed accidentally.	5
7. Being seriously beaten.	10
8. Being taken hostage.	0
9. Receiving threats towards your loved ones as retaliation for your police work.	50
10. Being shot at.	35
11. Being threatened with a gun.	45
12. Being threatened with a knife or other weapon.	65
13. Being trapped in a potentially life-threatening situation.	55
14. Being exposed to serious risk of AIDS or other life-threatening diseases.	70
15. Having your life threatened by an aggressive and dangerous animal.	47.5
16. Being exposed to a life-threatening toxic substance.	17.5
17. Having to kill or seriously injure someone in the line of duty.	20
18. Having to shoot at someone in the line of duty, without injuring them.	0
19. Making a mistake that lead to the serious injury or death of a fellow officer.	0
20. Making a mistake that lead to the serious injury or death of a bystander.	0
21. Being involved in a high-speed chase where lives were in danger.	77.5
22. Seeing someone dying.	85
23. Encountering the body of someone recently dead.	97.5
24. Encountering a decaying corpse.	95
25. Encountering a mutilated body or human remains.	50
26. Making a death notification.	85
27. Encountering a child who had been sexually assaulted.	82.5
28. Encountering a child who had been badly beaten.	72.5
29. Encountering an adult who had been sexually assaulted.	90
30. Encountering an adult who had been badly beaten.	95
31. Encountering a child who was severely neglected or in dire need of medical attention because of neglect.	77.5
32. Seeing animals that had been severely neglected, intentionally injured, or killed.	87.5
33. Having your life endangered in a large-scale man-made disaster.	2.5
34. Having your life endangered in a large-scale natural disaster.	7.5

Results and severity rating of Weiss et al. (2010). Copyright by the American Psychological Association.

		Item response category					
Abbreviated Item	*n*	0	1–9	10–20	21–50	51+	Severity rating
Mistake that injures/kills colleague	717	97.8	2.2	0.0	0.0	0.0	3.81
Colleague killed intentionally	714	79.0	20.3	0.6	0.0	0.0	3.76
Mistake that injures/kills bystander	640	97.5	2.3	0.2	0.0	0.0	3.67
Colleague killed accidentally	710	87.6	12.1	0.0	0.0	0.0	3.51
Being taken hostage	718	97.3	2.6	0.0	0.0	0.0	3.49
Colleague injured intentionally	714	52.7	42.6	4.3	0.4	0.0	3.39
Your loved ones threatened	716	65.8	28.2	4.6	0.8	0.6	3.29
Being shot at	719	60.1	38.1	1.8	0.0	0.0	3.23
Badly beaten child	708	33.1	35.9	20.9	7.9	2.3	3.23
Being seriously beaten	716	84.1	15.1	0.4	0.4	0.0	3.18
Kill or injure in the line of duty	716	74.9	23.0	1.8	0.0	0.0	3.16
Sexually assaulted child	714	21.0	40.6	24.5	8.1	5.7	3.11
Exposed to AIDS or other diseases	707	23.9	52.0	17.4	6.6	0.0	3.09
Severely neglected child	712	24.6	40.2	26.4	6.7	2.1	3.07
Trapped in life-threatening situation	716	52.2	39.4	7.5	0.8	0.0	3.02
Threatened with a gun	715	42.5	50.8	6.3	0.4	0.0	2.96
Seriously injured intentionally	713	64.9	29.2	3.4	1.4	1.1	2.92
Colleague injured accidentally	714	47.5	45.4	6.4	0.6	0.0	2.83
Threatened with knife/other weapon	703	34.1	55.2	9.4	1.3	0.0	2.70
Life-threatening man-made disaster	707	82.7	15.7	1.4	0.0	0.0	2.70
Life threatened by toxic substance	713	68.6	25.8	3.9	0.8	0.8	2.62
Shoot but not injure in line of duty	714	84.7	15.0	0.3	0.0	0.0	2.62
Life-threatening natural disaster	714	82.1	17.7	0.3	0.0	0.0	2.60
Seeing someone dying	704	12.4	87.2	0.1	0.3	0.0	2.49
Seriously injured accidentally	714	57.3	38.5	2.4	1.3	0.6	2.46
Making a death notification	700	25.6	42.1	20.6	6.7	4.7	2.42
Life-threatening high speed chase	667	16.7	82.2	0.4	0.0	0.0	2.30
Mutilated body or human remains	709	29.2	41.6	21.0	5.4	2.8	2.29
Sexually assaulted adult	704	11.4	36.2	29.6	14.2	8.7	2.29
Badly beaten adult	705	5.0	18.9	33.1	19.9	23.3	2.03
Life threatened by dangerous animal	718	48.1	44.1	6.3	0.8	0.1	2.02
Decaying corpse	714	8.8	40.1	31.1	12.0	8.0	1.98
Animal neglected, tormented, killed	706	25.9	37.2	28.0	5.4	3.4	1.94
Body of someone recently dead	710	1.6	21.7	32.5	20.4	23.8	1.87

Note. AIDS = Acquired immunodeficiency syndrome.

Appendix B

Operational Police Stress Questionnaire

Below is a list of items that describe different aspects of being a police officer. After each item, please circle how much stress it has caused you over the past 6 months, using a 7-point scale (see below) that ranges from "No Stress At All" to "A Lot Of Stress":

No Stress At All			Moderate Stress			A Lot Of Stress
1	2	3	4	5	6	7

1. Shift work	1	2	3	4	5	6	7
2. Working alone at night	1	2	3	4	5	6	7
3. Over-time demands	1	2	3	4	5	6	7
4. Risk of being injured on the job	1	2	3	4	5	6	7
5. Work related activities on days off (e.g. court, community events)	1	2	3	4	5	6	7
6. Traumatic events (e.g. MVA, domestics, death, injury)	1	2	3	4	5	6	7
7. Managing your social life outside of work	1	2	3	4	5	6	7
8. Not enough time available to spend with friends and family	1	2	3	4	5	6	7
9. Paperwork	1	2	3	4	5	6	7
10. Eating healthy at work	1	2	3	4	5	6	7
11. Finding time to stay in good physical condition	1	2	3	4	5	6	7
12. Fatigue (e.g. shift work, over-time)	1	2	3	4	5	6	7
13. Occupation-related health issues (e.g. back pain)	1	2	3	4	5	6	7
14. Lack of understanding from family and friends about your work	1	2	3	4	5	6	7
15. Making friends outside the job	1	2	3	4	5	6	7
16. Upholding a "higher image" in public	1	2	3	4	5	6	7
17. Negative comments from the public	1	2	3	4	5	6	7
18. Limitations to your social life (e.g. who your friends are, where you socialize)	1	2	3	4	5	6	7
19. Feeling like you are always on the job	1	2	3	4	5	6	7
20. Friends / family feel the effects of the stigma associated with your job	1	2	3	4	5	6	7

Appendix C

Organizational Police Stress Questionnaire

Below is a list of items that describe different aspects of being a police officer. After each item, please circle how much stress it has caused you over the past 6 months, using a 7-point scale (see below) that ranges from "No Stress At All" to "A Lot Of Stress":

No Stress At All			Moderate Stress			A Lot Of Stress
1	2	3	4	5	6	7

1. Dealing with co-workers	1	2	3	4	5	6	7
2. The feeling that different rules apply to different people (e.g. favouritism)	1	2	3	4	5	6	7
3. Feeling like you always have to prove yourself to the organization	1	2	3	4	5	6	7
4. Excessive administrative duties	1	2	3	4	5	6	7
5. Constant changes in policy / legislation	1	2	3	4	5	6	7
6. Staff shortages	1	2	3	4	5	6	7
7. Bureaucratic red tape	1	2	3	4	5	6	7
8. Too much computer work	1	2	3	4	5	6	7
9. Lack of training on new equipment	1	2	3	4	5	6	7
10. Perceived pressure to volunteer free time	1	2	3	4	5	6	7
11. Dealing with supervisors	1	2	3	4	5	6	7
12. Inconsistent leadership style	1	2	3	4	5	6	7
13. Lack of resources	1	2	3	4	5	6	7
14. Unequal sharing of work responsibilities	1	2	3	4	5	6	7
15. If you are sick or injured your co-workers seem to look down on you	1	2	3	4	5	6	7
16. Leaders over-emphasise the negatives (e.g. supervisor evaluations, public complaints)	1	2	3	4	5	6	7
17. Internal investigations	1	2	3	4	5	6	7
18. Dealing the court system	1	2	3	4	5	6	7
19. The need to be accountable for doing your job	1	2	3	4	5	6	7
20. Inadequate equipment	1	2	3	4	5	6	7

Appendix D1

Life Events Checklist

Instructions: Below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that (a) it happened to you personally, (b) you witnessed it happen to someone else, (c) you learned about it, (d) you don't know if it applies to you, or (e) does not apply to you.

Event	**Happened to me**	**Witnessed it**	**Learned about it**	**Don't know**	**Doesn't apply**
1. Natural disaster (for example, flood, hurricane, tornado, earthquake)					
2. Fire or explosion					
3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)					
4. Serious accident at work, home, or during recreational activity					
5. Exposure to toxic substance (for example, dangerous chemicals, radiation)					
6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)					
7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)					
8. Sexual assault (rape, attempted rape, made to perform any type of sexual act					

through force of threat of harm)					
9. Other unwanted or uncomfortable sexual experience					
10. Combat or exposure to a war-zone (in the military or as a civilian)					
11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)					
12. Life-threatening illness or injury					
13. Severe human suffering					
14. Sudden, violent death (for example, homicide, suicide)					
15. Sudden, unexpected death of someone close to you					
16. Serious injury, harm, or death you caused to someone else					
17. Any other very stressful event or experience					

Appendix D2

LEC Endorsement Frequencies

	% Experienced	%Witnessed	% Heard about it
1. Natural disaster (for example, flood, hurricane, tornado, earthquake)	35.0%	35.0%	57.5%
2. Fire or explosion	32.5%	55.0%	50.0%
3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)	72.5%	75.0%	50.0%
4. Serious accident at work, home, or during recreational activity	37.5%	42.5%	47.5%
5. Exposure to toxic substance (for example, dangerous chemicals, radiation)	20.0%	17.5%	57.5%
6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)	77.5%	65.0%	65.0%
7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)	30.0%	50.0%	75.0%
8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force of threat of harm)	2.5%	7.5%	87.5%
9. Other unwanted or uncomfortable sexual experience	7.5%	7.5%	72.5%
10. Combat or exposure to a war-zone (in the military or as a civilian)	12.5%	7.5%	47.5%
11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)	0.0%	7.5%	65.0%
12. Life-threatening illness or injury	17.5%	57.5%	65.0%
13. Severe human suffering	0.0%	32.5%	65.0%
14. Sudden, violent death (for example, homicide, suicide)	10.0%	50.0%	67.5%
15. Sudden, unexpected death of someone close to you	47.5%	37.5%	40.0%
16. Serious injury, harm, or death you caused to someone else	20.0%	17.5%	22.5%
17. Any other very stressful event or experience	60.0%	42.5%	32.5%

Appendix E

Post-Traumatic Checklist (PCL-C)

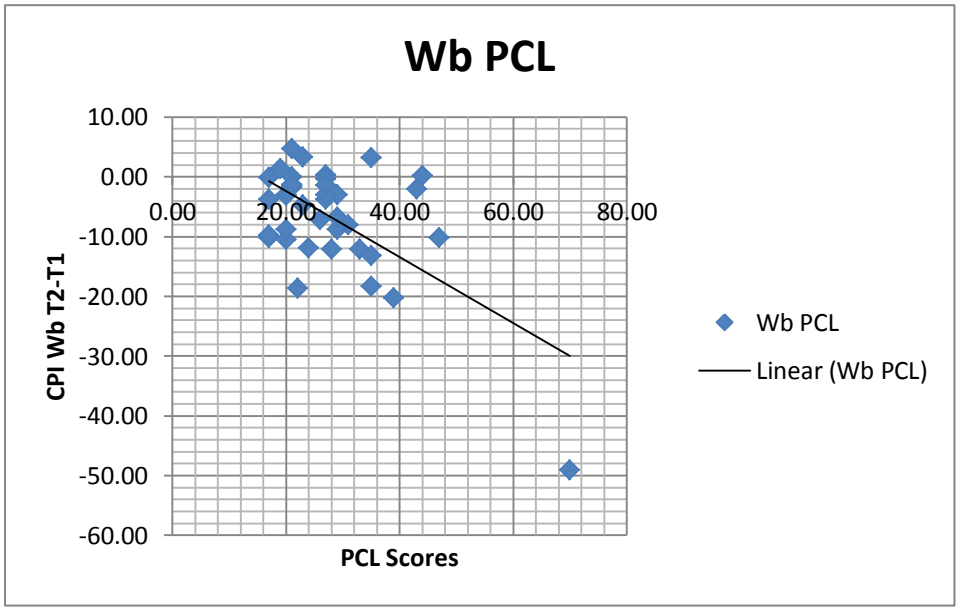
Instructions: Below is a list of problems/complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, check the box that indicates how much you have been bothered by these problems *in the last month.*	**Not at all (1)**	**A little (2)**	**Moderately (3)**	**Quite a bit (4)**	**Extremely (5)**
1. Repeated, disturbing memories, thoughts, or images of a stressful experience from the past?					
2. Repeated, disturbing dreams of a stressful experience from the past?					
3. Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)?					
4. Feeling very upset when something reminded you of a stressful experience from the past?					
5. Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful event?					
6. Avoid thinking about or talking about a stressful experience from the past or avoid having feelings related to it?					
7. Avoid activities or situations because they remind you of a stressful experience from the past?					
8. Trouble remembering important parts of a stressful experience from the past?					
9. Loss of interest in things that you used to enjoy?					
10. Feeling distant or cut off from other people?					

11. Feeling emotionally numb or being unable to have loving feelings for those close to you?					
12. Feeling as if your future will somehow be cut short?					
13. Trouble falling or staying asleep?					
14. Feeling irritable or having angry outbursts?					
15. Having difficulty concentrating?					
16. Being “super alert” or watchful on guard?					
17. Feeling jumpy or easily startled?					

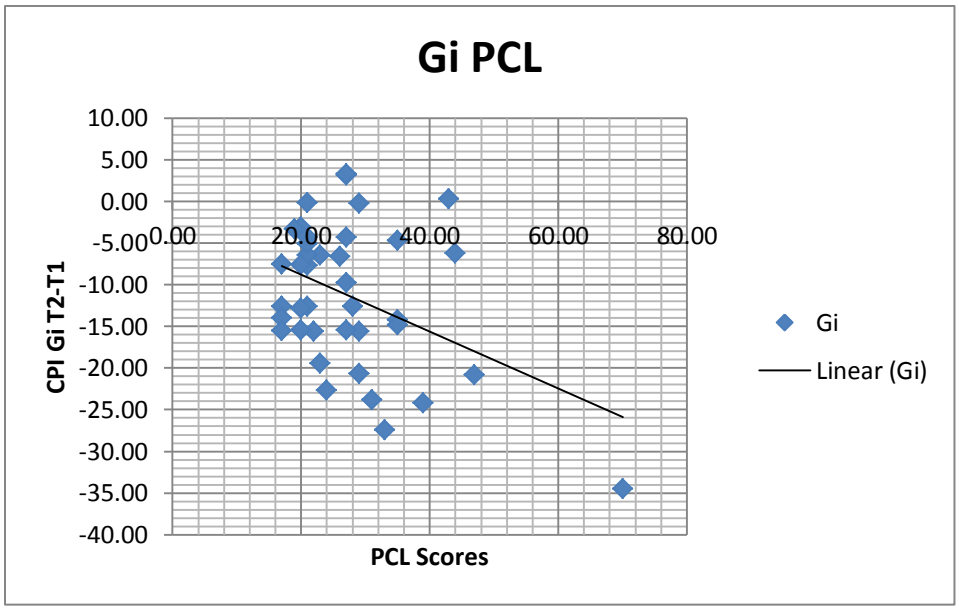
Appendix F

Relationships of selected CPI traits to the PCL

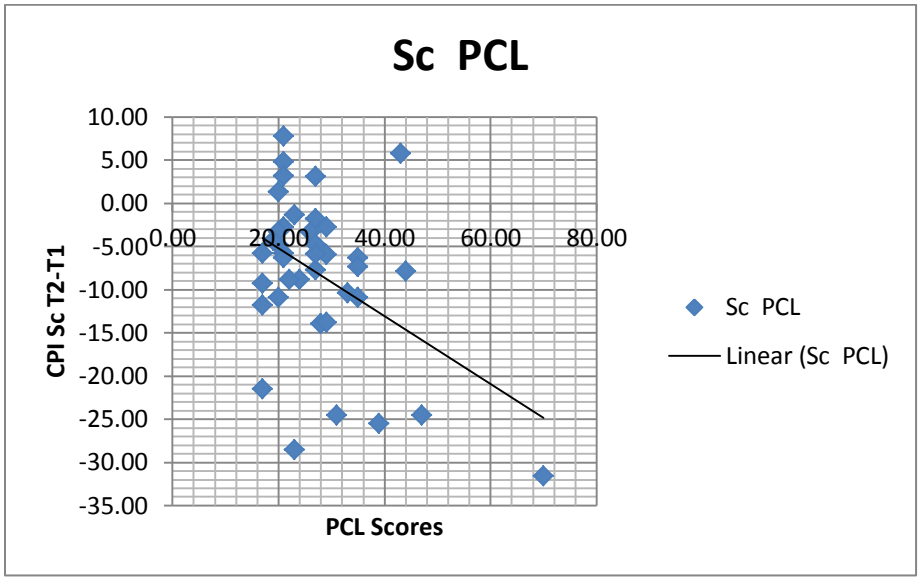
WB relationship to PCL
Pearson's *r*=-.66



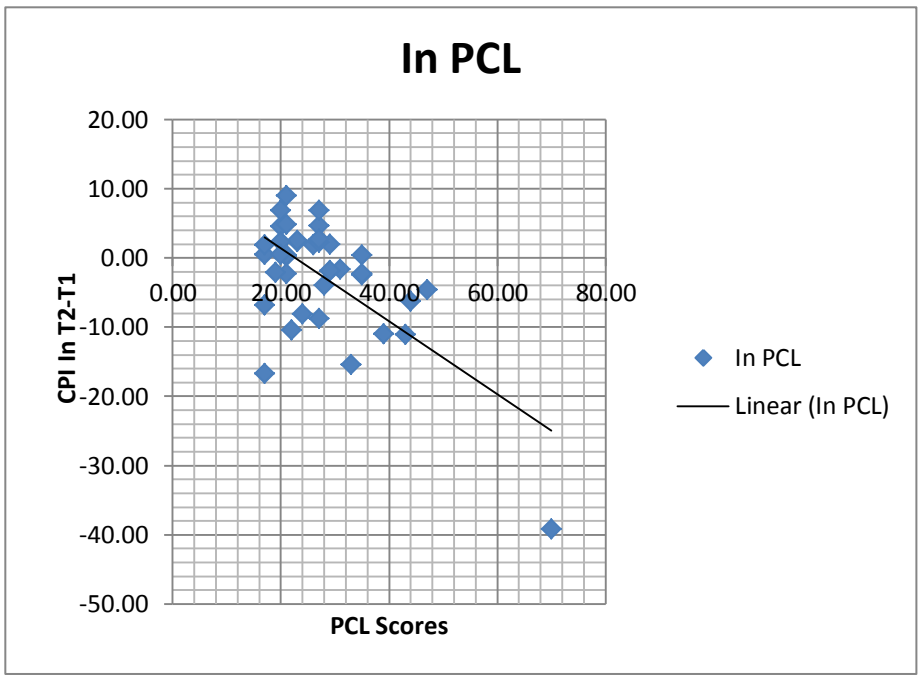
Gi relationship to PCL
Pearson's *r*=-.41



Sc relationship to PCL
Pearson's *r*=-.44



In relationship to PCL
Pearson's *r*=-.65



Em relationship to PCL
Pearson's *r*=-.03