An Exploratory Study on Psychological Body Armor:

Factors Supporting Reactive and Proactive Pathways to Resilience

Harvey J. Burnett, Jr.,

Rachelle E. Pichot,

Karl G. D. Bailey

Correspondence concerning this article should be addressed to:
Harvey J. Burnett Jr., Andrews University, Berrien Springs, MI 49104-0030.
Behavioral Sciences Department, 8488 E Campus Circle Dr.,
E-mail: harveyb@andrews.edu

Abstract. *Using Everly's Psychological Body Armor (PBA) as a theoretical framework, this exploratory study examined the relationship between PBA's two unique interacting human protective pathways (proactive and reactive resilience). Participants from Amazon's Mechanical Turk platform (N = 202) completed a demographic questionnaire and the 10-item Connor-Davidson Resilience Scale for global resilience capacity. We measured the proactive resilience pathway with the 9-item Self-Acceptance and 9-item Purpose in Life subscales from the Scale of Psychological Well-Being (PSW), the 4-item Subjective Happiness Scale, and a 1-item Spirituality scale. We assessed reactive resilience with the 9-item Relationships with Others subscale from the PSW, a 2-item Perceived Stress Scale, the 18-item Brief Symptom Inventory, a 1-item sleep scale, a 1-item fitness scale, and a 3-item nutrition scale. Hierarchical regression analysis revealed that for the proactive pathway, self-acceptance and subjective happiness were significant unique predictors of resilience capacity, while positive relationships with others, psychological distress, and physical fitness activity were significant unique predictors for the reactive pathway. We conducted a set-theoretic Qualitative Comparative Analysis in order to identify paths to resilience using a method that allowed for equifinality. We found paths to proactive resilience via strong self-acceptance and strong happiness, as well as via low self-acceptance, strong purpose in life, and low happiness. We found a path to reactive resilience via strong sleep quality, in addition to a path via strong personal relationships with others and low psychological distress. These two analytic approaches converge on a set of targets for building resilience in first responders.*

Keywords. *psychological body armor, resilience, proactive resilience, reactive resilience*

An Exploratory Study on Reactive and Proactive Pathways to Resilience

Unfortunately, in today's world many people are exposed to traumatic events. For instance, in 2016 there were 342 disasters triggered by natural hazards that resulted in at least 8,733 deaths (Guha-Sapir, Hoyois, Wallemacq, & Below, 2017). More broadly, a survey conducted by Benjet, et al., (2016) involving 24 countries with a combined sample of 68,894 adult respondents, found that approximately 70% of respondents reported experiencing a traumatic event, while 30.5% were exposed to four or more such events. Among a national sample of 2,953 adults in the United States, 89.7% indicated being exposed to at least one traumatic event using DSM-5 criteria, while exposure to multiple event types (i.e., physical or sexual assault, disaster, or fire) was the norm (Kilpatrick et al., 2013).

Regardless of the type of traumatic event, individuals who have been exposed to trauma are at risk for developing psychological after-effects (Norris, Galea, Friedman, & Watson, 2006; Neria, Nandi, & Galea, 2008). In fact, Raphael (1986) suggested that at least 25% of the population may experience such consequences. One chronic psychological after-effect of exposure to traumatic events is the development of Posttraumatic Stress Disorder (PTSD). Research involving adults in the United States aged 18 and older suggests a lifetime event prevalence of PTSD at 9.4%, with 5.3% experience PTSD within the past year and 4.2% within the past six months (Kilpatrick et al., 2013). The same study also indicated that women had a higher PTSD prevalence rate (12.8%) than men (5.7%).

First responders (i.e., police officers, firefighters, and EMS personnel) have a higher risk of developing stress-related symptoms based on direct or indirect exposure to job-related stressors including traumatic events (Plat, Frings-Dresen, & Sluiter, 2011). As a result, first responders may develop depression, PTSD and other stress-related disorders, substance abuse, suicidal ideation, and may attempt or complete suicide (SAMHSA, 2018). In addition, disaster mental health responders may also be affected vicariously from the work they do with traumatized individuals and populations. For instance, Burnett and Wahl (2015) found that 72% of their sample of 139 disaster mental health and emergency preparedness responders were at risk for compassion fatigue, while 19% were at risk for burnout. On the other hand, in another study involving a sample of 70 novice and seasoned Critical Incident Stress Management (CISM) responders, the majority of participants were at low risk for compassion fatigue and burnout, with approximately 77% exhibiting a moderate level of resilience (Burnett,

2017). One reason for these differences may be variations in the resilience of respondents.

Resilience

Even though most people have been exposed to at least one adverse incident in their lifetime (Kilpatrick et al., 2013, Ozer, Best, Lipsey, & Weiss, 2003), they respond to these events in different ways. For instance, some individuals may resist manifestations of psychological and behavioral impairment, while others will exhibit distress for a short time but are able to bounce back. Still others will experience impairment to the point of significant life distress and dysfunction (Everly, 2017; Kaminsky, McCabe, Langlieb, & Everly, 2007). Psychological factors play an important role in well-being and the prevention of illness (Batelaan, Seldenrijk, Bot, van Balkom, & Penninx, 2016; Gana, Alaphilippe, & Bailly, 2004; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000; Taylor, Lerner, Sherman, Sage, & McDowell, 2003); resilience in particular is an important factor associated with overcoming stress and adversity (Masten, 2011; Rutter, 2001; Werner & Smith, 1982). One form of resilience is the ability to maintain stable, healthy levels of psychological and physical equilibrium after exposure to a trauma or loss through multiple pathways (Bonanno, 2004). Resilient people (including groups, organizations, and entire communities) may be initially shaken by an adverse experience but tend to quickly and effectively keep moving forward, maintaining the ability to function over time, and experiencing positive emotions despite the experience (Bonanno, Papa, & O'Neill, 2001; Everly, 2012; Kaminsky et al., 2007). Everly (2017) refers to this as "reactive resilience." Hence, studies have suggested that there are multiple ways people can exhibit resilience after experiencing an adverse event including setting realistic expectations, fostering social support, engaging in positive cognitions and optimism, and building self-efficacy (Everly, 2012; Luther, Doernberger, & Zigler, 1993; Rutter, 1987).

Hardiness, self-enhancement, repressive coping, and positive emotion and laugher are also important pathways to resilience (Bonanno, 2004; Bonanno & Keltner, 1997; Bonanno, Noll, Putnam, O'Neill, & Trickett, 2003; Fredrickson & Levenson, 1998). When these precede a traumatic event, in a sense preparing people to recover from setbacks, resilience takes on a form described as "proactive resilience." Hardy people, for instance, tend to cope better with stress than their less hardy counterparts (Florian, Mikulincer, & Taubman, 1995; Kobasa, Maddi, & Kahn, 1982), as do individuals who practice self-enhancement are better adjusted, have better social support systems in place, and are seen as more positive (Bonanno, Field, Kovacevic, & Kaltman, 2002;

Bonanno, Rennicke, & Dekel, 2005). This pre-existing dispositional resilience (a trait of hardy people) is correlated with a lower level of psychological distress and can serve as a buffer against the influence of daily hassles on psychological distress and the lingering change in distress over time (Pinquart, 2009).

Still there are other characteristics that may influence resilience: time, the context of the adverse event, age, gender, and culture (Conner & Davidson, 2003). Thus, Bonanno (2004) has suggested that resilience research should focus on functional resilience—how resilience develops over the human lifespan, and which factors promoting resilience can be used to improve it.

The Theoretical Framework of Psychological Body Armor

Everly (2017) organized proactive and reactive resilience within the framework of Psychological Body Armor (PBA). Everly defines PBA as a "unique form of human resilience" that consists of two essential pathways: proactive resilience (one's immunity to crisis reactions) and reactive resilience (one's ability to bounce back from adverse life experiences). According to Everly (2017), three mechanisms are primary in building proactive resilience: (1) setting realistic expectations about significant challenges or threats, (2) fostering active optimism and self-efficacy, and (3) enhancing neurophysiological immunity. Reactive resilience is primarily driven by establishing supportive interpersonal relationships, fostering positive self-fulfilling prophecies, having access to formal crisis intervention services, and focusing on physical health. From Everly's perspective it is important to note that by applying the PBA framework, "stress arousing, repetitive interpretations can be replaced by empowering beliefs and actions BEFORE stress becomes excessive (proactive resilience) AND … even if distress and dysfunction arise they can be muted and mitigated (via reactive resilience)" (Everly, 2017, p. 27).

Components of Proactive Resilience in PBA

Based on the neurological functions of the limbic system and their impact on the development of resilience, Everly (2017) suggests proactive resilience (immunity) can be strengthened by creating realistic expectations, fostering active optimism and self-efficacy, and enhancing neurophysiological immunity. One key aspect of setting realistic expectations is self-acceptance. People who exhibit high self-acceptance have a realistic, positive orientation of self, feel that they can actively participate in changing the environment or situation, are confident in their abilities to overcome obstacles, make use of resources, and view hardships as an opportunity to learn and grow (Alvord & Grados, 2005). Self-compassion (an adaptive way of relating to self) in adults and adolescents is strongly correlated with well-being (Neff & McGehee, 2009). For example, when people face socially stigmatized obstacles to communication (in this case, stuttering), lower self-acceptance is related to lower levels of resilience (Plexico, Erath, Shores, & Burrus, 2019)

Self-efficacy is a person's belief in their own capabilities to successfully implement change for themselves or on behalf of others when experiencing adversity (Bandura, 1997). Although self-acceptance is associated with self-efficacy, having a purpose in life that consist of having goals and directness in life, along with having objectives and aims for living is also an important aspect of self-efficacy. Indeed, purpose in life has been found to significantly correlate with resilience (Nygren et al., 2005). One illustrative study found that people who scored higher on resilience and purpose in life scales were more tolerant or had an enhanced habituation to painful stimuli—a proxy for perseverance (Smith et al., 2009).

Studies have associated resilience with optimism and other positive emotions (e.g., Cohn et al. 2009; Fredrickson, 2006; Fredrickson, Tugade, Waugh, & Larkin, 2003; Tugade & Fredrickson, 2004; Youssef & Luthans, 2007).

Seligman (1998) defines optimism as an attributional style that can be learned and helps an individual to view negative events as temporary, external, and situation-specific. Optimism is linked with recovery from illness and disease (e.g., Schou, Ekeberg, & Ruland, 2005) and coping with difficult life events (e.g., Carver et al., 1993). However, optimism is also a component of happiness (a sense of joy, contentment, or positive well-being that is combined with a sense that life is meaningful and worthwhile (Lyubomirsky, 2007). Research has shown that intentionally engaging in optimistic thinking and other positive activities has the potential to improve one's level of happiness for a significant period of time (Lyubomirsky, King, & Diener, 2005; Lyubomirsky, Dickerhoof, Boehm, & Sheldon 2011; Lyubomirsky & Layous, 2013).

Finally, religious and spiritual involvement are associated with well-being and maintaining resilience among those who have experienced or survived traumatic events (Fernando & Ferrari, 2011; Greeff & Joubert, 2007; Manning, 2013; Pargament, Koenig, Tarakeshwar, & Hahn, 2001; Smith, Pargament, Brant, & Oliver, 2000;). For example, engaging in mind-body-type spiritual relaxation activities (i.e., repetitive prayer, meditation, yoga, guided imagery,

etc.) helps to reduce excessive stress arousal (Benson, 1983; Dusek et al., 2008; Hartwick & Kang, 2013; Robins, Keng, Ekblad, & Brantley, 2012; Saatcioglu, 2013).

Components of Reactive Resilience in PBA

Just as with proactive resilience, Everly (2017) derives several mechanisms associated with effectively building one's ability to rebound when faced with adversity (reactive resilience) from neuroscience. These mechanisms include establishing authentic supportive interpersonal relationships, cultivating a positive self-fulfilling prophecy, having access to formal crisis intervention services, and fostering physical health through physical fitness, nutrition, and quality rest and sleep.

One of the most effective methods to strengthen reactive resilience is through establishing supportive interpersonal relationships. Social support is associated with increased physical and psychological well-being, including adaptive functioning (e.g., Chu, Saucier, & Hafner, 2010; Criss, Pettit, Bates, Dodge, & Lapp, 2002; Guest, 2017; Haber, Cohen, Lucas, & Baltes, 2007; Willis, 1985). Furthermore, fostering authentic and mutual relationships are associated with less psychological distress and elevated resilience (Hartling, 2008; Mereish & Poteat, 2015; Wilks & Croom, 2008).

Self-fulfilling prophecies can also build resilience in response to trauma—how people believe that they will respond to adversity (i.e., believing that they will bounce back versus believing that they will fail) will increase the chances of that outcome occurring. This also applies to people's perceptions of stress and the coping resources available, which often affect health and psychological well-being outcomes (Lazarus & Folkman, 1984). Perceptions of heightened risk associated with a stressful event may increase psychological distress, especially if coping mechanisms are limited or ineffective (Schwartz, Lerman, Miller, Daly, & Masny, 1995). For example, Keller et al., (2012) found that high levels of stress and perceptions that stress negatively affects health were each associated with poor physical and mental health, and Hemenover (2003) found that disclosing a traumatic life event increased positive self-perceptions and decreased psychological distress. The relationship between perceptions and resilience is likely bi-directions—resilience serves as a buffer against perceived stress (Friborg et al., 2006; Kemper, Mo, & Khayat, 2015) and both perceived stress and resilience are predictors of life satisfaction (Abolghasemi & Varaniyab, 2010).

Physical well-being is an important component of a person's ability to rebound in the face of adversity. Studies have shown that participating in regular exercise and/or spontaneous physical activity bestows resilience, thereby buffering against stress-related diseases and increases positive mood and psychological well-being (Childs & de Wit, 2014; Deuster & Silverman, 2013; Fox, 1999; Silverman & Deuster, 2014; Ströhle, 2009). Moreover, research has also shown that sleep quality is negatively associated with exposure to abuse and trauma and PTSD—and positively with resilience and reduced symptoms of depression and anxiety (e.g., Chambers & Belicki, 1998; Germain, 2013; Hamilton, Nelson, Stevens, & Kitzman, 2007; Kemper, Mo, & Khayat, 2015). Finally, physical well-being in the area of nutrition (more specifically, dietary behaviors) is associated with well-being outcomes (Hong & Peltzer, 2017; Mandleco & Peery, 2000). Increased frequency of consuming fast food and soda are associated with PTSD symptoms among women (Hall, Hoerster, & Yancy, 2015), while good nutrition along with psychosocial stimulation can work together to advance protective factors and mitigate deficiencies in cognitive, motor, social, and affective functioning, increasing adaptation to adverse experiences (Yousafzai, Rasheed, & Bhutta, 2012).

Present Study

Using the PBA as a theoretical framework, we conducted an exploratory research study that examined the makeup of the proactive and reactive resilience pathways using two different analytic approaches. We measured the range proposed PBA mechanisms for both aspects of resilience (proactive and reactive) and examined the contributions of those mechanisms to resilience in two ways. In order to explore which well-being and behavioral action variables best uniquely predict strong resilience capacity for each aspect of resilience in a regression model, we conducted separate hierarchical linear regressions for the proactive and reactive mechanisms. We then explored which combinations of mechanism variables might form consistent pathways to resilience in two separate set-theoretic analyses allowing for equifinality of solutions.

Methodology

Participants

We collected data from 202 participants who completed the PBA measures through Amazon's Mechanical Turk (MTurk). We required that participants be 18 years of age or older and reside in the United States in order to be included in this study; we compensated participants $0.50 for completing the study.

Forty-eight percent of participants were female (*n* = 97) and 52% were male (*n* = 105). The mean age

of participants was 37.7 years (*SD* = 11.6) and ranged from 22 to 76 years. Eighty-five percent of participants identified themselves as White (non-Hispanic), 7% were African American, 4% were Asian/Pacific Islander, 3% were Latino, and 1% were American Indian/Alaskan Native. Forty-eight percent were married, 25% were single, 16% were in a dating relationship, 6% were divorced, 4% were engaged, and 1% were widowed. Around 44% had graduated from college, 20% had some college experience, 18% had completed a post-graduate degree, 8% had graduated high school, 8% had trade/technical/vocational training, and 2% had done some post-graduate work. Eighty-eight percent of participants had an annual household income between $20,000 and $150,000 with a relatively even distribution between $20,000 to $80,000 and a median of $55,000. Of the 202 participants, 53% identified themselves as not belonging to any religious affiliation, 25% were Protestant, 20% were Catholic, 1% were Seventh-day Adventist, 1% were Muslim, and 1% were Hindu.

Overall Resilience Measure

We measured overall resilience using the 10-item self-report Connor-Davidson Resilience Scale (CD-RISC10; Campbell-Sills & Stein, 2007). The CD-RISC10 measured participants' perceived ability to cope with adversity. Participants rate their agreement with 10 statements that apply to them over the last month (e.g., "I can deal with whatever comes my way" and "I tend to bounce back after illness, injury, or other hardships") on a 5-point scale ranging from 0 (not true at all) to 4 (true nearly all the time). Responses on all items are summed to provide a total score, with higher scores indicating greater resilience. The CD-RISC10 has demonstrated good convergent, discriminant and predictive validity, decent test-retest reliability, and good internal consistency with a Cronbach's alpha of .89 (Conner & Davidson, 2003).

Proactive Resilience Mechanism Measures

Scales of Psychological Well-Being (PSW). The Scales of Psychological Well-Being (Ryff, 1989) originally consisted of 20 items per scale that measured six dimensions of psychological well-being (i.e., autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life, and self-acceptance). Later, Ryff developed shorter 14-item, 9-item and 3-item versions of the six scales. This study used only the 9-item Positive Relationship with Others (PRWO), Purpose in Life (PL), and Self-Acceptance (SA) scales. Each scale asked participants to respond to items on a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Items on these scales included "Most people see me as loving and affectionate (PRWO scale)", "I

have a sense of direction and purpose in life (PL scale)", and "In general, I feel confident and positive about myself (SA scale)". Several of the items on each scale are reversed coded. Scores for each scale range from 9 to 54, with higher scores being indicative of the psychological well-being construct dimension being measured. Content validity for the theoretical framework for each of the six psychological well-being dimension scales has been well-established in numerous studies (see Ryff, 1989; Ryff & Keyes, 1995; Ryff & Singer, 2006, 2008; Ryff, 2014). Internal consistency for each of the three scales used in the study are good at .88 (PRWO), .88 (PL), and .91 (SA)(Ryff, n.d.).

Subjective Happiness Scale (SHS). The 4-item SHS (Lyubomirsky & Lepper, 1999) was a self-report measure of participants' then current state of happiness. Participants respond to four items on a 7-point scale—for example, "In general, I consider myself …" either 1 (not a very happy person) to 7 (a very happy person) and "Compared to most of my peers, I consider myself …" either 1 (less happy) to 7 (more happy). A composite score (ranging from 1 to 7) is computed by averaging responses on all four items after reverse coding the fourth item. Internal consistency is good to excellent (ranging from .79 to .94), while test-retest reliability is stable over time (ranging from .55 to .90; Lybubomirsky & Lepper, 1999). The SHS has also demonstrated good convergent and discriminant validity (Lybubomirsky & Lepper, 1999).

Spirituality. A single-item self-report spirituality question measured how often participants engaged in spiritually related activities. Participants responded to the statement "How often do you practice spiritual related activities, such as prayer, meditation, yoga, etc.?" on a 6-point scale, ranging from 1 (never) through 2 (several times a month), 3 (once a week), 4 (two or more times a week), and 5 (once a day), to 6 (more than once a day).

Reactive Resilience Pathway Measures

Perceived Stress Scale (PSS). The 2-item self-report PSS (Buchanan & McConnell, 2017) measured participants' levels of perceived stress. Participants responded to the statement "I consider myself _____" on a 7-point scale ranging from 1 (not a very stressed person) to 7 (a very stressed person), and then to the statement "I consider myself _____" on a 7-point scale ranging from 1 (less stressed) to 7 (more stressed). We calculated the mean of these two items—larger scores are indicative of higher perceived stress. Buchanan and McConnell (2017) reported good internal consistency for these two items (.92).

Brief Symptom Inventory 18 (BSI-18). The 18-item BSI-18 (Derogatis, 2001) is a self-report

screening measure for psychological distress. Participants were asked to rate 18 statements (e.g., "Feeling no interest in things" and "Thoughts of ending your life") that they considered distressing or bothersome to them during the past seven days on a 5-point scale ranging from 0 (not at all) to 4 (extremely). The BSI-18 contains three subscales (Somatization, Depression and Anxiety) containing six items for each dimension—however, we used the total score or global severity index (GSI), which is calculated by summing the score on all items. Raw scores thus range from 0 to 72 and can be converted to a T score for interpretation. Higher scores are indicative of greater psychological distress. The BSI-18 has demonstrated good convergent-discriminant and predictive validity, good test-retest reliability, and satisfactory internal consistency with a GSI alpha coefficient of .89 and subscale coefficients ranging from .74 to .84 (Derogatis, 2001).

Sleep Quality. A single-item self-report question assessed participants' sleep quality. Participants responded to the statement, "How would you related your overall sleep quality?" on an 8-point scale, ranging from 0 (very poor) to 7 (very good).

Physical Fitness Activity. A single-item self-report question assessed participants' regular engagement in some form of fitness activity. Participants responded to the statement "How often do you participate in some form of regular physical activity, such as exercise, walking, Pilates, strength training, etc." on a 5-point scale, ranging from 1 (never), through 2 (several times a month), 3 (once a week), and 4 (two or more times a week), to 5 (daily).

Nutrition. A 3-item self-report section assessed participants' nutrition practices. Participants were asked to respond to three statements ("I eat three healthy meals a day," "On a daily basis, I drink more than one sugary drink (i.e., soda, energy and sports drinks, fruit juices, etc.)", and "On a daily basis, I drink more than one caffeinated beverage (i.e., coffee, tea, soda, energy drinks, etc.)") on an 8-point scale, ranging from 0 (not true at all) to 7 (very true).

Procedure

Participants who volunteered to complete the study signed up online through MTurk and completed the survey in their web browser. Human Subjects Review Board approval from the researchers' institution was obtained prior to initiating the study (IRB Protocol #17-143).

Results

Data was collected through MTurk and analyzed utilizing IBM SPSS software. The means, standard deviation, range and reliability for each measure used in this study are reported in Table 1.

Table 1. Mean, standard deviation, range, and reliability scores for all study measures.

Measure	M	SD	Range	α
CD-RISC 10	28.1	7.22	5 – 40	.906
BSI-18	11.9	15.8	0 – 68	.969
PL	39.1	9.16	13 – 54	.872
PRWO	38.2	9.06	16 – 54	.699
SA	37.2	9.41	10 – 54	.896
PSS	5.74	2.73	1.50 – 10.5	.951
SHS	18.9	5.79	4 – 28	.885
Spiritual activity question	2.67	1.82	1 – 6	-
Sleep quality question	4.20	1.78	0 – 7	-
Physical fitness activity question	3.56	1.32	1 – 5	-
Nutrition "eat three healthy meals" question	3.95	2.30	0 – 7	-
Nutrition "drink … sugary drink" question	4.91	2.43	0 – 7	-
Nutrition "drink … caffeinated beverage" question	3.00	2.73	0 – 7	-

Note. $N = 202$.

Hierarchical Regression Analysis

We began by exploring the bivariate correlations between overall resilience and each mechanism variable. For the proactive resilience mechanisms, significant positive correlations were observed between overall resilience and self-acceptance ($r = .62, p < .001$), purpose in life ($r = .47, p < 0.001$), subjective happiness ($r = .64, p < .001$), and spiritual activities ($r = .16, p = 0.02$). For the reactive resilience mechanisms, significant positive correlations were observed between overall resilience and positive relationships with others ($r = .49, p < .001$), overall sleep quality ($r = .26, p < .001$), and physical fitness activity ($r = .20, p < .001$). Significant negative correlations were also observed between overall resilience and both perceived stress ($r = -.40, p < .001$) and psychological distress ($r = -.48, p < .001$). There was no significant relationship observed between overall resilience and the three nutrition questions: eating three meals a day ($r = .11, p = .11$.); daily use of sugary drinks ($r = .14, p = .053$); and daily use of caffeinated beverages ($r = -.01, p = .92$).

In order to explore the unique effects of proactive and reactive mechanisms on resilience, mechanism variables were entered into the regression models into two steps. The first step for both models

included well-being mechanisms (i.e. subjective happiness, self-acceptance, purpose in life, perceived stress, relationships with others, and overall psychological distress). The second step included actions taken by participants for promoting resilience (sleep quality, physical fitness activity, nutrition/eating three meals, nutrition/drinking sugary drinks, nutrition/drinking caffeinated beverages, and spiritual practices). For the proactive resilience model, the total variance explained by the model as a whole was 45%, $F (4, 197) = 40.94$, $p < .001$, while for the reactive resilience model, the total variance explained by the model as a whole was 35%, $F (8, 193) = 12.91$, $p < .001$. In the second step, action mechanisms explained less than 1% of additional

variance in overall resilience in the proactive resilience model, $F (1, 197) = 1.512$, and only an additional 3% of the variance in the reactive resilience model $F (5, 193) = 1.767$. Thus, well-being mechanisms were better predictors of overall resilience than the action mechanisms in both cases-- actions have little relationship to overall resilience beyond the that of internal states. Self-acceptance and subjective happiness were significant unique predictors of resilience in the full proactive model (see Table 2), while positive relationships with other and psychological distress were significant unique predictors of resilience in the full reactive model (see Table 3).

Table 2. Hierarchical regression analysis summary for proactive resilience mechanism variables predicting overall resilience ($N = 202$).

Step and Predictor Variable	B	SE B	β	R^2	ΔR^2	f^2
Step 1:						
SA	0.20	0.07	0.26**	0.45***	0.45	0.82
PL	0.08	0.05	0.10	0.45***	0.45	0.82
SHS	0.47	0.11	0.38***	0.45***	0.45	0.82
Step 2:				0.45	0.004	0.84
Spiritual Practices	0.26	0.21	0.67			

Note. $*p < 0.05$. $**p < 0.01$. $***p < 0.001$.

Table 3. Hierarchical regression analysis summary for reactive resilience mechanism variables predicting overall resilience ($N = 202$).

Step and Predictor Variable	B	SE B	β	R^2	ΔR^2	f^2
Step 1:						
PRWO	0.25	0.06	0.32***	0.32***	0.32	0.57
PSS	-0.32	0.20	-0.12	0.32***	0.32	0.57
BSI-18	-0.11	0.04	-.024**	0.32***	0.32	0.57
Step 2:						
Sleep	0.44	0.20	0.11	0.35*	0.03	0.53
Fitness	0.72	0.34	0.13*	0.35*	0.03	0.53
Nutrition/meals	-0.11	0.20	-0.34	0.35*	0.03	0.53
Nutrition/sugary drinks	-0.04	0.19	-0.01	0.35*	0.03	0.53
Nutrition/caffeinated	-0.81	0.16	-0.03	0.35*	0.03	0.53

Note. $*p < 0.05$. $**p < 0.01$. $***p < 0.001$.

Comparative Qualitative Analysis

Qualitative comparative analysis (QCA) is a set-theoretic method for identifying all of the configurations of factors that consistently overlap with an outcome of interest. An important feature of a set-theoretic approach is equifinality—inclusion of multiple paths to an outcome in the solution. This allows us to explore all of the different configurations of cases in which participants reported high levels of resilience for each pathway.

In QCA, there are four possible classifications for each case given a particular configuration of factors and a particular outcome. Cases with the target configuration of factors and the target outcome are *consistent*. Those with the target configuration but with a different outcome are *contradictory*. The proportion of target configuration cases with the target outcome is the consistency of that configuration. When cases have the target outcome, but not the target configuration, the cases are labelled as *unexplained*. The proportion of cases with the target outcome that

are consistent is the coverage of that particular configuration. The remaining classification, *irrelevant*, for cases without the target configuration and without the target outcome does not play a role in the scores assigned to a given configuration. QCA searches the space of possible consistent configurations to find those that most efficiently cover the target outcome by identifying those configurations that minimize contradictory cases and maximize consistent cases relative to unexplained cases (Marx, Rihoux, & Ragin, 2014; Ragin, 1987; Ragin, 2008; Thiem, 2017). Low consistency is evidence that target factors may be inappropriate for understanding pathways to the target outcome; low coverage is evidence that the set of target factors is incomplete.

Truth tables (see Table 4) constructed from our dataset for the proactive pathway to resilience found nine of 16 possible configurations. Specifically, there were two levels for each of our four exogenous factors that represent descriptive factors that are roughly equivalent to independent variables. The other seven

configurations might be either logically impossible, rare and not observed in our sample size, or were rare and lower than our threshold of cases. Therefore, the first proactive pathway to resilience was the configuration of high self-acceptance and high happiness, which had a consistency of 98% (142 cases) of relevant high resilience cases and coverage of 81% of cases with that configuration of factors (see Tables 5). In other words, highly resilience subjects have a high sense of self-acceptance and have a high degree of happiness. The second proactive pathway configuration (low self-acceptance, high purpose in life, and low happiness) had a consistency of 82% (11 cases) but covered only 5% of cases with that configuration of factors (see Table 5). Some highly resilient subjects may also have low feelings of self-acceptance, have a high sense of purpose in life, and have a low degree of happiness.

Table 4. Proactive resilience mechanisms truth table for all configurations with at least four cases.

Exogenous Factors[a]				Consistency[b]		n[c]
SA	PL	SHS	SPIRIT	%	OUT	
0	0	0	0	47%	0	17
0	0	0	1	50%	0	4
0	0	1	0	50%	0	4
0	1	0	0	82%	1	11
0	1	1	0	57%	0	7
1	0	1	0	100%	1	5
1	1	0	0	67%	0	9
1	1	1	0	98%	1	98
1	1	1	1	100%	1	39

[a] Exogenous factors defined as follows: SA = self-acceptance (0 = low, 1 = high); PL = purpose in life (0 = low, 1 = high); SHS = happiness (0 = low, 1 = high); SPIRIT = spiritual (0 = low, 1 = high).
[b] Consistency is the percentage of cases with (OUT = 1) or without (OUT = 0) the target outcome (high resilience).
[c] n = number of cases per configuration.

Table 5. QCA solution for proactive mechanisms with strong resilience as an outcome.

Configurations	Consistency[a]	Raw coverage[b]	Unique coverage[c]	Consistent Cases
High self-acceptance, high happiness	98%	81%	81%	142
Low self-acceptance, high purpose in life, low happiness	82%	5%	5%	11
Overall:	97%	86%		

[a] Consistency is the percentage of cases in the high resilience outcome that are also in the configuration identified in that row.
[b] Raw coverage is the percentage of cases in that configuration that intersect with the high resilience outcome.
[c] Unique coverage is the proportion that only includes cases that are not in any other configuration.

Truth tables (see Table 6) constructed from our dataset for the reactive pathway to resilience found 12 of 64 possible configurations. Specifically, there were two levels for each of our six exogenous factors. The

other 52 configurations might be either logically impossible, rare and not observed in our sample size, or were rare and lower than our threshold of cases. Therefore, the reactive pathway to resilience found

that high sleep quality had a consistency of 91% (93 cases) of relevant high resilience cases, and coverage of 52% of high sleep quality cases (see Tables 7). In other words, highly resilience subjects have a high amount of sleep quality. High personal relationships with others and low psychological distress had a

consistency of 91% (10 cases) of relevant high resilience cases and coverage of 83% of cases with that configuration of factors (see Table 7). Some highly resilient subjects may also have a high quantity of satisfying relationships with others and have a low degree of psychological distress.

Table 6. Reactive resilience mechanisms truth table for all configurations with at least four cases.

Exogenous Factors[a]						Consistency[b]		n[c]
PRWO	PSS	BSI-18	SLEEP	FIT	NUTRI	INV	OUT	
0	0	0	0	0	0	57%	0	7
0	0	0	1	0	0	100%	1	5
1	0	0	0	0	0	90%	1	31
1	0	0	0	0	1	79%	1	24
1	0	0	0	1	0	100%	1	6
1	0	0	0	1	1	100%	1	16
1	0	0	1	0	0	93%	1	27
1	0	0	1	0	1	88%	1	32
1	0	0	1	1	0	100%	1	6
1	0	0	1	1	1	100%	1	17
1	0	1	0	0	0	25%	0	4
1	0	1	1	0	0	100%	1	6

[a] Exogenous factors defined as follows: PRWO = personal relationships with others (0 = low, 1 = high); PSS = perceived stress (0 = low, 1 = high); BSI-18 = psychological distress (0 = low, 1 = high); SLEEP = sleep quality (0 = low, 1 = high); FIT = fitness (0 = low, 1 = high); NUTRI = nutrition (0 = low, 1 = high).
[b] Consistency is the percentage of cases with (OUT = 1) or without (OUT = 0) the target outcome (high resilience).
[c] n = number of cases per configuration.

Table 7. QCA solution for reactive mechanisms with strong resilience as an outcome.

Configurations	Consistency[a]	Raw coverage[b]	Unique coverage[c]	Consistent Cases
High sleep quality	91%	52%	9%	93
High personal relationships with others, low psychological distress	91%	83%	40%	10
Overall:	90%	92%		

[a] Consistency is the percentage of cases in the high resilience outcome that are also in the configuration identified in that row.
[b] Raw coverage is the percentage of cases in that configuration that intersect with the high resilience outcome.
[c] Unique coverage is the proportion that only includes cases that are not in any other configuration.

Discussion

This exploratory study examined how overall resilience was associated with a set of proposed mechanism variables within the proactive and reactive resilience pathways in Everly's (2017) Psychological Body Armor framework. We used linear regression to examine which well-being and action mechanisms uniquely predicted resilience separately for proactive and reactive models. We also used a set-theoretic, equifinal Qualitative Comparative Analysis to identify configurations of mechanisms that consistently covered those cases with high resilience.

We found that for the proactive mechanisms, self-acceptance and happiness were significant unique predictors of resilience, while for the reactive mechanisms, positive relationships with others, psychological distress, and physical fitness activities were significant unique predictors of resilience. Similarly, the set-theoretic approach showed a substantial proactive pathway to high resilience via high self-acceptance and high happiness, and substantial reactive pathways to high resilience via high sleep quality and via high personal relationships with others and low psychological distress.

We do note that with the exception of the nutrition variables, the mechanism variables generally had a significant relationship with overall resilience (although correlation coefficients ranged from weak to strong effect sizes). Although these findings are not causal, they are consistent with previous studies that have reported relationships between resilience and self-acceptance (Alvord & Grados, 2005), purpose in life (Nygren et al., 2005), happiness (Lyubomirsky & Della Porta, 2010), spirituality (Manning, 2013), positive relationships with others (Ozbay, Fitterling, Charney, & Southwick, 2008), psychological distress and stress (Keller et al., 2012; Schwartz et al., 1995), physical fitness (Childs & de Wit, 2014), and sleep quality (Hamilton et al., 2007). The converging evidence from our regression and set-theoretic analyses also supports Everly's (2017) PBA framework, suggesting that resilience can be built both proactively and reactively—a starting point for responders in the disaster mental health/crisis intervention response field to promote overall resilience.

One unexpected finding was the absence of a relationship between resilience and the three nutrition questions that assessed eating three healthy meals per day, daily consumption of sugary drinks, and drinking more than one caffeinated beverage per day. Previous research has indicated that habitual consumption of sugary and caffeinated beverages has detrimental impact on health, brain functioning, and sleep quality (Vartanian, Schwartz, & Brownell, 2007; Imamura et al., 2015; Anjum, Jaffery, Fayyaz, Wajid, & Ans, 2018). In fact, the Dietary Guidelines for Americans (2010) strongly recommends reducing the intake of added sugars that are often found in sodas and energy drinks. Furthermore, research has suggested that resilience is more associated with diet quality rather than the frequency of consuming a specific amount of meals per day (Lutz et al., 2017; Flórez, Shih, & Martin, 2014). A plausible reason for the possible lack of findings in this area is the lack of a standardized nutrition measure in our study (and the complexity of measuring nutrition generally). One suggestion for further research regarding the nutrition variable is to employ a methodologically valid and reliable food frequency questionnaire to better assess its association with resilience along the reactive pathway.

Based on previous research, the present study posited that self-acceptance, happiness, purpose in life, spirituality, personal relationships with others, perceived stress, psychological distress, sleep, exercise, and nutrition would all be significant independent predictors in their respective resilience models. However, contrary to this, stress, sleep, nutrition, purpose in life, and spirituality were not significant unique predictors of resilience in the respective models. Although these variables (with the exception of nutrition) were found to be significantly related with resilience in bivariate analyses, they may not contribute to that aspect of resilience beyond other mechanisms (Allison, 1999)—this could suggest some necessary tightening of the definition of mechanisms for proactive and reactive resilience. Everly did not identify a specific quantitative or qualitative measure for each mechanism but did refer to numerous studies that supported the importance of the mechanism and connections to the relevant aspect of resilience. A suggestion for future research would be to continue to review the mechanisms for each aspect of resilience and identify measures that are more operationally representative of the aspect. For instance, along the proactive resilience pathway there may be a better measure that quantifies the mechanism of fostering self-efficacy rather than the having a purpose in life measure that was used in the present study.

Limitations

One of the limitations of this study is our use of a web-based crowdsourcing marketplace platform (MTurk) to collect research data from human subjects. As with any convenience sample, MTurk samples may not be representative of the population under study. Because the survey was done online, there is also the potential of subjects rushing through some parts of the study in order to receive the posted compensation upon completion of the task. However, there is also evidence that these issues are no worse than those faced by traditional survey methods, and that frequent MTurk workers generally take the survey process seriously (Lovett, Bajaba, Lovett, & Simmering, 2018).

Another limitation of this study, which is common with survey research, was the use of self-reported measures that are often sensitive to bias based on the subject's state of mind at that point in time in response to the prompts of the measure. A third limitation was the ethnic demographics of the participating subjects. Most of the subjects in this study identified themselves as White/Non-Hispanic (86%), which affects to some degree the generalizability of these results. Finally, the present study was conducted on the general public and not among the CISM and other disaster mental health responders that are typically associated with the need to incorporate PBA as a protective tool based on the work they perform. In other words, while the study does provide a wealth of information on resilience and its two pathways regarding the public, it may not be applicable to trauma responders. Future research should focus on examining the resilience pathways of PBA among CISM and other disaster mental responders in order to better identify more specifically

which variable are more predictive of resilience capacity among this population.

Implications

In alignment with previous research, the current study found that personal relationships with others, psychological distress, exercise, self-acceptance, and happiness were significant predictors of their respective resilience pathways as well as overall resilience. Since CISM and other disaster mental health responders often are exposed to trauma indirectly—which may make them more vulnerable to vicarious traumatization (Figley, 1995; McCann & Pearlman, 1990; Motta, 2008; Pearlman & Saakvitne, 1995)—it is important for them to intentionally engage in behaviors and activities that strengthen their resilience capacity. Therefore, responders should build and nurture a diverse network of personal and professional social supports, develop and maintain constructive coping skills that reduces their psychological distress, participate in some form of a consistent physical exercise program, and involve themselves in activities that enhance personal and professional happiness and self-acceptance.

Lyubomirsky's (2007) book on happiness provides an excellent cadre of activities that build one's level of happiness. Responders are also strongly encouraged to attend workshops, conferences and trainings that enhance their crisis intervention skills, as well as their stress management and coping capacities as a way to build self-acceptance. For reactive resilience, maintaining a strong quality sleep pattern, nurturing solid personal and professional social supportive relationships, and engaging in activities that reduce psychological distress are important to boost resilience capacity. Lyubomirsky's book provides practical activities that can help in these areas as well. Responders should also attend professional conferences, workshops and trainings within the CISM and disaster mental health response field that provide opportunities to network and build social support across a variety of professional disciplines (i.e., law enforcement, fire services, emergency medical services, nurses, mental health workers, clergy, etc.).

Building such support systems for responders is crucial in terms of having access to resources to turn to in a deployment for assistance, as well as for emotional support in the days, weeks and months after the response has ended. It is also important that after a deployment, responders participate in a debriefing as a way to build resilience capacity, promote response team cohesiveness and reduce vulnerability to vicarious traumatization, compassion fatigue, and burnout. Responders should also be encouraged to practice regular physical activity. Depending on age,

health, and mobility factors, responders should consult with a trainer to develop a personal physical activity program that is conducive to their needs to maintain overall well-being balance. Finally, based on the correlational findings for both pathways, responders are encouraged to maintain their faith and spiritual practices, which are important in strengthening one's purpose in life, as well as monitoring and managing their life stress. Although the nutrition variable was not significant with resilience in this study, it may still be important that responders incorporate a daily nutrition program that supports healthy eating practices to help reduce their susceptibility to the physical and mental stressors of trauma work.

In conclusion, our study found evidence-based support for Everly's Psychological Body Armor as a distinctive form of human resilience comprised of two pathways. By applying this framework, CISM and other disaster mental health responders can proactively build a resilience immunity from stress through engaging in activities that strengthen self-acceptance and happiness. Furthermore, responders can also empower their reactive resilience ability to mitigate and mute arising distress and dysfunction through practicing optimal sleep quality behaviors, as well as through investing in positive personal relationships with others and maintaining a low level of psychological distress. As traumatic events continue to occur, the potential risk for the development of posttraumatic psychological distress remains. Therefore, it becomes very important for CISM and other disaster mental health responders to incorporate more evidence-based practices to empower their resilience capacity to meet this ever-present challenge.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Abolghasemi, A., & Taklavi Varaniyab, S. (2010). Resilience and perceived stress: Predictors of life satisfaction in the students of success and failure. *Procedia – Social and Behavioral Sciences, 5*, 748-752.

Allison, P. D. (1999). *Multiple regression: A primer*. Thousand Oaks, CA: Pine Forge Press.

Alvord, M. K., & Grados, J. J. (2005). Enhancing resilience in children: A proactive approach. *Professional Psychology: Research and Practice*, *36*(3), 238-245.

Anjum, I., Jaffery, S. S., Fayyaz, M., Wajid, A., & Ans, A. H. (2018). Sugar beverages and dietary

sodas impact on brain health: A mini literature review. *Cureus*, *10*(6), e2756.

Batelaan, N. M., Seldenrijk, A., Bot, M., van Balkom, A., & Penninx, B. (2016). Anxiety and new onset of cardiovascular disease: Critical review and meta-analysis. *The British Journal of Psychiatry*, *208*, 223-231.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Benjet, C., Bromet, E., Karam, E. G., Kessler, R. C., McLaughlin, K. A., Ruscio, A. M., . . . Alonso, J. (2016). The epidemiology of traumatic event exposure worldwide: results from the World Mental Health Survey Consortium. *Psychological Medicine*, *46*(2), 327-343.

Benson, H. (1983). The relaxation response: Its subjective and objective historical precedents and physiology. *Trends in Neuroscience*, *6*, 281–284.

Bonanno, G. A. (2004). Loss, trauma, and human resilience. *American Psychologist*, *59*(1), 20-28.

Bonanno, G. A., Field, N. P., Kovacevic, A., & Kaltman, S. (2002). Self-enhancement as a buffer against extreme adversity: Civil war in Bosnia and traumatic loss in the United States. *Personality and Social Psychology Bulletin, 28*, 184-196.

Bonanno, G. A., & Keltner, D. (1997). Facial expressions of emotion and the course of conjugal bereavement. *Journal of Abnormal Psychology, 106*, 126-137.

Bonanno, G. A., Noll, J. G., Putnam, F. W., O'Neill, M., & Trickett, P. (2003). Predicting the willingness to disclose childhood sexual abuse from measures of repressive coping and dissociative experiences. *Child Maltreatment, 8,* 1-17.

Bonanno, G. A., Papa, A., O'Neill, K. (2001). Loss and human resilience. *Applied and Preventative Psychology, 10,* 193-206.

Bonanno, G. A., Rennicke, C., & Dekel, S. (2005). Self-enhancement among high-exposure survivors of the September 11th terrorist attack: Resilience or social maladjustment? *Journal of Personality and Social Psychology, 88*(6), 984-998.

Buchanan, T., & McConnell, A. (2017). Family as a source of support under stress: Benefits of greater breadth of family inclusion. *Self and Identity*, *16*(1), 97-122.

Burnett, H. J. (2017). Revisiting the compassion fatigue, burnout, compassion satisfaction, and resilience connection among CISM responders. *Journal of Police Emergency Response, 7(3),* 1-10.

Burnett, H. J., & Wahl, K. (2015). The compassion fatigue and resilience connection: A survey of resilience, compassion fatigue, burnout, and compassion satisfaction among trauma responders. *International Journal of Emergency Mental Health and Human Resilience, 17,* 318-326.

Campbell-Sills, L., & Stein, M. (2007). Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10-Item measure of resilience. *Journal of Traumatic Stress, 20*(6), 1019-1028.

Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., . . . Clark, K. C. (1993). How coping mediates the effect of optimism on distress: a study of women with early stage breast cancer. *Journal of Personality and Social Psychology*, *65*(2), 375-390.

Chambers, E., & Belicki, K. (1998). Using sleep dysfunction to explore the nature of resilience in adult survivors of childhood abuse or trauma. *Child Abuse and Neglect, 22*(8), 753-758.

Childs, E., & de Wit, H. (2014). Regular exercise is associated with emotional resilience to acute stress in healthy adults. *Frontiers in Physiology*, *5*(161), 1-7.

Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-analysis of the relationships between social support and well-being in children and adolescents. *Journal of Social and Clinical Psychology*, *29*(6), 624-645.

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion, 9*(3), 361-368.

Conner, K. M., & Davidson, J. (2003). Development of a new resilience scale: The Conner-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18,* 76-82.

Criss, M. M., Pettit, G. S., Bates, J. E., Dodge, K. E., & Lapp, A. L. (2002). Family adversity, positive peer relationships, and children's externalizing behavior: A longitudinal perspective on risk and resilience. *Child Development, 73*(4), 1220-1237.

Derogatis, L. R. (2001). *BSI 18, brief symptom inventory 18: Administration, scoring, and procedures manual*. Minneapolis, MN: NCS Pearson.

Deuster, P. A., & Silverman, M. N. (2013). Physical fitness: a pathway to health and resilience. *US Army Medical Department Journal*, October-December 24-35.

Dusek, J. A., Otu, H. H., Wohlhueter, A. L., Bhasin, M., Zerbini, L. F., Joseph, . . . Libermann, T. A.

(2008). Genomic counter-stress changes induced by the relaxation response. *PloS one*, *3*(7), e2576.

Everly, G. S. (2012). *Fostering human resilience: A primer on resilient leadership, psychological first aid, psychological body armor, critical incident stress management* (2nd ed.). Ellicott City, MD: Chevron.

Everly, G. S. (2017). *Psychological body armor: Lessons from neuroscience that can save your career, your marriage.* Ellicott City, MD: Crisis Intervention & CISM Resources, LLC.

Fernando, C. & Ferrari, M. (2011). Spirituality and resilience in children of war in Sri Lanka. *Journal of Spirituality in Mental Health, 13*(1), 52-77.

Figley, C. R. (1995). Compassion fatigue as secondary traumatic stress disorder; an overview. In C. R. Figley (Ed.), *Compassion fatigue: Coping with secondary traumatic stress disorder in those who treat the traumatized* (pp. 1-20). New York, NY: Routledge.

Flórez, K. R., Shih, R. A., & Martin, M. T. (2014). *Nutritional fitness and resilience: A review of relevant constructs, measures, and links to well-being*. Santa Monica, CA: RAND Corporation. Retrieved from https://www.rand.org/pubs/research_reports/RR105.html.

Florian, V., Mikulincer, M., & Taubman, O. (1995). Does hardiness contribute to mental health during a stressful real-life situation? The roles of appraisal and coping. *Journal of Personality and Social Psychology, 68,* 687-695.

Fox, K. R. (1999). The influence of physical activity on mental well-being. *Public Health Nutrition*, *2*(3a), 411-418.

Fredrickson, B. L. (2006). The broaden-and-build theory of positive emotions. In M. Czsikszentmihalyi & I. S. Czsikszentmihalyi (Eds.), *A life worth living: Contributions to positive psychology* (pp. 85–103). New York, NY: Oxford University Press.

Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelea of negative emotions. *Cognition and Emotion, 12,* 191-220.

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11, 2001. *Journal of Personality and Social Psychology, 84,* 365–376.

Friborg, O., Hjemdal, O., Rosenvinge, J. H., Martinussen, M., Aslaksen, P. M., & Flaten, M. A. (2006). Resilience as a moderator of pain and stress. *Journal of Psychosomatic Research, 61*(2), 213-219.

Gana, K., Alaphilippe, D., & Bailly, N. (2004). Positive illusions and mental and physical health later in life. *Aging & Mental Health*, *8*(1), 58-64.

Germain, A. (2013). Sleep disturbances as the hallmark of PTSD: Where are we now? *The American Journal of Psychiatry, 170*(4), 372-382.

Greeff, A. P. & Joubert, A. M. (2007). Spirituality and resilience in families in which a parent has died. *Psychological Report, 100*(3 Pt 1), 897-900.

Guest, D. E. (2017). Human resource management and employee well- being: Towards a new analytic framework. *Human Resource Management Journal*, *27*(1), 22-38.

Guha-Sapir, D., Hoyois, P., Wallemacq, P., & Below, R. (2017). *Annual disaster statistical review 2016: The numbers and trends*. Brussels: CRED.

Haber, M. G., Cohen, J. L., Lucas, T., & Baltes, B. B. (2007). The relationship between self- reported received and perceived social support: A meta-analytic review. *American Journal of Community Psychology*, *39*(1-2), 133-144.

Hall, K. S., Hoerster, K. D., & Yancy Jr, W. S. (2015). Post-traumatic stress disorder, physical activity, and eating behaviors. *Epidemiologic reviews*, *37*(1), 103-115.

Hamilton, N. A., Nelson, C. A., Stevens, N., & Kitzman, H. (2007). Sleep and psychological well-being. *Social Indicators Research*, *82*(1), 147-163.

Hartling, L. M. (2008). Strengthening resilience in a risky world: It's all about relationships. *Women & Therapy, 31*(2-4), 51-70.

Hartwick, J. M., & Kang, S. J. (2013). Spiritual practices as a means of coping with and ameliorating stress to reduce teacher attrition. *Journal of Research on Christian Education*, *22*(2), 165-188.

Hemenover, S. H. (2003). The good, the bad, and the healthy: Impacts of emotional disclosure of trauma on resilient self-concept and psychological distress. *Personality and Social Psychology Bulletin*, *29*(10), 1236-1244.

Hong, S. A., & Peltzer, K. (2017). Dietary behaviour, psychological well-being and mental distress among adolescents in Korea. *Child and Adolescent Psychiatry and Mental Health*, *11*, 56.

Imamura, F., O'Connor, L., Ye, Z., Mursu, J., Hayashino, Y., Bhupathiraju, S. N., & Forouhi, N. G. (2015). Consumption of sugar sweetened beverages, artificially sweetened beverages, and

fruit juice and incidence of type 2 diabetes: Systematic review, meta-analysis, and estimation of population attributable fraction. *BMJ*, 351: h3576.

Kaminsky, M. J., McCabe, O. L., Langlieb, A., & Everly, G. S. (2007). An evidence-informed model of human resistance, resilience, & recovery: The Johns Hopkins' outcomes-driven paradigm for disaster mental health services. *Brief Therapy and Crisis Intervention*, 7, 1-11.

Keller, A., Litzelman, K., Wisk, L. E., Maddox, T., Cheng, E. R., Creswell, P. D., & Witt, W. P. (2012). Does the perception that stress affects health matter? The association with health and mortality. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 31(5), 677–684.

Kemper, K. J., Mo, X., & Khayat, R. (2015). Are mindfulness and self-compassion associated with sleep and resilience in health professionals? *The Journal of Alternative and Complementary Medicine, 21,* 496-503.

Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using DSM- IV and DSM- 5 criteria. *Journal of Traumatic Stress*, 26(5), 537-547.

Kobasa, S. C., Maddi, S. R., & Kahn, S. (1982). Hardiness and health: A prospective study. *Journal of Personality and Social Psychology, 42,* 168-177.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer Publishing Company.

Lovett, M., Bajaba, S., Lovett, M., & Simmering, M. J. (2018). Data quality from crowdsourced surveys: A mixed method inquiry into perceptions of Amazon's Mechanical Turk Masters. *Applied Psychology, 67,* 339-366.

Luthar, S. S., Doernberger, C. H., & Zigler, E. (1993). Resilience is not a unidimensional construct: Insights from a prospective study of inner-city adolescents. *Development and Psychopathology*, 5(4), 703-717.

Lutz, L. J., Gaffney-Stomberg, E., Williams, K. W., McGraw, S. M., Niro, P. J., Karl, J. P., ... & McClung, J. P. (2017). Adherence to the Dietary Guidelines for Americans is associated with psychological resilience in young adults: a cross-sectional study. *Journal of the Academy of Nutrition and Dietetics*, 117(3), 396-403.

Lyubomirsky, S. (2007). *The how of happiness: A new approach to getting the life you want*. New York, NY: Penguin Books.

Lyubomirsky, S., & Della Porta, M. D. (2010). Boosting happiness, buttressing resilience. *Handbook of adult resilience*, 450-464.

Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: an experimental longitudinal intervention to boost well-being. *Emotion*, 11(2), 391-402.

Lyubomirsky, S., King, L. A., & Diener, E. (2005). The benefit of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, 131, 803-855.

Lyubomirsky, S., & Layous, K. (2013). Ho do simple positive activities increase well-being? *Current Directions in Psychological Science*, 22(1), 57-62.

Lyubomirsky, S. & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research, 46,* 137-155.

Mandleco, B. L., & Peery, J. C. (2000). An organizational framework for conceptualizing resilience in children. *Journal of Child and Adolescent Psychiatric Nursing*, 13(3), 99-112.

Manning, L. K. (2013). Navigating hardships in old age: Exploring the relationship between spirituality and resilience in later life. *Qualitative Health Research, 23*(4), 586-575.

Marx, A., Rihoux, B., & Ragin, C. (2014). The origins, development, and application of qualitative comparative analysis: the first 25 years. *European Political Science Review*, 6(1), 115-142.

Masten, A. S. (2011). Resilience in children threatened by extreme adversity: Frameworks for research, practice, and translational synergy. *Development and Psychopathology*, 23, 493-506.

McCann, I.L., & Pearlman, L.A. (1990). Vicarious traumatization: A contextual model for understanding the effects of trauma on helpers. *Journal of Traumatic Stress*, 3, 131-149.

Mereish, E. H., & Poteat, V. P. (2015). The conditions under which growth-fostering relationships promote resilience and alleviate psychological distress among sexual minorities: Applications of relational cultural theory. *Psychology of Sexual Orientation and Gender Diversity, 2*(3), 339-344.

Motta, R.W. (2008). Secondary trauma. *International Journal of Emergency Mental Health*, 10(4), 291-298.

Neff, K. D. & McGehee, P. (2009). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity, 9*(3), 225-240.

Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological Medicine*, *38*(4), 467-480.

Norris, F. H., Galea, S., Friedman, M. J., & Watson, P. J. (Eds.). (2006). *Methods for disaster mental health research*. New York, NY: Guilford Press.

Nygren, B., Alex, L., Jonsen, E., Gustafson, Y., Norberg, A., & Lundman, B. (2005). Resilience, sense of coherence, purpose in life and self-transcendence in relation to perceived physical and mental health among the oldest old. *Aging & Mental Health, 9*(4), 354-362.

Ozbay, F., Fitterling, H., Charney, D., & Southwick, S. (2008). Social support and resilience to stress across the life span: a neurobiologic framework. *Current Psychiatry Reports*, *10*(4), 304-310.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin, 129,* 52-71.

Pargament, K. I., Koenig, H. G., Tarakeshwar, N., & Hahn, J. (2001). Religious struggle as a predictor of mortality among medically ill elderly patients: A 2-year longitudinal study. *Archives of Internal Medicine, 161*(15), 1881–1885.

Pargament, K. I., Koenig, H. G., Tarakeshwar, N., & Hahn, J. (2004) Religious coping methods as predictors of psychological, physical and spiritual outcomes among medically ill elderly patients: A two-year longitudinal study. *Journal of Health Psychology, 9*(6), 713–730.

Pearlman, L.A., & Saakvitne, K.W. (1995). Treating therapist with vicarious traumatization and secondary traumatic disorders. In C.R. Figley (Ed.), *Compassion fatigue: Coping with secondary traumatic stress disorder in those who treat the traumatized* (pp.150-177). New York, NY: Routledge.

Pinquart, M. (2009). Moderating effects of dispositional resilience on associations between hassles and psychological distress. *Journal of Applied Developmental Psychology, 30*(1), 53-60.

Plat, M. J., Frings-Dresen, M. H., & Sluiter, J. K. (2011). A systematic review of job-specific workers' health surveillance activities for fire-fighting, ambulance, police and military personnel. *International Archives of Occupational and Environmental Health*, *84*(8), 839-857.

Plexico, L. W., Erath, S., Shores, H., & Burrus, E. (2019). Self-acceptance, resilience, coping and satisfaction of life in people who stutter. *Journal of Fluency Disorders*, *59*, 52-63.

Ragin, C. C. (1987). *The comparative method.* Berkeley, CA: University of California Press.

Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond.* Chicago, IL: University of Chicago Press.

Raphael, B. (1986). *When disaster strikes: How individuals and communities cope with catastrophe.* New York, NY: Basic Books.

Robins, C. J., Keng, S. L., Ekblad, A. G., & Brantley, J. G. (2012). Effects of mindfulness- based stress reduction on emotional experience and expression: A randomized controlled trial. *Journal of Clinical Psychology*, *68*(1), 117-131.

Rutter, M. (1987). Psychological resilience and protective mechanisms. *American Journal of Orthopsychiatry, 57,* 316-331.

Rutter, M. (2001). Psychosocial adversity: Risk, resilience and recovery. In J. M. Richman & M. W. Fraser (Eds.), *The context of youth violence* (pp. 13-42). Westport, CN: Praeger.

Ryff, C. D. (n.d.). *Scales of psychological well-being.* Unpublished manuscript.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069-1081.

Ryff, C. D. (2014). Psychological well-being revisited: Advances in the science and practice of eudaimonia. *Psychotherapy and Psychosomatics, 83*(1), 10-28.

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality & Social Psychology, 69*(4), 719-727.

Ryff, C. D., & Singer, B. H. (2006). Best news yet on the six-factor model of well-being. *Social Science Research, 35*, 1103-1119.

Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of Happiness Studies, 9*(1), 13-39.

Saatcioglu, F. (2013). Regulation of gene expression by yoga, meditation and related practices: a review of recent studies. *Asian Journal of Psychiatry*, *6*(1), 74-77.

Schou, I., Ekeberg, Ø., & Ruland, C. M. (2005). The mediating role of appraisal and coping in the relationship between optimism- pessimism and quality of life. *Psycho- Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer*, *14*(9), 718-727.

Schwartz, M. D., Lerman, C., Miller, S. M., Daly, M., & Masny, A. (1995). Coping disposition, perceived risk, and psychological distress among women at increased risk for ovarian cancer. *Health Psychology*, *14*(3), 232-235.

Seligman, M. (1998). *Learned optimism.* New York, NY: Pocket.

Silverman, M. N., & Deuster, P. A. (2014). Biological mechanisms underlying the role of physical fitness in health and resilience. *Interface Focus, 4,* 20140040. http://dx.doi.org/10.1098/rsfs.2014.0040

Smith, B. W., Pargament, K. I., Brant, C., & Oliver, J. M. (2000). Noah revisited: Religious coping and the impact of a flood. *Journal of Community Psychology, 28*, 169–186.

Smith, B. W., Tooley, E. M., Montague, E. Q., Robinson, A. E., Cosper, C. J., & Mullins, P. G. (2009). The role of resilience and purpose in life in habituation to heat and cold pain. *The Journal of Pain, 10*(5), 493-500.

Ströhle, A. (2009). Physical activity, exercise, depression and anxiety disorders. *Journal of Neural Transmission, 116*(6), 777.

Substance Abuse and Mental Health Services Administration (2018). First responders: Behavioral health concerns, emergency response, and trauma. *Disaster Technical Assistance Center Supplemental Research Bulletin*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Taylor, S. E., Kemeny, M. E., Reed, G. M., Bower, J. E., & Gruenewald, T. L. (2000). Psychological resources, positive illusions, and health. *American Psychologist, 55,* 99-109.

Taylor, S. E., Lerner, J. S., Sherman, D. K., Sage, R. M., & McDowell, N. K. (2003). Are self-enhancing cognitions associated with healthy or unhealthy biological profiles? *Journal of Personality and Social Psychology*, *85*(4), 605-615.

Thiem, A. (2017). Conducting configurational comparative research with qualitative comparative analysis: a hands-on tutorial for applied evaluation scholars and practitioners. *American Journal of Evaluation*, *38*(3), 420-433.

Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional arousal. *Journal of Personality and Social Psychology, 86,* 320–333.

Vartanian, L. R., Schwartz, M. B., & Brownell, K. D. (2007). Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *American Journal of Public Health*, *97*(4), 667–675.

Werner, E., & Smith, R. (1982). *Vulnerable but invincible: A longitudinal study of resilient children and youth*. New York: Adams, Bannister and Cox.

Wilks, S. E., & Croom, B. (2008). Perceived stress and resilience in Alzheimer's disease caregivers: Testing moderation and mediation models of social support. *Aging & Mental Health, 12*(3), 357-365.

Wills, T. A. (1985). Supportive functions of interpersonal relationships. In S. Cohen & S. L. Syme (Eds.), *Social support and health* (pp. 61-82). San Diego, CA, US: Academic Press.

Yousafzai, A. K., Rasheed, M. A., & Bhutta, Z. A. (2012). Annual Research Review: Improved nutrition—a pathway to resilience. *Journal of Child Psychology and Psychiatry, 54*(4), 367-377.

Youssef, C. M., & Luthans, F. (2007). Positive organizational behavior in the workplace: The impact of hope, optimism, and resilience. *Journal of Management*, *33*(5), 774-800.