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## Examining Communiobiology During Adrenal Stress Scenario Training in Feminist Self-Defense: An Experimental Study

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EXAMINING COMMUNIBIOLOGY DURING ADRENAL STRESS SCENARIO  
TRAINING IN FEMINIST SELF-DEFENSE: AN EXPERIMENTAL STUDY

A Thesis

Presented to

The Faculty of the Department of Communication Studies

San José State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Daniel Van Hook

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EXAMINING COMMUNIBIOLOGY DURING ADRENAL STRESS SCENARIO  
TRAINING IN FEMINIST SELF-DEFENSE: AN EXPERIMENTAL STUDY

by

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## ABSTRACT

### EXAMINING COMMUNIBIOLOGY DURING ADRENAL STRESS SCENARIO TRAINING IN FEMINIST SELF-DEFENSE: AN EXPERIMENTAL STUDY

by Daniel Van Hook

In communication episodes featuring heightened stress, interactions that are perceived as threatening and evoke a sense of powerlessness often predict a cycle of victimization. Meanwhile, social interactions which affirm safety and agency amidst stress foster empowerment. This study utilized *Hoplology*, which studies stress inoculation against aggression and posttraumatic stress, and *Communibiology*, the study of neurobiology as an antecedent and outcome of communication, to explore (a) whether Adrenal Stress Scenario Training in Feminist Self-Defense (ASST-FSD) produces a physiological response to promote stress inoculation, (b) how anxiety impacts physiological response, and (c) reports of mental toughness. A 4-day ASST-FSD training pilot study was conducted to collect saliva samples to measure stress response via the hormone cortisol and pre-post self-report surveys to measure cognitive markers of stress-coping (mental toughness). Findings suggest ASST-FSD may require more extensive training features to promote a physiological behavior change, and future research with a larger sample could benefit from exploring stress adaptations and recovery, particularly with marginalized populations likely to experience interpersonal violence.

## DEDICATION

*-- Dedicated to Alex and their friends.*

Alex was my friend, and when we were 11 years old, they were my first martial arts student. They were a target for chronic bullying at school, and after witnessing ongoing beatings and humiliations from a particularly sadistic aggressor, I offered Alex karate lessons. My help turned out to be harmful. The skills and strategies were ineffective, and as I helplessly watched Alex get hurt again, the other kids looked to the trainer (me) to intervene. Frightened of the aggressor and having no idea what to do or say, I ridiculed Alex's technique and lack of effort. Looking back, I think the aggressor was relieved, and it makes me sad to think about how that must have affected my friend.

Alex and I drifted apart, and I didn't hear much of them until after high school when they committed suicide. That news is still fresh in many ways. Meanwhile, the aggressor had a reputation for being volatile and dangerous. It wasn't that he had any exceptional ability or strength which intimidated people, but rather a lack of compassion and restraint against brutalizing those smaller than him. Many years after high school, I was shocked but unsurprised to learn that he too had committed suicide. These tragic parallels have opened the doorway to extensive meditations on cycles of violence.

Looking forward, I will never forget Alex or the aggressor. As a friend of Alex's, I am highly motivated to research ways of helping people resist maltreatment as well as supporting those who have been wounded by it. Communication is the key. My

"action-research" consists of serving as a telephone counsellor in therapeutic crisis intervention, and also as a "mugger" in reality-based self-defense training for women. On the crisis lines, I use dialogue to provide a caring relationship and facilitate problem solving for people overwhelmed by emotional distress, and in self-defense training scenarios, I channel the hostile voice and behavior of Alex's aggressor for clients to resist and overcome. In both contexts, I hear Alex's voice in the clients' stories maltreatment and how it robbed them of their sense of self, and again as they reach within themselves, ignite their innate "fighting spirit", and reclaim their power. In the process, my compassion and fighting spirit burn brighter as well.

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## LIST OF ABBREVIATIONS

ACTH – Adrenocorticotrophic Hormone  
ANS – Autonomic Nervous System  
ASST – Adrenal Stress Scenario Training  
CNS – Central Nervous System  
CRH – Corticotropin-releasing hormone  
FSD – Feminist Self-Defense  
GAS – General Adaptation Syndrome  
HPA – Hypothalamic-Pituitary-Adrenal  
NE – Norepinephrine  
PNS – Parasympathetic Nervous System  
PUA – Pick-Up Artist  
SISR – Stress-Induced Structural Remodeling  
SIT – Stress Inoculation Training  
SNS – Sympathetic Nervous System

## Introduction

An individual's experience of interpersonal violence can have longstanding implications on subsequent violent or hostile interactions. Assertive and strategic communication skills are assumed to significantly reduce risk when one is targeted for interpersonal violence (Amdur, 2011; de Becker, 1997; Gold & Belzer, 1998; Ullman, 2007). Execution of these adaptive skills depends upon management of *adrenal stress* (i.e., the biological component of the *fight or flight response*). In the context of threatening interactions, adrenal stress may impair performance and heighten vulnerability or, conversely, provide access to a mind-body state conducive to critical decision making and efficient action (Askern & Grossman, 2010; Grayson & Stein, 1981; D. A. Hall, 2013; Hayes, 1994). To conceptualize aggression, anxiety, and stress inoculation within the communicative context, this study utilizes Hopology – the unique, multi-disciplinary approach to the study of violence (e.g., Burton, 1884; Draeger, 1980; D. A. Hall, 2013; Hayes, 1994) – to (a) provide an evolutionary framework for aggression and problematic stress, (b) identify phylogenic human capacities for stress coping which can be enhanced through combative training, and (c) classify and analyze feminist self-defense as a combative system.

Hopology conceptualizes violence from an evolutionary perspective, which assumes human behavior is a product of biological and psychological mechanisms that have been conserved through natural selection and manifest uniquely according to individual and sociocultural factors (Darwin, 1889/2015; Draeger, 1981; Hayes, 1994). The capacity for violence has been conserved throughout evolution because

it confers a survival advantage, and as cultural survival depends on the ability to defend against aggression, every society has developed methods of training warriors to kill and die on behalf of the community (Belzer, 1987; Draeger, 1980). The most successful and extensively documented warrior traditions have historically employed stress inoculation training (SIT) to promote more adaptive responses to stressful encounters (D. A. Hall, 2013; Hayes, 1994). The two primary SIT techniques are adrenal stress scenario training (ASST) for combative performance, and crisis intervention for post-combat stress (Grinker & Spiegel, 1945; D. A. Hall, 2013; Salmon, 1917). As noted by Hayes (1994), these methods aim to promote *agency* through enhancement of genotypical psycho-physical traits – which are analogous with anxiety-reduction, as well as adrenal stress management and corresponding cognitive-behavioral markers of *mental toughness* (*self-efficacy*, *self-regulation*, and *resilience*) (Benight & Bandura, 2004; Connor & Davidson, 2003; Dagnall et al., 2019).

These methods are uniquely synthesized as tools for empowerment in feminist self-defense, which was originally developed as a civilian combative system to address the biopsychosocial realities of violence against women (Morris, 1996; Hollander, 2009). Typical multi-day training workshops have been documented to reduce risk of assault and support clinical interventions for assault survivors (Gidycz & Dardis, 2014; Ozer & Bandura, 1990; Rosenblum & Taska, 2014). The triggering and management of adrenal stress is a primary focus of the training, as well as a key factor in the psychobiological anxiety believed to underlie most mental health

challenges that result from victimization (e.g., posttraumatic stress, depression, generalized anxiety; Beard & Björgvinsson, 2014; Christopher, 2004; McEwen, 2007; Zorn et al., 2017). Through asynchronous (i.e., one-sided) full-contact training scenarios featuring common types of assault, participants viscerally resist and overcome disempowering social constructs, anxiety, and learned helplessness (McCaughey & Cermele, 2017; Snortland, 1998; Van der Kolk, 2006). The stress inoculation curriculum includes education of- and scaffolding in targeted communication skills-acquisition, which are applied in realistic verbal scenarios with mock-aggressors, providing a biopsychosocial experience of success against threatening predatory communication (Morris, 1996; Van der Kolk, 2006). However, no studies to date have examined the training's physiological impact, particularly as it affects stress hormone levels. Therefore, the goals of this study are to confirm: (1) whether the ASST verbal scenarios induce a physiological stress response; (2) whether there is a difference in physiological stress response based on cognitive markers of anxiety; and (3) whether the training promotes psychobiological stress inoculation.

Communibiological studies offer a useful lens for examining these goals (e.g., Afifi et al., 2011; Floyd & Riforgiate, 2008; King & Theiss, 2016). Communibiology examines the relationship between social interaction and biological processes (Floyd et al., 2007; Hickson & Stacks, 2010). As an interactive process of meaning-construction and verbal and non-verbal expression, communication is enabled reflexively through a biological stress response. This response is a *biopsychosocial*

system of threat appraisal and coping mechanisms based upon primeval neural mechanisms (i.e., the “fight or flight response”), as mediated by primitive social-emotional patterns (i.e., bullying, appeasement) and higher cognitive functions (i.e., agency) (Cannon, 1932; Damasio et al., 2000; Kemeny, 2003; Lazarus & Folkman, 1984; Lischinsky & Lin, 2020; Miller, 2015; Siegel & Victoroff, 2009). Human capacities for violence emerge in predatory and defensive contexts (Hall, 1997). The adrenal stress response, which affects cognition and behavior, contains genotypical schemas for defense against predatory communication patterns, as well as the problematic biopsychosocial stress adaptations (e.g., anxiety) resulting from victimization (Cantor, 2009; Endler, 1986; McEwen, 2007). These mechanisms become increasingly unconscious (i.e., uncontrollable) under intense stress (Van der Kolk, 2006). Predatory communication confirms and exploits vulnerability based on anxiety cues, contributing to a cycle of victimization (Duncan, 1999; Jonason & De Gregorio, 2022; Ritchie et al., 2019).

As academic disciplines that analyze the interface of nature and nurture, Hopology and Communibiology together position communication, stress, and interpersonal violence as interrelated biopsychosocial processes. Adaptive traits, inherited through evolution, provide “universal” (i.e., phylogenic) scripts for social and predatory violence based upon (a) biology (neurocognitive and physiological), (b) psychology (cognitive and affective), and (c) sociology (behavioral). More specifically, communication is conceived as an interactive process of meaning-construction and verbal and non-verbal expression that is facilitated through biology

and psychology (Floyd et al., 2007; Hickson & Stacks, 2010). Communication operates bidirectionally with the biopsychosocial stress response, which is a genotypical system of threat appraisal and coping based upon primeval neural mechanisms (i.e., the “fight or flight response”) as mediated by primitive social-emotional patterns (e.g., bullying and appeasement within social dominance hierarchies) and higher cognitive capacities (i.e., logic and agency – which may be utilized for predatory aggression or its defense) (Cannon, 1932; Damasio et al., 2000; Kemeny, 2003; Lazarus & Folkman, 1984; Lischinsky & Lin, 2020; Miller, 2015; Siegel & Victoroff, 2009). Therefore, the training emphasis on adrenal stress management through assertive communication as a strategic response to predatory communication patterns is the focus of this study. To accomplish this, measures of biological and cognitive markers of stress appraisal and coping in simulated communication episodes were collected to determine scenario efficacy in prompting a psychosocial stressor and enabling stress inoculation.

As the concepts to be addressed are largely based upon organic evolution, neurobiology, and evolutionary psychology, phenomena that are observed universally among most mammals, non-human primates, and humans are not considered “pathological” but rather “constructive” or “problematic” based upon context and effect upon well-being (Cantor, 2009; Christopher, 2004; Jonason, 2014; Wilson, 2007). For example, problematic biopsychosocial stress adaptations are assumed to underly most “disorders” resulting from interpersonal trauma, and thus the terms *distress*, *anxiety* and *traumatic stress* are used interchangeably to



describe intense stress reactions containing biopsychosocial elements of disempowering peritraumatic contexts (e.g., physiological arousal, dissociation, helplessness) -- which are conducive to basic survival in emergencies or abusive social environments, but may be problematic in more normative contexts (Christopher, 2004; Lazarus & Folkman, 1984). For example, *bullying* is recognized as an adaptive, albeit unpleasant schema of hierarchical social interaction among mammals and non-human primates, but which is problematic in humans in that it utilizes a power-imbalance to enact myriad forms of harassment, abuse, sexual assault, and criminal violence (Jonason, 2014; Sherrow, 2011; Volk et al., 2014). These behaviors and the anxiety they produce challenge agency, which is a uniquely human capacity necessary for growth and development (Bandura 2018; Benight & Bandura, 2004; Maslow, 1943). Paradoxically, anxiety is a motivator for change, and “posttraumatic growth” is assumed to be an intrinsic human capacity which can be enhanced through social interaction and strategic communication (Christopher, 2004; Everly & Lating, 2017; Wilson, 2007).

In the following literature review, Hopology will be examined to provide (a) an evolutionary neurobiological model for predatory communication, anxiety, and stress inoculation; (b) an examination of genotypical psycho-physical stress-coping capacities which have historically been enhanced through combative training; and (c) classification and analysis of ASST-FSD as a combative system. These will inform the study’s communibiological framing of research hypotheses, methods, and measures (biological and cognitive-behavioral).

## **Literature Review**

### **Hoplology**

Hoplology is a unique, interdisciplinary approach to the study of violence. The term is based on the Greek word “hopl,” which means “armored” in reference to the “hoplites” or heavily armored foot soldiers of ancient Greece. It was coined by Sir Richard Burton (1821 – 1890), who studied combative behavior and fighting systems to better understand the cultural, social, and biological aspects of humanity. In the late 1950’s, Major Donn F. Draeger (USMC Ret.) (1922-1982) re-vitalized Hoplology with the goal of establishing it as a formalized academic discipline for the "study of the basis and patterns and relationships of combativeness in all levels of social complexity" (Draeger, 1980, p. 8; Relnick, 1981). Draeger, along with a group of researchers collectively known as the International Hoplology Society (IHS) utilized cultural anthropology, biomechanics, and evolutionary psychology to understand the reflexive relationship between sociocultural and evolutionary factors and combative behavior and systems (Belzer, 1987; D. A. Hall, 1997). Based upon Hoplology’s analytical framework, this section will (1) conceptualize aggression and problematic stress according to an evolutionary biopsychosocial perspective, (2) identify intrinsic human capacities of stress coping, which are optimized through stress inoculation methods, and (3) classify and analyze feminist self-defense as a combative system.

### ***The Evolution of Aggression and Defense***

In examining combative behavior and performance, Hoplology considers violence and stress from an evolutionary perspective. The capacity for violence and the ability

to defend against aggression confer survival advantages for individuals and cultures and are thus universally sanctioned and conserved throughout evolution (Draeger, 1981). Innate behavioral tendencies of “combativeness in [humans] are based in brain structure and functioning” (Draeger, 1981, p. 7), which, according to the *trilateral-brain model* (see Figure 1), contains genotypical patterns of interaction that have co-evolved across species: (1) *reptilian*<sup>1</sup> biosocial schemas of aggression and defense (i.e., the fight or flight response), (2) *paleomammalian*<sup>2</sup> emotional and social impulses (i.e., the limbic system), and (3) *neomammalian* capacity for abstract thought and communication (i.e., the neocortex), known colloquially as the “reptile”,

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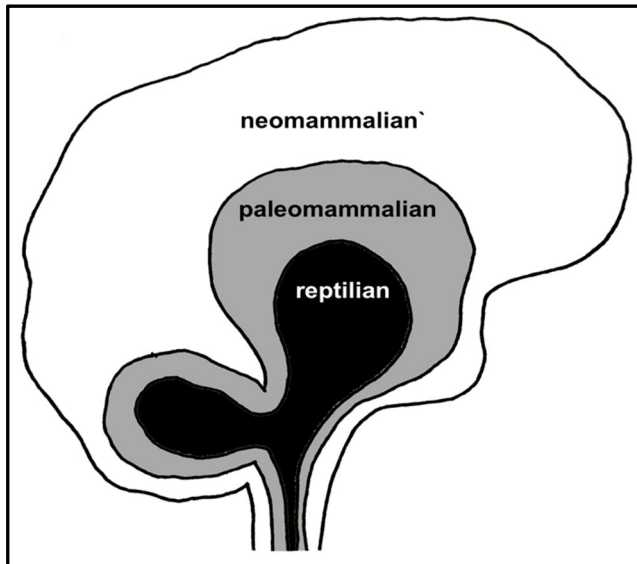
<sup>1</sup>The “Reptile” layer of the brain is the foundation of the stress response. Similar responses to perceived threat exist in all tetrapods, beginning with the emergence of reptiles 300 to 400 million years ago (Darwin, 1889/2015; Stearns & Hoekstra, 2000). As a function of basic survival, four-limbed vertebrates are equipped with emotion-based “fight-flight-freeze” behaviors, which are initiated by the involuntary mechanisms of the brain’s threat-sensing amygdala and facilitated by the hypothalamic-pituitary-adrenal axis (HPA-axis; Cannon, 1922; Selye, 1936). Adapted and activated in response to predatory communication scripts and interpersonal violence, adrenal stress affects biology, psychology, and behavior (Blascovich & Tomaka, 1996; Christopher, 2004).

<sup>2</sup> The “Primate” or limbic brain structure of mammals and primates is believed to have developed as a complex, socially oriented adjunct to the reptilian threat-sensing amygdala (MacLean, 1990). From an evolutionary perspective, emotions are regarded as response patterns shaped by natural selection; homologous social and emotional impulses can be observed in species as diverse as cats, wolves, chimpanzees, and humans (Darwin, 1889/2015). Like reptiles, mammals and primates are equipped with similar predatory and defensive schemas; however, their survival also depends upon cooperative relationships (e.g., nursing of young, collective defense against inter- and intra-species threats, and hunting and gathering), and thus the neural and endocrine systems are modulated by enhanced emotional range to motivate social impulses -- which include predisposition for social hierarchy, a need for affiliative relationships, and threat-based fears of rejection (MacLean, 1990).

“primate”, and “human” brain (Jackson, 1958; MacLean, 1990; Miller, 2015; Panksepp, 2004; Van der Kolk, 2006).

## Figure 1

### *Trilateral-Brain Model*



Although the trilateral processes integrate and adapt uniquely according to individual and sociocultural factors, they contain the genotypical (i.e., evolutionary) biopsychosocial parameters for communication, stress, and interpersonal violence. The next section will include an overview of the stress response followed by a delineation of each trilateral layer’s role in the cycle of predatory communication, problematic stress adaptations, and interpersonal violence.

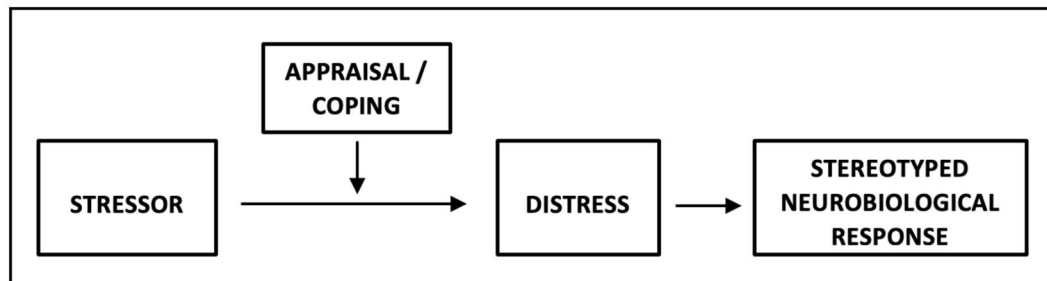
### **Overview of Stress**

Historically, “stress” has been difficult to define. Whereas physicists conceptualize “stress” as an external load that forces “strain” upon a body,

sociologists and psychologists have variously identified stress as an external stimulus, an internal physical and psychological response, and a dynamic relationship between stimulus and response (Lazarus & Folkman, 1984; Romas & Sharma, 2022). Based largely on the work of Selye (1936) and then Lazarus and Folkman (1984), current trends in studying stress favor a *generalized transactional model of stress* (see Figure 2), which identifies “stressors” as subjective physical or emotional challenges that stimulate a stereotyped pattern of internal physiological responses -- the magnitude of which is mediated by individual cognitive factors of stressor *appraisal* and biopsychosocial *coping* strategies.

**Figure 2**

*Generalized Transactional Model of Stress*

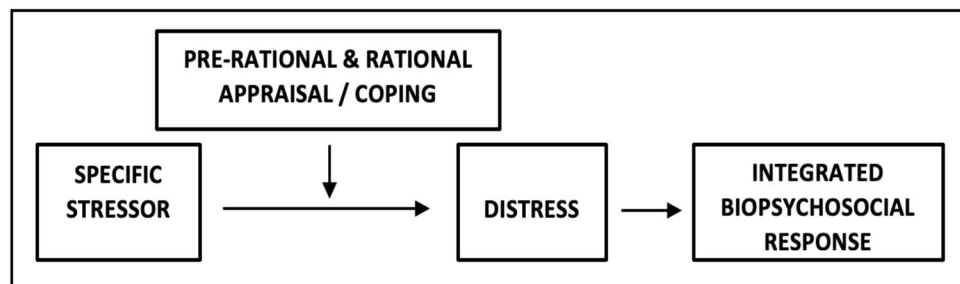


Stress may be experienced negatively or positively as “distress” or “eustress” (Lazarus & Folkman, 1984; Selye, 1982). The former is characterized by a sense of threat or helplessness which, when prolonged or chronic, is indicated in deleterious effects on brain and body health; the latter is marked by a sense of challenge and accomplishment and is shown to facilitate positive stress-management and personal growth (Lazarus & Folkman, 1984; McEwen, 2007; Selye, 1936; 1982).

Recent advances in neuroimaging support an *integrated specificity model of stress* (see Figure 3): neurobiology, physiology, and behavior integrate and adapt coping and appraisal according to specific demands (Kemeny, 2003; Weiner, 1992) wherein, according the theorized trilateral-brain model, primeval neurobiological-behavioral schemas of the fight or flight response are mediated through a complex interplay of socially oriented emotions and abstract cognitive processes (Jackson, 1958; MacLean, 1990; Panksepp, 2004).

### Figure 3

*The Integrated-Specificity Model of Stress*



Reflexively, these neural patterns may be re-organized in accordance with specific behaviors, and in periods of heightened arousal, the brain is amenable to *stress-induced structural remodeling (SISR)* (McEwen, 2007; Rossi, 1996), or structural neurocognitive adaptations in response to threats. Social interaction is a significant factor in stress-reactivity and outcomes, thus SISR is associated with interpersonal violence -- an especially potent stressor that merges the dynamics of social and existential threat and reinforces the event's biopsychosocial response-patterns, whether constructive or destructive (Blascovich & Tomaka, 1996; Damasio et al., 2000; Van der Kolk, 2006).

In threatening communication episodes, SISR is both an antecedent and outcome (McEwen, 2007; 2022). In the trilateral hierarchy of integrated responses, higher order cognitive functions (e.g., abstract thought and reasoning) generally govern the lower, until heightened arousal activates the lower and often unconscious defensive instincts (e.g., the fight-or-flight response and socio-emotional impulses predicated upon dominance hierarchies; Jackson, 1958; MacLean, 1990; Miller, 2015). Recent developments in neuroimaging confirm that intense emotional activation corresponds with inhibited prefrontal activity in addition to stimulation of subcortical (i.e., reptile and primate) regions of the brain (Damasio et al., 2000). According to Bessel Van der Kolk (2006), this development “provides a neurobiological understanding of the clinical observation that people usually have difficulty organizing a modulated behavioral response when they experience intense emotions” and, further, specific emotional states such as anger or fear activate “programmed sequence[s] of action” (p. 3; e.g., Damasio, 1999; Panksepp, 2004). In other words, individuals may develop “hard-wired” biopsychosocial patterns (e.g., “fear conditioning”), which occur as the result of ongoing biopsychosocial adaptations of SISR. Conversely, fear and anxiety can become “extinguished” or deconditioned through learning, illustrating the underlying mechanisms for both traumatic stress and stress inoculation (McNally, 2007; Mahan & Ressler, 2012). These processes, which will be discussed in the next section, are grounded in the most primitive layer of the trilateral brain, wherein the “fight-or-flight response”

houses the “default” responses to threat and the facilitators of meta-learning associated with SISR.

### ***Fight or Flight Response***

Walter Cannon (1932), who coined the term ‘fight or flight response’, classified emotional activity as a function of the central nervous system, which ensures survival and maintains homeostasis of an organism – namely through motivating defensive behaviors in response to environmental threats. These are thought to be contained within the basic amygdala, or “threat sensor” of the brain, whose emotional range is limited to fear, anger, and pleasure. Social interaction is emotionally evaluated and managed according to the degree it either threatens or affirms survival, consumption, or reproduction. For predation of other species, “cold-blooded” communication processes function according to targeting and assessment of vulnerability / odds of success. The biopsychosocial state of the predator is: (a) minimal HPA-axis activation (e.g., heart rate, blood pressure), (b) lethal intent and lack of emotional arousal, and (c) hunting / stalking behaviors (Keeley, 2019).

Aggressive predation is based on risk and reward and follows a generalized pattern of interaction involving: (1) detection, (2) identification, (3) approach, (4) subjugation, (5) consumption (Cantor, 2009; Eibl-Eibesfeld, 1985; Endler, 1986) – and this is the basis for the predatory communication schema employed to “interview” and subjugate potential targets (e.g., de Becker, 1997; Quinn, 1996).

As a defensive system against predation, the basic emotions of anger or fear motivate the “fight, flight, freeze” schema (i.e., fight or flight response) -- genetically



inherited defenses whose objective is to render a threat irrelevant and thus restore conditions to the usual state of affairs (Cannon, 1932; Lischinsky & Lin, 2020; Siegel & Victoroff, 2009). Defense-based behavioral strategies are prioritized as (1) avoidance (2) withdrawal, and (3) aggressive defense (Cantor, 2005; Endler, 1986). Avoidance involves maintaining distance or “freezing” to avoid detection; withdrawal may be active “flight” (i.e., fleeing) or passive “freezing” (e.g., playing dead so that proximal threats lose interest); and “fight” (i.e., counter-aggression) is engaged as a last resort as it carries the greatest physical risks and demands; however, an aggressive response from the target signals threat, activating the predator’s amygdala, which disrupts the predatory interview sequence (Cantor, 2005; Quinn, 1996). Because the biopsychosocial changes associated with adrenal stress can be profound and disorienting, stress inoculation training includes psychoeducation to demystify its effects.

### ***Physiology of Adrenaline***

In response to perceived threats, the primeval fear-sensor of the brain (amygdala) activates adrenal stress by signaling the *hypothalamic-adrenal-pituitary axis (HPA-axis)* to stimulate the endocrine and central nervous systems for fight or flight activity (McEwen, 2007; Selye, 1936). When (1) the sensory thalamus displays stimuli deemed threatening, (2) the amygdala initiates an integrated response along the HPA axis, (3) activating the sympathetic nervous system (SNS), whose fibers transmit norepinephrine (NE; a neurotransmitter and hormone) to the adrenal cortex (located above the kidneys), signaling the release of adrenaline (i.e., epinephrine,

another hormone / neurotransmitter) into the bloodstream. Within seconds, (4) adrenaline and SNS activity stimulate involuntary reactions to facilitate behaviors associated with fight-flight-freeze response – including neurocognitive changes, increased heart rate, elevated blood pressure, constricted breathing, and nervous sweating. Meanwhile, (5) the HPA axis activates a corticotropin-releasing hormone (CRH), (6) stimulating the pituitary gland to release adrenocorticotrophic hormone (ACTH) into the bloodstream, which (7) stimulates the adrenal gland to release a second stress hormone, *cortisol*, which (8) exercises an inhibitory effect on non-essential systems (e.g., digestive and immune systems) to support heightened SNS activity and protect the body from its effects. Successful management of the threat terminates arousal of the amygdala and HPA-axis, signaling activation of the parasympathetic nervous system (PNS; the rest and digest counterpoint to fight or flight of the SNS) and cortisol levels return to baseline in approximately 20 to 40 minutes (Lupien, 2013; McEwen, 2007; Romas & Sharma, 2022).

While the effects of adrenal stress are adaptive for surviving acute physical threats, neurochemical stimulation is highly demanding on the body and incurs short- and long-term costs (McEwen, 2022). In the short-term, effects may be disorienting and debilitating, including rapid changes in heart rate and blood pressure, distortions of sensory processing, (e.g., tunnel vision, auditory exclusion, distorted sense of time), diminished memory and cognition, and degradation of fine motor skills (e.g., manual dexterity and speech) (Askern & Grossman, 2010). Heightened threat sensitivity (i.e., fear conditioning of the amygdala) or chronic or

long-term stressors result in dysregulation of the HPA-axis, evincing blunted or overreactive cortisol production – which either fails to protect the body from the acute effects of adrenaline, or continually suppresses vital functions such as the digestive and immune systems, resulting in conditions such as hypertension, cardiovascular disease, gastrointestinal distress, and increased susceptibility to illness and infection (McEwen, 2022; Selye, 1936). Indicated as the underlying biological component in disorders of anxiety and posttraumatic stress, dysregulation of the HPA-axis invokes neurohormonal changes which strongly affect cognition, emotions, and behavior (Kemeny, 2003; Tyrka et al., 2006).

Potentiating meta-learning, SISR resulting from victimization may include fear-conditioning. As a pre-rational structure, the amygdala perceives and reacts to “triggers” faster than the conscious mind can process (Whalen et al., 1998). Learned through visceral experience, neutral stimuli associated with prior threats can trigger the fear response; conversely, fear of specific stimuli can become “extinguished” or deconditioned through learning (McNally, 2007; Mahan & Ressler, 2012). As the underlying mechanisms of stress inoculation and posttraumatic anxiety, these processes of stress induction and structural remodeling are influenced by social-emotional impulses.

### ***Socio-Emotional Impulse***

Generally, social interaction may be positioned on a continuum of hedonic to agonistic: the former, characterized by cooperation and affiliative relationships, dampens the stress response and encourages exploratory behavior, while the latter

is marked by aggression and a dominant-subordinate dynamic, conveying threat and heightening stress reactivity (Cantor, 2005; Chance, 2015; Weinschenker & Seigel, 2002). Subordinate status corresponds with higher stress-reactivity to everyday stressors, increased likelihood of threatening social encounters, and less availability of social support (Abbot et al., 2003; Sapolsky, 1987; Sapolsky & Share, 2004). Furthermore, patterns of victimization repeat across generations through learned behavioral responses and epigenetic transmission predicated upon gene expressions modified via SISR (McEwen, 2007; Maestriperi, 2005; Sanchez et al., 2010).

As a socially adaptive schema, bullying and *appeasement* compliment the phylogenic schemas of aggression and defense, respectively. Bullying is instrumental aggression that is physical, psychological, or sexually coercive, occurring within the context of a power-imbalance (Jonason, 2014; Volk et al., 2014). Beyond traditional conceptions of peer-victimization which are contained within childhood and adolescence, bullying occurs among heterogeneous social differentials -- within households, schools, workplaces, and the community -- emerging globally as myriad forms of harassment, abuse, sexual assault, and criminal violence (Volk et al., 2014). Aggressors are individuals or allied groups who target those perceived as weaker, of subordinate or rival status, or whose behavior is considered unusual, eccentric, or overly aggressive (Kinsey et al., 2007; Sherrow, 2011; Smith et al., 2002). Per the aforementioned defensive schema of (1) withdrawal, (2) immobility, and (3) aggressive defense, Marks (1987) identifies

appeasement as a fourth genotypical behavior, which is a socially oriented defense against instrumental aggression involving confirmation of a dominant's status through displays of submission, alliance, and/or relinquishment of resources or space. In response to higher-ranking members, aggressive defense is usually deprioritized due to combined advantages of conserving energy and reducing risk of injury in conjunction with the limbic-based stress differentials of social hierarchy (Cantor, 2005).

As an adaptive emotion, anxiety accompanies fear and anger as a signal for HPA-axis activation in response to social cues and ambiguous threats (Lazarus & Folkman, 1984). As noted above, survival that is supported by hierarchical social patterns of aggression and submission constitutes a significant stressor among subordinates. Across species, subjugation from bullying correlates with problematic stress reactivity and a cycle of victimization. For example, peer aggression or child abuse impact the lifespan through signs of chronic biopsychosocial anxiety, including (a) increased sensitivity and emotional reactivity to threats, (b) dysregulation of the HPA-axis and elevated cortisol levels, and (c) neophobic behavioral tendencies (e.g., fear of novel situations, low sociability, less exploratory behavior), which correlate with higher stress reactivity and more frequently experienced threatening social experiences involving defeat and submission (Kinsey et al., 2007; McEwen, 2007; Sapolsky, 1987; Zobel et al., 2004). However, while problematic anxiety may be “imprinted” and manifest unconsciously in response to

threatening interactions like bullying, so may it be reconditioned via constructive SISR to reduce neurobiological threat-sensitivity and enhance cognitive mediation.

### ***Cognitive Response***

Located in the executive neo-cortex, abstract thought and the ability to communicate potentiate agency: an evolved human capacity to transcend biological and sociocultural constraints to enact existential decision-making (e.g., learning pursuits, behavioral adaptations, or unpopular moral stances) (Bandura, 2018). Agentic function is supported by cognitive-intuitive processes wherein clear cognition and attuned instincts facilitate optimized functioning under adrenal stress (Hayes, 1994). Agency and life-satisfaction are largely determined by one's ability to manage stress, which is comprised of the cognitive-behavioral factors of a) self-efficacy, (b) self-regulation, and (c) resilience, known collectively as mental toughness (Bandura, 1978; Dagnall et al., 2019; Diener et al., 2010). Lazarus and Folkman (1984) note that the difference between distress and eustress (i.e., negative and positive stress reactions which may contribute to impairment or growth) is mediated by cognitive appraisals of *challenge* versus *threat* and behavioral coping efforts of emotion-regulation and problem-solving. Constructive appraisals of a stressful situation correlate with self-efficacy, or one's belief in their ability to handle problems, which facilitates their confidence to set goals, take risks, and stay motivated (Schwarzer & Jerusalem, 2010). Motivation and achievement necessitate self-regulation, which engages coping efforts to persist in goal-directed control of impulses, thoughts, and behaviors (Bandura, 2018, Dagnall et al., 2019). To cope with failure, overwhelming

events, or tragic outcomes, resilience is a key biopsychosocial factor in one's ability to recover, adapt, and persevere (Connor & Davidson, 2003). These agentic components comprise mental toughness, which entails an adaptive physiological stress response combined with confidence in abilities that manifest as optimized performance and overall life satisfaction (Dagnall et al., 2019; Diener et al., 2010).

As a direct challenge to agency, threats to autonomy stimulate stress reactivity, and victimization within the context of a power-imbalance (i.e., bullying) predicts the most extensive and clinically severe posttraumatic anxiety (American Psychiatric Association, 2013; Herman, 1995; Hyland et al., 2017; Van der Kolk, 2006).

Paradoxically, the cognitive structures which enable agency are suppressed under stress, and perceived threats to agency are especially stressful. As Maslow (1943) observes,

freedom to speak, freedom to do what one wishes so long as no harm is done to others, freedom to express oneself, freedom to investigate and seek for information, freedom to defend oneself, justice, fairness, honesty, orderliness in the group are examples of such preconditions for basic need satisfactions. Thwarting in these freedoms will be reacted to with the threat or emergency response. (p. 383)

Recent advances in magnetic resonance imaging (MRI) were applied to anxiety and traumatic stress reactions to cues redolent of the traumatic stressor, demonstrating that perceived threats challenge agency via intense emotional activation that suppresses neo-cortical activity (cognitive) and stimulates subcortical (fight-flight-freeze and socio-emotional) regions of the brain (Damasio, 1999; Damasio et al., 2000; Panksepp, 2004). Specific emotional states such as fear, anger, or anxiety activate learned neurobiological patterns informed by peritraumatic contexts – which

become more pronounced and unconscious as sense of threat increases (Gray, 1991; McEwen, 2022; Van der Kolk, 2006).

Cross-culturally, anxiety is shown to be a learned (i.e., biopsychosocially embodied) adaptation to maltreatment and interpersonal violence, (a) imprinting qualitative aspects of the social dysfunction upon the neurobiological stress response, (b) affecting stress-sensitivity and the corresponding cognitive and behavioral processes, and (c) uniquely manifesting according to individual and sociocultural parameters (Christopher, 2004; Lazarus & Folkman, 1984; Wilson, 2007). Victimization within the context of a power-imbalance generally involves “boundary violations, loss of autonomous action, and loss of self-regulation” and often precludes engagement of the natural instincts to fight back or run away (Van der Kolk, 2006, p. 3). When the survival is predicated upon “appeasement” or “freezing” through immobility and dissociation, helplessness becomes a neurobiologically established pathway of response to perceived threat. These embodiments express vulnerability cues: among violent offenders’ acknowledged criteria for victim selection, signs of prior victimization are emphasized, and potential targets who exhibit apprehension, inhibition, low self-efficacy, and/or dissociated or hyper-vigilant awareness are more likely to be selected (Book et al., 2013; Duncan, 1999; Grayson & Stein, 1981; Jonason & De Gregorio, 2022; Ritchie et al., 2019). Attempts at subjugation escalate as these vulnerabilities are confirmed and exploited through predatory communication processes and, if successful, predict a cycle of



victimization for the target via heightened anxiety and increased likelihood of negative social interactions (Duncan, 1999, Goemans et al., 2021).

In social applications, practitioners of *empowerment* (e.g., motivational coaches, shamans, therapists) use communicative practices to co-manage clients' physiological states and perceived self-efficacy with the intention of enhancing agency. This process requires conscious modulation of physiological arousal (per the psychobiology of stress) wherein experiences are modelled and scaffolded to facilitate higher functioning responses, thereby constructing greater self-efficacy, self-regulation, and resilience (Caplan, 1989; Ozer & Bandura, 1990). A complete pedagogy of empowerment must instill concepts and behaviors to resist bullying (e.g., awareness of patterns of predatory communication and acquisition of de-escalatory strategies) to foster the embodied self-efficacy and resilience to become a "hard target", enabling proficient navigation of stressful social interactions (M. Gold, personal communication, July 11, 2021; Hollander, 2009; McCaughey, 2000). The next section will discuss combative training and crisis intervention as methods of empowerment via stress inoculation.

### **Empowerment and Stress Inoculation**

To be empowered is to become agentic through social interaction. Ozer and Bandura (1990) describe this as "equipping people with the requisite knowledge, skills, and resilient self-beliefs of efficacy to alter aspects of their lives over which they can exercise some control" (p. 472). To foster empowerment in military, civilian, and clinical contexts, stress inoculation training (SIT) has been successfully

employed to reduce anxiety and improve performance (Meichenbaum & Cameron, 1989; Mueller et al., 2012; Saunders et al., 1996;). Historically, successful combative systems included training methods for management of the intense stress before, during, and after combat. As D. A. Hall (2013) observes:

Many pre-modern cultures understood the necessity of ritual/psychological preparation for battle with ritual/psychological preparation for return to non-combative status. This was considered essential not only for the preservation of civil society but also for the preservation of sanity in the combatant. Neglect of proper psychological training for combatants results in inadequate preparation for the stress of battle; neglect of de-escalation of the combative mind set after combat results in conflict in civil society and post-traumatic stress disorder (PTSD). (p. 277)

In addition to adrenal stress scenario training in martial arts, crisis intervention is a military innovation demonstrated to buffer stress and foster resilience in the wake of potentially traumatic combat (Everly & Lating, 2017; Salmon, 1917). To demonstrate the significance of stress inoculation training as a means for enhancing empowerment amidst interpersonal violence, the following sections will explore innate human capacities for stress-coping and resilience as they have historically been optimized through combative training and crisis intervention.

### ***Combative Training***

*Martial* systems prepare warriors to engage in mortal combat on behalf of a larger community (Draeger, 1981). A modern form of this is the national Armed Forces, which trains and retains professional soldiers. Meanwhile, *civilian* combative systems are developed for individual or small group survival – usually within one’s own sociocultural environment – and are generally marked by a more pro-social, or less-than-lethal intent (Draeger, 1981; Keeley, 2019). Civilian varieties include

classical martial arts, competitive sports (e.g., boxing, wrestling, judo), and systems of unarmed reality-based self-defense against interpersonal violence (e.g., self-defense courses). Optimal performance within any system requires effective stress coping and appraisal<sup>3</sup>, which necessitates training methods to empower and protect combatants (D. A. Hall, 2013). Synthesizing documentation from several long-standing Japanese martial traditions, Hayes (1994) identifies three foundational psycho-physical traits which, although drawn from Japanese combative culture, are applicable to combative behavior outside Japan (D. A. Hall, 1997). Linked to both martial and civilian systems, training sought to enhance: 1) steadfast / imperturbable mind, 2) cognition / intuition, and 3) volition. These psycho-physical traits reflect stress inoculation conducive to a “combative flow state” through regulation of adrenal stress and optimized neuro-cognitive functioning, facilitating critical decision-making and skill execution (D. A. Hall, 1997; 2013). Furthermore, as training environments often invoked various Buddhist ideals and beliefs, the manifestation of the psycho-physical combative traits reflected these socio-cultural contexts and were found to correlate with enhanced social and emotional functioning, e.g., humility, compassion, self-control, and clarity of mind (D. A. Hall, 2013; Hayes, 1994) –

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<sup>3</sup> Although competitive martial arts (e.g., wrestling, judo, boxing, MMA) offer training in combative behavior and performance, practitioners are socialized into systems of civilized aggression with agreed upon rules, which ensure a fair fight and preserve the safety and dignity of the combatants. Context and intended application of the training do not induce the psychobiology intrinsic to real-world violence, and thus do not adequately prepare practitioners for the biosocial reality of a potentially life-threatening assault (Miller, 2011; Quinn, 1996).

characteristics associated with higher functioning and spiritual enlightenment. Complete systems of combat address the physical, psychological, and social realities of violence, which necessitates healing or restoration techniques to manage the aftermath of violence (e.g., first aid – physical or psychological; M. Belzer, personal communication, July 11, 2021; D. A. Hall, 2013; Janovich, 2011). Discussed in the next section, crisis intervention is a modern military innovation for biopsychosocial stress management.

### ***Crisis Intervention***

The English word “crisis” comes from the Greek word *krisis* which means “turning point, or opening door”, suggesting the potential for change without indicating the nature or direction of its course. Analogous to the distress experienced by posttraumatic stress reactions, crisis refers to a person's experience of emotional overwhelm and confusion in response to intense stress (Caplan, 1989). During World War I, it was observed that when combat resulted in injury or noticeable psychological upset, men who were given immediate social support in the form of brief and constructive dialogue sessions tended to be more resilient and suffered fewer long-term posttraumatic stress symptoms (Everly & Lating, 2017; Salmon, 1917). This type of crisis intervention is consistent with the concept of SISR and Crisis Theory (Caplan, 1964; Lindemann, 1944), which propose that these crisis states are potentially transformative, with outcomes ranging from (a) return to homeostasis, (b) prolonged functional impairment, and (c) increased resilience and higher functioning. Constructive outcomes are predicted by quality of attendant

social interaction (e.g., affirmation of safety and agency vs. threats and coercion), which is shown to mitigate or exacerbate distress (Everly & Lating, 2017; France, 2015; Robinaugh et al., 2011). Brewin (2000) reports that a perceived lack of social support is strongly linked with heightened risk for subsequent onset of PTSD, which is superseded by perceived negative social support as an even greater predictor of PTSD (McNally et al., 2003). Thus, there exists a causal link between intense stress and problematic adaptations, and appropriate social support can serve as a buffer by promoting agency, self-efficacy, and resilience. As a combative system that promotes empowerment and stress inoculation via induction and co-management of simulated crises, ASST-FSD will be delineated and analyzed in the following section.

### **Adrenal Stress Scenario Training in Feminist Self-Defense**

An example of a crisis intervention that subscribes to civilian-combative, SISR, and Crisis Theory constructs, is ASST-FSD (adrenal stress scenario training in feminist self-defense). ASST-FSD is conceptualized by its practitioners as embodied resistance to rape-culture ideology and violence against women (Holtzman & Menning, 2019; McCaughey, 2000; McCaughey & Cermele, 2017). Hollander (2009) provides a succinct description of the ASST-FSD approach:

classes that focus on sexual violence against women, that teach skills appropriate for women's bodies, for rapid learning, and for sexual assault situations, and that address gender socialization and other psychological issues that make self-defense challenging for many women. Feminist self-defense classes also teach options rather than prescriptions for responding to assault and focus on prevention and interruption of assault as well as physical self-defense. (p. 591)

Throughout history, systemic gender discrimination and power imbalance have perpetuated an epidemic of violence against women (Brownmiller, 1975). Gender violence—stemming from institutional gender inequality, social ideologies of male privilege and sexual entitlement, and violence-oriented masculine attitudes and behaviors—is identified by the World Health Organization (2019) as a global public health problem and violation of women’s rights. Worldwide, thirty percent of women over the age of 15 have suffered intimate partner violence and / or non-partner sexual violence, which “negatively affects every aspect of survivors’ lives, including their health, educational achievement, and economic and political participation” (Kendall, 2020, p. 9). Usually hidden and seldom discussed, the threat of gender violence and its traumatic consequences are holistically disempowering.

Statistics consistently verify the efficacy of women's resistance in response to physical threats. Contradicting the rape myth that “men’s violence is an inevitable, if unfortunate biological fact”, overwhelming empirical evidence corroborates that active resistance (verbal and / or physical) significantly deters sexual assault (McCaughey, 2000, p. 160; Ullman, 2007), and numerous experts recommend self-defense training for women and girls as a strategic form of resistance (Gidycz & Dardis, 2014; Holtzman & Menning, 2019; McCaughey & Cermele, 2017). However, as Ellen Snortland (1998) reports, the consideration of active resistance as an option to deter violence against women, not to mention education in self-defense, is never discussed in the foremost preventative efforts – most notably the Violence Against Women Act (1994), Violence Against Women Reauthorization Act of 2013, President

Obama's (2014) Task Force on College Sexual Assault, and the World Health Organization's RESPECT (2019). Based on strategies of *primary prevention* as opposed to *risk reduction* (i.e., micro-level physical and verbal resistance strategies), these programs are aimed at micro-level avoidance behaviors for women and macro-level shifts in cultural norms and bystander cultures (Holtzman & Menning, 2019).

ASST-FSD, as its name indicates, was developed and adapted to address the biopsychosocial realities of violence against women (McCaughey, 2000). According to Morris (1996), the catalyst for ASST-FSD's development occurred in 1971, when a woman college student was beaten and raped by an unarmed assailant. As a champion-level black-belt, she blamed herself and was ashamed by the prospect of having dishonored the martial arts system to which she was dedicated. Matt Thomas, her friend and fellow student at Stanford University, believed it was the martial art system that was the failure, as "her training had not prepared her for the emotional and physical realities of an actual assault [thus] her skills were neutralized in an actual attack situation" (Morris, 1996, p. 4). This incident, followed by several other criminal assaults against college women, motivated Thomas to initiate a hoplological study on the biological and social realities of gender violence. He analyzed over 2700 relevant police reports to understand how men attack women and applied this problem to a study of numerous martial arts and self-defense systems to isolate techniques that were effective and easy to learn within a short timeframe (Morris, 1996).

The result was a reality-based form of self-defense training for women. It was based on realistic attack and defense, incorporating basic and effective techniques which could be learned and retained in the span of hours (as opposed to the years required to “master” a martial arts system). Quickly gaining popularity (and some notoriety), this system underwent significant structural changes and paradigm shifts before it came to resemble the form of feminist self-defense training most commonly seen today. Key evolutions include: (1) developing adrenal stress scenario training (ASST) methods and technology, (2) cultivating trauma-informed staff with women coaches as the lead trainers, and (3) emphasizing the primary role of communication skills in deterring violence and including verbal-only scenarios (L. Gaeta, personal communication, November 12, 2021; Morris, 1996; I. Van der Zande, personal communication, April 4, 2022).

### ***ASST Methods***

Originally known as "women's self-defense" and then as "Model Mugging", ASST-FSD was a form of stress inoculation and accelerated skill acquisition in combative training. According to Morris (1996), a basic course would include lectures in criminal psychology and behavior followed by instruction and practice in basic movement patterns that incorporate powerful strikes to vulnerable targets on an assailant's body. These skills and concepts were then applied on a mock-assailant (i.e., "mugger") wearing heavily padded head and groin protection. Role-playing a variety of criminal-aggression patterns, the mugger's realistic physical and psychological threat simulation was intended to activate women's adrenal stress



response. Innovations in the training armor allowed women to unleash full-force strikes and sustain resistance without risk of injury to self or mugger. This allowed for "breakthrough" behaviors to occur in an optimized learning state that was context-specific to the biopsychosocial realities of gender violence, and whose parameters could be individualized to reflect a client's trauma-narrative and facilitate a more constructive resolution. This breakthrough similarly describes the "revelation" or "combative flow state" described by D. A. Hall (2013) and Hayes (1994) in relation to the genotypical combative traits beginning with steadfast mind -- which correlates with constructive pre-rational appraisal and coping of the threat and the blending of cognition and intuition to bypass anxiety and socialization, channeling affective aggression into a powerful volitional response. Therefore, the ASST-FSD combative traits promote the agentic response that corresponds with physiological and cognitive markers of stress-coping (optimized neurobiological response and mental toughness: self-efficacy, self-regulation, resilience).

The scenarios are based on evolutionary patterns of aggression and defense. From a hoplological perspective, the scenarios are dynamic *katas* -- a Japanese term for stylized movement patterns based on common patterns of attack (M. Belzer, personal communication, July 11, 2021; D. A. Hall, 1997). Scenarios feature mock-aggressors who improvise characters ranging from "the friendly guy who won't take 'no' for an answer" to "enraged motorist" to "charming sexual predator," and utilize predatory communication strategies involving intimidation and / or charm, which are incorporated within the "interview" schema (Gold & Belzer, 1998; M. Harris, personal

communication, July 11, 2021). Structured according to genotypical processes and behaviors of predation, “muggers” model common sociocultural patterns of vulnerability-assessment and aggression through (1) visual targeting, (2) approach, (3) boundary violation / personal space invasion (de Becker, 1997; Quinn, 1996). The fourth step is (4) *assault* (reserved for “full-force” scenarios and absent from “verbal-only scenarios), which students attempt to pre-empt through verbal and non-verbal behaviors designed to “fail” each step of the interview: (1) confident affect and posture, (2) conscious maintenance of distance, asking questions, and de-escalating, (3) verbalizing and maintaining strong boundaries and commands, and (4) execution of powerful strikes to neutralize the simulated threat and create an opening for escape (Gold & Belzer, 1998).

In conjunction with the community support from coach and fellow trainees, the experience of agentic functioning in a co-managed crisis is believed to contribute to positive biopsychosocial stress inoculation, which pre-empts and disrupts cycles of victimization (Caplan, 1964; Ozer & Bandura, 1990; Rosenblum & Taska, 2014). However, as conceptualized in SISR and Crisis Theory (Caplan, 1964; Lindemann, 1944; McEwen, 2007), the biopsychosocial meta-learning initiated in the adrenalized state is predicted by the quality of attendant social support, which may be constructive or destructive. Given the intense scenario training and the likelihood of drawing assault survivors prone to problematic anxiety, early ASST-FSD innovators recognized the need for a trauma-informed training experience.

### ***Trauma-Informed Staff Led by Women***

ASST-FSD's trauma-informed approach was largely based on observed problematic stress reactions in some clients. The "breakthrough experience" described above was found to have an empowering effect on women who had been victimized by interpersonal violence and suffered from posttraumatic stress, but there were also instances of "flashbacks" involving panic, dissociation, helplessness, or rage, which were more often observed in survivors (M. Gold, personal communication, July 11, 2021; M. Morris, personal communication, April 4, 2022; I. Van der Zande, personal communication, April 4, 2022; R. Vizansky, personal communication, January 8, 2022). Therefore, the curriculum evolved to include concentrated efforts in providing caring social support to mitigate distress and foster posttraumatic growth (Morris, 1996).

The crisis induced by the scenarios is potentially empowering, but it is also potentially re-traumatizing if negative social support in the form of coercive or careless behavior is exhibited by training staff (Gold & Belzer, 1998; Soalt & Haynack, 2001). Portions of the training simulate physical assault and emotional abuse, but it must never be seriously dangerous or personally degrading (M. Gold, personal communication, July 11, 2021). This conscious balance necessitates careful vetting and training of staff that are men, who usually serve in the capacity of "muggers" and assistant skills instructors. Staff that are women often fill the role of class lead and head coach. In this capacity, they (1) facilitate opening and closing circles, wherein clients are encouraged to share and process their experiences; (2)

instruct and model verbal and physical behaviors of resistance against the mugger; and (3) support the client (participant) in verbal scenarios -- acting as an ally in counter-balance to the mugger's aggression (Morris, 1996). Notably, some factions have removed men from the training staff altogether to optimize safety, while others emphasize the need to model men and women working together to end the cycle of violence against women (M. Gold, personal communication, July 11, 2021; Morris, 1996).

These innovations are the basis for the therapeutic empowerment component of ASST-FSD, evincing constructive biopsychosocial interventions and predicting the fostering of resilience. ASST-FSD's first two innovations (stress-inducing scenarios within supportive community contexts) are characteristic of most current incarnations; to expand the practical application of the skillsets imparted, verbal-only scenarios emerged as the third development.

### ***Verbal-Only Scenarios***

The subject of this study, verbal-only scenarios are utilized in ASST-FSD based on observations that common patterns of predatory communication often precede physical violence, communication behaviors may escalate or deescalate aggression, and non-physical aggression is a commonly encountered form of bullying (Amdur, 2011; de Becker, 1997; Gold & Belzer, 1998). Coercive and manipulative tactics are commonly employed in communicative contexts including date-rape, high-pressure or predatory sales, aggressive panhandling, or workplace bullying involving subordinate-hazing or sexual harassment. If not disrupted, these patterns may

escalate into violence and / or reinforce cycles of problematic stress and victimization.

Verbal-only scenarios are designed to include genotypical and socio-culturally relevant manifestations of predatory communication (e.g., de Becker's seven survival signals<sup>4</sup>) for purposes of familiarizing participants with the "interview" pattern, desensitizing them to the hostile or manipulative language, and strengthening their resolve to maintain boundaries in the face of escalating aggression (M. Harris, personal communication, July 11, 2021; R. Vizansky, personal communication, January 8, 2022). While trainees are provided with skills and concepts in "verbal agility" (e.g., asking questions, re-direction, de-escalation, deception; Gaeta & Chasen, 2000; Gold & Belzer, 1998), the key objective is to hold one's ground and clearly communicate wants and needs, which in the face of predatory communication, can be reduced to a single word: "No" (M. Belzer, personal communication, July 11, 2021; M. Gold, personal communication, July 11, 2021; M. Morris, personal communication, April 4, 2022). As de Becker (1997) explains:

Declining to hear "no" is a signal that someone is either seeking control or refusing to relinquish it...refusal to hear no can be an important survival signal, as with a suitor, a friend, a boyfriend, even a husband...because it sets the stage for more efforts to control. If you let someone talk you out of

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<sup>4</sup> "Muggers" commonly employ combinations of de Becker's (1997) seven survival signals –which describe tactics of predatory communication whose overall objective is to obtain compliance and control: (1) forced teaming, (2) charm and niceness, (3) too many details, (4) typecasting, (5) loan sharking, (6) unsolicited promise, (7) discounting the word 'no' (pp. 56-64).

the word “no,” you might as well wear a sign that reads, “You are in charge” (p. 64)

Being at the favorable end of a power imbalance confers an obvious advantage, and thus individuals with marginalized status are more likely to be targeted. For example, rape culture in the United States is a manifestation of the global epidemic of violence against women, whose activity is evidenced in the *man-o-sphere*: a loose online collective of associated with the Men’s Rights movement, which ascribes to anti-feminist concepts of “masculine enlightenment” based on the realization of and resistance to an assumed social order wherein men are subjugated by women (Ging, 2019; Marwick & Caplan, 2018). Openly misogynistic, numerous factions promote concepts and strategies for establishing male dominance, including the promotion of naturalistic fallacies based on evolutionary psychology to legitimize men’s coercive control and sexual assault of women (Denes, 2011; Gotell & Dutton, 2016; Jane, 2018; Klement, 2019). Verbal abuse and the threat of sexual violence are common tactics of intimidation and harassment (Jane, 2018). Notably, the *pick-up-artist (PUA)* community is based on exchange of information regarding seduction and sexual conquest of women, contributing highly specific predatory communication strategies and tactics for overcoming a woman’s resistance and bypassing consent (e.g., responding to boundaries or the word ‘no’ with mockery or ridicule, or the use of “negging” i.e., insults and verbal abuse to diminish self-efficacy; King, 2018; Klement, 2019; Washko, 2015).

Statistics on gender-violence confirm the global ubiquity of bullying (World Health Organization, 2019). In the context of a power-imbalance, both impulsive and

calculated attempts at subjugation follow predictable patterns of predatory communication. These trends indicate a need for further curriculum development and methods of evaluation for trauma-informed stress inoculation programs. For purposes of enhancing personal safety among vulnerable populations likely to be targeted, context-specific verbal-only scenario workshops are currently being developed and implemented in schools and workplaces by empowerment-based ASST organizations such as Esteem Communication, IMPACT Personal Safety, Kidpower International, and R.A.W. Power. Suggesting broad applications for risk-reduction and constructive stress-management via assertive communication, these training methods and their complex biopsychosocial interactions can be examined and measured through the discipline Communibiology, which will be examined in the next section for the analysis of ASST-FSD's verbal-only scenarios, informing this study's research questions, hypotheses, methods, and measures.

## **Research Questions and Hypotheses**

### **Communibiology**

Communibiology is the study of communication from a biological perspective (Floyd et al., 2007; Hickson & Stacks, 2010). Communication, as a process of social interaction involving meaning construction and verbal- and non-verbal expression, is both facilitated and influenced by “prepackaged” biological processes and behaviors which, reflexively, are modulated by the quality of social interaction – affecting cognition, expression, and learning (Floyd et al., 2007). To better understand and measure these biopsychosocial integrations, the discipline of communication has historically examined physiological, neurobiological, and genetic factors (see Eisenson et al., 1963; Emmert & Brooks, 1970; Gray & Wise, 1959) (Hickson & Stacks, 2010). Highlighting the nature versus nurture quandary, the distinction between verbal- and non-verbal communication (e.g., semantics and language vs. gestures and facial expressions) underlies research efforts to identify “universal” or genetically inherited communication behaviors (see Emmert & Brooks, 1970), as distinct from those learned socio-culturally (see E. T. Hall, 1959) (Hickson & Stacks, 2010). Combined, the implications of these communibiological efforts challenge the Cartesian brain-body dichotomy and indicate communication as a complex synthesis of nature and nurture – a process of biopsychosocial construction that necessitates further multi-disciplinary research efforts (Floyd et al., 2007; Hickson & Stacks, 2010).



As a discipline, Communibiology includes numerous subsets concerned with distinct-yet-related variables and research methods. Hickson and Stacks (2010) identify four general approaches within the methodology: (1) Biosocial, (2) Trait-Temperament, (3) the Communication Gene approach, and (4) the Endocrine method. Respectively, these study and measure (a) biological homologues and variance between humans and animals, and how the human brain and body interact to create communication patterns (many of which are based upon “pre-packaged” evolutionary schemas) (e.g., Hickson & Neiva, 2002; Stacks et al., 1991); (b) genetic factors’ influence upon personality traits, temperament, and their corresponding communicative expressions of apprehension and aggression (e.g., Beatty et al., 1998; McCroskey et al., 2001); (c) genetically-based capacities for empathy which underlie the sending and receiving of unconscious or *spontaneous communication* signals (e.g., Buck, 1984; Buck & Ginsburg, 1997); and (d) hormone levels as an antecedent and outcome of communication behaviors (e.g., Afifi et al., 2015; Floyd & Roberts, 2009). The aforementioned evolutionary model assumes basic “universal” traits (i.e., biological, psychological, and / or social-behavioral functions that are true of most people most of the time; Floyd et al., 2007), which include predictable biopsychosocial patterns associated with aggression.

A communibiological perspective will guide this study of stress reactivity in ASST-FSD’s verbal-only scenarios. This work aligns with previous communication lenses but introduces a hoplogical framework, which integrates and modifies the four general approaches (biosocial, trait-temperament, genetic, endocrine) to expand on

the contexts for examining the communibiology of verbal aggression, problematic stress adaptations, and stress inoculation. For example, akin to Hickson and Stacks' (2010) interactive model of "four forms of feedback" (confrontation, avoidance, motive attribution, and engagement), the fight-flight-freeze-appease schema is ethologically based, but it is simplified to describe the basic defensive neurobiological behaviors that become more pronounced under escalating stress – particularly in response to the predatory "interview" pattern they evolved to counteract. Likewise, behavioral parameters and individual tendencies have traditionally been examined in relation to temperament and personality -- which are considered relatively stable (e.g., Beatty et al., 1998; Hickson and Stacks, 2010; Valencic et al., 1998), whereas this study examines communication behaviors according to genotypical patterns of aggression and defense, as influenced by emotional and cognitive functions of the trilateral brain – which integrate uniquely in response to specific demands and are amenable to change (i.e., SISR) through social interaction (Kemeny, 2003; McEwen, 2007, 2022; Panksepp, 2004).<sup>5</sup> Metrics for personality traits and temperaments, then, are eschewed in favor of measures for generalized anxiety, which is conceptualized as a trait-like state that may impair performance (e.g., biosocial inhibition and apprehension) but also potentiates meta-

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<sup>5</sup> While a review of communibiological literature did not reveal any incorporation of the trilateral brain model (MacLean, 1990; Van der Kolk, 2006), *modular mind* -- or the theory that the brain is divided into two hemispheres, which regulate and express different functions (e.g., Gazzaniga, 1985) – has been examined in relation to interpersonal communication, e.g., Stacks & Andersen (1989) (Hickson & Stacks, 2010).

learning (e.g., crisis states and SISR) conducive to stress inoculation and enhanced mental toughness (Caplan, 1989; Christopher, 2004; Wilson, 2007). In line with other researchers who have measured endocrine activity to examine the relationship between quality of communication and stress reactivity (e.g., Floyd & Riforgiate, 2008; King & Theiss, 2016), this study examines the interplay of aggression (albeit simulated) and positive social support in relation to physiological stress-induction and inoculation.

### ***Physiological Response***

The verbal-only scenarios are designed to induce adrenal stress through simulation of threats indicating interpersonal violence. The mock-aggressor's agonistic behaviors jeopardize the target's safety, social-functioning, and agency, which constitute threats at each respective trilateral-brain level. An acute stress response may occur from non-verbal cues (e.g., "encroachment", menacing facial expressions, or loud vocalizations) (Endler, 1986; Morris, 1996; Whalen et al., 1998); based on genotypical predator-prey transactions, the "interview" represents (a) a process of identity negotiation featuring (b) controlling behaviors within relational conflict, which (c) confer subordination and threaten autonomy –interrelated factors demonstrated to heighten HPA-activity (elevated cortisol) (Abbott et al., 2003; Afifi et al., 2015; King & Theiss, 2016; Meyer & Hamel, 2014; Sapolsky, 1987). However, the threat posed in these scenarios is mitigated by positive coaching and community social support -- hedonic factors demonstrated to blunt stress reactivity and promote self-efficacy and resilience (Afifi et al., 2015; Chance, 2015; Haverfield & Theiss,

2020). Theoretically, if the scenarios induce a physiological response, the quality and degree of the biopsychosocial interaction is conducive to stress inoculation.

As mentioned, previous research efforts have verified the training's effectiveness in reducing risk of assault and enhancing cognitive-behavioral makers of stress-coping for the management of posttraumatic stress (e.g., Gidycz & Dardis, 2014; Ozer & Bandura, 1990; Rosenblum & Taska, 2014), but no studies to date have examined the biological component. This necessitates research as to whether the simulations do indeed induce the physiological stress reaction needed for constructive remodeling. Stress induction, then, is the focus of the first research question guiding this study:

**RQ1:** Do the verbal-only scenarios induce a physiological stress response?

### ***Stress Inoculation***

Traditionally, stress inoculation training (SIT) has been employed in clinical and non-clinical contexts for anxiety management and skills-acquisition (Meichenbaum & Cameron, 1989; Mueller et al., 2012; Saunders et al., 1996). SIT efforts utilize a cognitive-behavioral approach to improve rational and pre-rational cognitive appraisal and behavioral coping in response to context-specific stressors. According to Lazarus and Folkman (1984), psychobiological responses to environmental or emotional stressors may be negative (distress) or positive (eustress). The latter describes the desired state for constructive SISR in training scenarios; the former involves a more intense adrenal stress reaction along with corresponding impairment and is believed to underly SISR associated with posttraumatic stress and

conditioned fear responses (e.g., phobias; McEwen, 2007; Rauch & Foa, 2006).

Although SIT's focus has not historically included physiology, it promotes eustress-based acquisition of appraisal and coping factors which correlate with reduced physiological arousal (Lazarus & Folkman, 1984).

Psychobiological arousal is influenced by three general elements of cognitive appraisal: (1) *threat vs. challenge*, (2) *perceived control*, and (3) *social cognition* (Kemeny, 2003). Blascovich and Tomaka (1996) describe threat as being when the demands of a situation are perceived to be greater than one's resources, while a challenge is when resources are believed to surpass or equal the demand. Physiologically, the stress activation resulting from challenge increases blood flow without increasing blood pressure; threat entails increased flow and resistance (Kemeny, 2003). Manifesting as physical resistance, symptoms from acute stress include choking, "freezing up", muscle tension, impaired coordination, and blurred vision (Askern & Grossman, 2010). Perceived control relates to factors identified by Mason (1968) as novelty, predictability, and controllability. Circumstances that are perceived as unfamiliar, arbitrary and unexpected, and / or not beyond one's capacity to influence contribute to perception of threat. Askern and Grossman (2010) identify characteristic situational dynamics as (a) "sudden and unexpected demands that disrupt normal procedures", (b) "consequences of poor performance are immediate and severe", (c) "task environment is complex and unpredictable", and (d) "personnel must perform multiple tasks under adverse conditions" (p. 53). Social cognition relates to one's perceived social status and degree of community support.

Dickerson and Kemeny (2004) note higher levels of HPA activation when poor performance is a threat to one's status, and perceived quality of social support (or lack thereof) determined whether extreme stress resulted in impaired functioning or increased resilience (Brewin, 2000; Caplan, 1989).

Per the psychobiology of stress, the appraisal and coping interventions in ASST-FSD should promote stress inoculation. Within a socially supportive environment, it presents potentially "threatening" situations as "challenges", affording a sense of control by (a) reducing novelty and unpredictability and (b) providing targeted skillsets, and (c) improving self-efficacy by facilitating success in "worst-case scenarios". These biopsychosocial interventions are embodied as constructive SISR, which contributes to positive appraisal and coping – consciously as well as pre-rationally. In the process of overcoming helplessness via taking effective action, Van der Kolk (2006) notes:

we have taken the findings from neuroscience about the rerouting of conditioned responses by taking effective action very seriously. Neuroscience research provides the theoretical underpinning of our work with action-oriented programs with traumatized adolescents and adults, involving improvisational theater, "model mugging" (in which women who have been raped are taught self-defense and learn to actively fight of a simulated attack by a potential rapist), and other interventions that involve physical action (p. 8)

Stress hormones and neurotransmitters are "informational substances" that "encode the phenomenological experiences of mind and behavior" into memory and are activated according to associated stimuli (Rossi, 1996, p. 205). Further, Rossi (1996) asserts (a) these processes underly anxiety and neurosis and (b) "could contribute to a unified theory of mind-body communication and healing" (p. 205). In

neuroplastic process, the pre-rational appraisal of the amygdala and coping of the HPA-axis can be re-conditioned in sensitivity and response to threat cues (Mahan & Ressler, 2012). Reduction of anxiety and problematic fear responses (e.g., phobias) occurs when (1) fear structures are activated while introducing agentic behaviors and perceptions contrary to learned problematic coping, and (2) the level of stress activation is neither overwhelming nor underwhelming (e.g., Emotional Processing Theory; Foa & Kozak, 1986; Rauch & Foa, 2006). ASST-FSD has been demonstrated to achieve these ends for clients with clinical PTSD diagnoses (Rosenblum & Taska, 2014); therefore, it is likely that ASST-FSD will promote stress coping, as indicated by the following hypothesis:

**H1:** Indicative of stress inoculation, physiological markers of stress coping will improve from the first communication exercise to the last.

### ***Anxiety***

Another consideration is the socio-emotional adjustment that may result from repeated threatening interactions. As indicated by ASST-FSD's trauma-informed approach, anxiety (i.e., problematic stress reactivity) among trauma-survivors is an important variable for consideration. Research indicates that physiological stress reactions are individualized and do not conform to generalized "norms" (as opposed to blood pressure or body temperature); the integrated HPA axis reaction, notably in measures of cortisol, varies widely according to individual temperament and experience, particularly as these relate to anxiety. So-called disorders of anxiety, depression and posttraumatic stress are believed to include "re-wiring" and

deregulation of pre-rational appraisal (amygdala) and coping (HPA-axis); in response to chronic psychobiological stress, the amygdala may become predisposed to continually register threat so that cortisol levels are often elevated (Elzinga et al., 2008; Heim et al., 2004; McEwen, 2007). Conversely, this may dysregulate the HPA-axis and result in “blunted” or insufficient levels of cortisol protection in response to stressors. Zorn et al. (2017) note a “blunted” cortisol response to psychosocial stressors in women with anxiety or depression and, in contrast, a “heightened” response in men with the same diagnoses. These inconsistencies complicate the stress inoculation axiom regarding optimized physiological arousal as a key for constructive meta-learning (McEwen, 2007; 2022; Rauch & Foa, 2006), which invites an examination in differentials in stress response based upon susceptibility to anxiety.

Susceptibility to anxiety and corresponding HPA-axis deregulation have been linked variously with neurotic temperament (nature) and a history of maltreatment (nurture). Communibiologists (e.g., Beatty & McCroskey, 1998; Valencic et al., 1998) and criminologists (e.g., Book et al., 2013; Jonason & De Gregorio, 2022) have identified neuroticism and introversion as personality factors that predict *behavioral inhibition* and *communication apprehension*, which are characteristic elements of the *learned helplessness* associated with SISR—when one is victimized in a manner wherein the sympathetic nervous system is highly activated but they cannot engage instinctive defenses (e.g., running away, yelling for help, fighting back; Van der Kolk, 2006). Contexts of fear and powerlessness predict the most extensive and severe



posttraumatic anxiety in which peritraumatic biopsychosocial elements integrate in response to specified threats under increasing stress (American Psychiatric Association, 2013; Herman, 1995; Kemeny, 2003; Panksepp, 2004; Van der Kolk, 2006). The training scenarios simulate genotypical patterns of aggression (e.g., Eibl-Eibesfeld, 1985; Endler, 1986) within socio-culturally relevant contexts (e.g., de Becker, 1997) which may resemble some clients' trauma histories and thus affect them more strongly. Given that anxiety has the potential to blunt or elevate threat sensitivity of the amygdala in conjunction with dysregulation of the HPA-axis and cortisol levels, the following research question is proposed:

**RQ2:** Is there a difference in physiological response among individuals reporting levels of low / moderate versus high generalized anxiety?

### ***Mental Toughness***

As anxiety is a psychobiological phenomenon, cognitive measures of positive stress-coping and appraisal (i.e., self-efficacy, resilience, and self-regulation) provide another perspective into participants' physiological response. As previous research indicates, these cognitive-behavioral markers correlate with the degree of physiological stress reactivity (e.g., Kemeny, 2003; Lazarus & Folkman, 1984; McEwen, 2022), and have been enhanced through ASST-FSD training – which also demonstrated reduction of risk for assault and mitigation of posttraumatic stress symptoms (e.g., Ozer & Bandura, 1990; Rosenblum & Taska, 2014). As such, the following prediction is made:

**H2:** The training program improves perceived (a) resilience and (b)

mental toughness (self-efficacy, self-regulation, and resilience) regardless of self-reported levels of generalized anxiety.

## **Methods**

This study aims to determine whether ASST-FSD training triggers a stress response and whether the training promotes stress inoculation between the first and second verbal scenario exercises. Further, this study considers how anxiety may impact stress response and examines participant perceptions of training on mental toughness amidst varying levels of anxiety. To arrange data collection, Lisa Gaeta, the CEO of IMPACT Personal Safety – an international organization with a thirty-year history of providing feminist self-defense – was contacted and authorized the recruitment of training attendees for purposes of collecting physiological and cognitive data for the study. To these ends, the study employed a pre- and post-physiological measure for stress reactivity, a pre-screening self-report measure for generalized anxiety, and a pre- and post-self-report measure for cognitive stress-coping and appraisal.

### **Sample**

To address the research questions and test hypotheses, fifteen women were recruited from a four-day IMPACT Beginners' Basics course and a concurrent Instructor Training Seminar in women's self-defense. While the target sample was twenty women over the age of 18, the sample for this study includes fifteen women, 100% of whom (15) identified as female; their ages ranged from 24 to 55, with an average age of 40; their racial / ethnic identity was reported at 67% (10) for White/Caucasian, 13% (2) for Hispanic/Latinx or Spanish Origin, .07% (1) for

Black/African American, and .13% (2) as two or more: Black/African American and White /Caucasian, and American Indian/Alaska Native, Asian, and White/Caucasian.

Participants were recruited among those participating in the Basics Course and the Instructor training. The Basics course consisted of four consecutive four-hour evening workshops and included education in the biopsychosocial realities of gender violence, direct-instruction and skills-practice in physical techniques and strategic verbal and non-verbal communication, and application of concepts and skills in stress-inducing scenarios, both verbal-only and “full-force”. Each evening course was preceded by an intensive instructor training workshop; although the original plan was to recruit from the Basics course only, various constraints made it necessary to recruit women instructors-in-training – limiting this phase of recruitment to those of whom were not supplementing their learning by attending as students in the evening class. For some instructors-in-training, this was their first or second experience as a student in ASST.

For both the instructor training and the evening Basics course, recruitment and data-collection followed the same timeline and procedures. The primary difference was the instructor training was an 8-hour intensive workshop that took place during the day and the Basics course was for 4 hours each evening. The instructor training was designed to mirror the format of the evening class (4 hours), with the additional time devoted to debriefing and discussion of pedagogical concepts and coaching methods. The following description of procedures thus applies to both courses, with each process completed once in the day and once in the evening.

## Procedures

Recruitment occurred on Day 1, wherein an introductory session was coordinated prior to the training.<sup>6</sup> A table was set up for recruitment purposes, where those attending the introductory session were addressed by the researcher and handed a study flyer. Attendees were advised that volunteering for the study is not a condition for participation in any portion of the workshop. Those interested in participating were handed a consent form which, upon completion, was collected and stored in an envelope that was sealed once the recruitment period ended, and then each study recruit was given a unique identifier to be used in subsequent points of data collection.

Once the signed consent form was received, participants provided pre-training biological and cognitive data. Biomarker collection occurred via saliva swab vials provided from bioscience firm Salimetrics. For the first (baseline) saliva sample (S1), each participant was informed on how to self-administer and seal the sample, write their unique identifier on the vial, and return the vial to a collection container. Once all samples were collected, the container was stored in a freezer to await shipping. Participants were then given a hard-copy of the baseline cognitive survey to complete (see Appendix A), which included questions pertaining to perceived resilience (CD-RISC; Connor & Davidson, 2003), mental toughness (i.e., self-

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<sup>6</sup> Due to COVID-19 concerns and SCC mandates, all attendees were required to be masked. Additionally, per IMPACT requirements, all training attendees (research team included) provided proof of vaccination and agreed to observe social distancing and hand-sanitization protocols.

efficacy, self-regulation, and resilience; MTQ-10; Dagnall et al., 2019), and generalized anxiety (GAD-7; Spitzer et al., 2006). After all participants completed the questions and included their unique identifier, surveys were placed in an envelope that was sealed.

On Day 2 of the training, the second and third saliva samples (S2 and S3) were collected to measure participants' stress response to their first verbal-only scenario. They had been prepared on Day 1 to recognize patterns of predatory communication (i.e., "the interview") and choose constructive responses. In addition, the verbal-only scenario on Day 2 was their first introduction to simulated aggression from the assistant coaches in their role as "muggers". Participants were reminded of the self-administration procedures for S1 on Day 1, which was repeated for saliva sample 2 (S2) and 3 (S3). S2 was collected immediately following the scenario. Specifically, the participant walked off the mat directly to the collection table, provided the sample, returned the vial to the collection box, and then the researcher set a timer for 20 minutes -- which is considered the "spike period" for cortisol levels in response to a stressor (Kemeny, 2003; Lupien, 2013). Twenty minutes after the scenario and collection of S2, participants self-administered S3 and returned the vial to the collection container. Again, once all samples were collected, the box was stored in a freezer alongside the S1 samples.

On Day 4 of the training, the final verbal-only scenarios were implemented, whereupon the research team collected S4, S5, and the post-training cognitive surveys. At this point, from the span of Day 2 to Day 4, participants had engaged in

multiple “full force” scenarios of increasing intensity. The ‘full force’ physical component featured various types of simulated assault that were often preceded by predatory communication. To test for changes in cortisol response indicative of stress inoculation in response to predatory communication of verbal-only scenarios, S4 and S5 were administered, collected, and stored according to the same timing and procedures as Day 2. To measure for perceived cognitive changes in response to the training, participants completed a post self-report survey (see Appendix B), which included the same questions as the pre-training survey (CD-RISC and MTQ-10) with the exclusion of the generalized anxiety (GAD-7) measure. Once all surveys were collected and sealed in an envelope, participants were debriefed and thanked by the research team, each receiving a \$40 Amazon gift card as compensation. The researcher then gathered all data and packed the saliva samples with dry ice into a specialized cold-shipping container, which was shipped via expedited registered mail to the Salimetrics firm for bioanalysis of salivary cortisol levels.

## **Measures**

### ***Physiological: Cortisol***

To review, cortisol is a stress hormone associated with the adrenal stress response and HPA-axis activation. In response to perceived threat, cortisol protects the body from the acute effects of adrenal stimulation and suppresses functions non-essential to immediate survival (e.g., immune and digestive systems) to re-direct energy to fight-or-flight mechanisms (McEwen, 2022). In a well-regulated response, cortisol levels peak 20 to 40 minutes from the perception of the stressor and return

to baseline 40 to 60 minutes after the stressor has ended (Lupien, 2013; Kemeny, 2003). As a bio-metric, salivary cortisol “is preferred as it is an easily obtainable biofluid and noninvasive source for evaluating the HPA axis” (Faravelli et al., 2012, p. 14).

Saliva samples were collected to test for cortisol levels at baseline, immediately following both the first and second verbal scenarios, and (c) 20 minutes after the initial post-scenario sample was drawn, as this is the optimal time frame “to observe peak reactivity of salivary cortisol” (Liu et al., 2017, p. 27). Due to limitations in the recruitment process, the research team was unable to control for certain variables that can potentially bias cortisol response (time of day; intake of caffeine, nicotine, or glucose; Lupien, 2013). At key points of the training, saliva sampling was self-administered and then collected for freezing before being sent to the third-party bioanalysis firm Salimetrics (also the supplier of testing supplies) for analyzing.

### ***Cognitive: Surveys***

Participants completed a baseline survey that asked general demographic questions (age, gender identity, and race / ethnicity), as well as questions about cognitive stress-coping and appraisal, which were comprised of 27 Likert-scale items from validated measures of generalized anxiety disorder, resilience, and mental toughness. To measure for changes in cognitive stress-coping, the post-training survey consisted of 20 Likert-scale items, which retained the measures for resilience and mental toughness and excluded generalized anxiety.



Based on previous research that suggests anxiety may impact stress response, the Generalized Anxiety Disorder (GAD-7) scale (Spitzer et al., 2006) was used to determine participant perceptions of anxiety. The GAD-7 is an effective seven-item measure to predict problematic stress-coping associated with HPA-axis dysregulation. Previous studies have used this measure to successfully identify anxious and depressed individuals (Beard & Björgvinsson, 2014). Scores on the GAD-7 were compared to participants' pre- and post-intervention cortisol reactivity and stress-coping capacity. Responses to the GAD-7 demonstrated high reliability  $\alpha = .94$ .

Resilience, or the perceived ability to manage adversity and recover from setbacks, is an acknowledged factor in constructive stress-coping and appraisal, and it is integral to positive mental health outcomes and the mitigation of anxiety, depression, and problematic stress reactions (Connor & Davidson, 2003). As a 10-item unidimensional measure of resilience, the CD-RISC-10 (Connor & Davidson, 2003) is reported to have good internal consistency and construct validity and is considered to be an efficient measure (Campbell-Sills & Stein, 2007). Scores on the CD-RISC-10 were compared pre- and post-training to measure for changes in perceived cognitive stress coping and to confirm consistency with previous studies reporting positive cognitive changes resulting from ASST-FSD (e.g., Gidycz & Dardis, 2014; Ozer & Bandura, 1990). Responses to the CD-RISC-10 demonstrated acceptable reliability in both pre ( $\alpha = .81$ ) and post surveys ( $\alpha = .82$ ).

Representative of self-efficacy, the concept of mental toughness describes a multi-dimensional resource against problematic stress: a synthesis of constructive appraisals marked by confidence and a sense of challenge (as opposed to threat), and coping efforts involving control (self-regulation), and commitment (Clough & Strycharczyk, 2012; Crust, 2008). The 10-item Mental Toughness Questionnaire (MTQ-10) is considered a reliable measure that predicts an individual's ability to successfully perform regardless of circumstances (Dagnall et al., 2019). Verified as a unidimensional measure for self-efficacy, it is empirically validated, accounts for gender invariance, and positively correlates with other measures relating to psychological well-being and self-efficacy (Clough et al., 2002; Dagnall et al., 2019). The MTQ-10 was compared pre- and post-training to determine changes in cognitive stress coping and appraisal. Both pre- and post-scenario responses to the MTQ-10 demonstrated acceptable reliability ( $\alpha = .76$ ,  $\alpha = .79$  respectively).

## Results

To begin, a paired samples *t*-test was conducted to determine whether the verbal-only scenario induced a stress response. In comparing baseline cortisol levels with the 20-minute cortisol level, there was no significant increase in cortisol, suggesting that the verbal-only scenario does not trigger the physiological stress response ( $t(-1.51) = 14, p = .077$ ).

Recall that the first hypothesis predicted that there would be a significant demonstration of stress coping from scenario 1 to scenario 2. Based on a paired samples *t*-test, there was a significant increase in cortisol from scenario 1 to scenario 2, rejecting the hypothesis ( $t(-2.01) = 14, p = .032$ ). Findings suggest that stress inoculation did not occur following the training.

Research question two considered whether stress response levels are impacted by participant reports of generalized anxiety disorder (GAD). To determine whether anxiety influences stress response related to the training, a paired samples *t*-test was conducted comparing cortisol reactivity between participants with low to moderate GAD and those with high GAD. The low to moderate GAD group demonstrated a significant increase in cortisol levels from scenario 1 to scenario 2, consistent with earlier findings that no stress inoculation occurred ( $t(-2.18) = 9, p = .029$ ). In the high GAD group, there was no significant difference in cortisol levels between scenario 1 and scenario 2 ( $t(-.23) = 4, p = .413$ ). Collectively, findings suggest a difference in cortisol response based on anxiety.

Hypothesis two predicted that training participants would report higher self-efficacy and resilience following the training, when compared to baseline reports. A paired samples *t*-test comparing pre and post scores confirmed significant improvement in perceived resilience ( $t(2.55) = 14, p = .012$ ) and self-efficacy ( $t(2.07) = 14, p = .029$ ). Findings support previous research that suggests the training improves mental toughness.

## **Discussion**

This study was initiated on the assumption that stress and communication operate reflexively and that the biopsychosocial embodiments of stressful experiences may be constructively or destructively adaptive. Findings suggest that the verbal-only scenarios of ASST-FSD training do not trigger the stress response needed to promote stress inoculation. Further, anxiety appears to impact the ways in which participants are able to benefit from training goals. Consistent with previous research, however, the ASST-FSD approach continues to promote positive cognitive outcomes of resilience and mental toughness. The results from this study are discussed in more detail below including how findings inform both theory and practice.

### **Physiological Response**

While it was hypothesized that the initial verbal-only scenarios would induce a physiological stress response, findings show no significant increase in cortisol compared to baseline. This suggests the scenarios did not present an effective psychosocial stressor. Possible reasons for the lack of change in cortisol response could be attributed to insufficient variable control and inconsistencies in data-collection, which will be discussed more in the following paragraphs.

This study attempted to isolate and measure a training intervention that was introduced with a host of other contexts and experiences, potentially affecting stress reactivity and complicating data collection. Specifically, scenario intensity was diminished through “pre-loading”, i.e., supplemental psychoeducation, scaffolding,

and extensive behavior modelling, as acknowledged strategies to reduce anxiety and improve performance. For example, prior to client participation in simulations, coaches engage in scenarios to demonstrate effective responses and provide vicarious experiences of success against the mock-assailant. These interventions likely counteract much of the anxiety and confusion intended by the training's real-world predatory scenarios. In addition, verbal-only scenarios occur one at a time, averaging two minutes (from the time the participant steps onto the mat to the time they exit) while the rest of the class observes. Each successive student experiences increasingly longer "wait" periods that may reduce novelty and unpredictability, affirm safety, and provide vicarious experiences of success against the upcoming stressor. These, combined with the quality of post-stressor social support from fellow-students and staff – which included applause, hugs, grounding touch, and calming breathing exercises – are all elements associated with stress-reduction (Dickerson & Kemeny, 2004; Weiner, 1992) and often occurred inside participants' 20-minute "spike" intervals. The timing structure points to further irregularities in biological data collection. The research team was not able to control for factors (e.g., diet, medications, time of day) due to limitations in recruitment and workshop proceedings, which may have affected cortisol levels at baseline and post-stressor. Therefore, findings are likely influenced by inconsistencies in data collection and training features that may mitigate physiological response and stress inoculation, pre- and post-scenario.

## **Stress Inoculation**

While stress inoculation research and training within the ASST-FSD context has traditionally focused on cognitive-behavioral factors (e.g., Ozer & Bandura, 1990; Rosenblum & Taska, 2014), this study examined biological changes in cortisol. Based on theorized plasticity of the amygdala and HPA-axis, which are amenable to SISR (McEwen, 2007; Mahan & Ressler, 2012), the study expected a change between Scenario 1 and Scenario 2, with a reduction in cortisol as an indicator of stress inoculation. However, findings revealed a significant increase. This may be a further manifestation of irregular data collection as discussed above, or it may point to a re-examination of what constitutes physiological stress inoculation and how it is best supported through training.

The increased response from Scenario 1 to Scenario 2 could suggest that (a) the training destructively heightened participants' physiological stress, (b) for some individuals, constructive change entails an increase in physiological response, and / or (c) more training and exposure may be required for constructive SISR. It is unlikely that the workshop heightened susceptibility to anxiety, given the increase in clients' self-reported scores for mental toughness. Another possibility is stress inoculation against aggression may be expressed as *heightened* physiological arousal in individuals who might otherwise be inhibited. The neurological implications of overcoming inhibition through a volitional response (Van der Kolk, 2006) may involve activation of the aggressive "fight" impulse and corresponding adrenal and cortisol activity. Furthermore, the act of responding with counter-

aggression may heighten stress in individuals challenged by “learned helplessness” and / or embodied socio-cultural constructs that are disempowering; whereas the intended stressor (simulated predatory communication) may not be novel or unpredictable for the client, but the volitional response may be. This suggests clients may benefit from extended or follow-up training sessions which include repeated exposure and practice; just as learned helplessness and complex trauma are often the result of prolonged and chronic maltreatment. A single 4-day workshop may not sufficiently produce significant SISR indicative of stress inoculation against aggression. These implications are relevant for individuals with high anxiety, particularly when it results from victimization, which will be considered in the next section. Given the wide-range and lack of norms for cortisol reactivity, further research should explore fluctuations indicative of constructive SISR and biological stress inoculation.

### **Anxiety**

Consistent with previous research, this study’s findings indicate anxiety is a factor in biological stress-reactivity. Zorn et al. (2017) note a “blunted” cortisol response to psychosocial stressors in women with anxiety or depression. Participants in this study, whose self-reported scores on the GAD-7 (Spitzer et al., 2006) were “low” or “moderate” (as opposed to “high”), demonstrated an elevated response from Scenario 1 to Scenario 2 – suggesting that the “high” anxiety group’s cortisol reactivity was “blunted” by comparison. As discussed above, this may relate to challenges in martialing an assertive biopsychosocial response.



The inhibited response correlating with anxiety may be specific to context (e.g., responding assertively to predatory communication) and thus additional demographic screening measures and timing schedules for biomarker collection are needed. Notably, there was no measure for assault history -- which predicts problematic stress and whose peritraumatic context may correlate with a blunted response to the scenarios. According to the “integrated-specificity model” (Kemeny, 2003), cues redolent of particular stressful experiences evoke specific biopsychosocial responses; generalized anxiety was only measured to identify problematic stress, and thus data analysis would have been more informative with specific measures for assault history. In addition, studies in anxiety and HPA-axis reactivity indicate that problematic stress is not solely an issue of heightened threat sensitivity subsequent to adrenal response, but also with recovery or return to biological homeostasis following resolution of the stressor (McEwen, 2007) – which would suggest a different timing schedule for saliva sampling than was employed in the study. For assessments and interventions, it would be more useful to measure cortisol at (a) baseline, (b) 20 minutes post stressor (i.e., the “spike” period), and (c) 60 minutes post stressor to determine if the amygdala and HPA-axis have sufficiently “calmed” the stress response in relation to baseline levels. Whereas this study concentrated upon initial reactivity to a stressor, future communibiological research of problematic stress may consider testing for recovery levels as well.

## **Mental Toughness**

While significant physiological change was not evidenced in the predicted direction, the workshop did meet cognitive expectations. Following the verbal-only scenarios there was an increase in cognitive markers of resilience and self-efficacy, or mental toughness. As this is consistent with findings from past studies that examined the cognitive-behavioral stress inoculation properties of ASST-FSD (e.g., Ozer & Bandura, 1990; Gidycz & Dardis, 2014; Rosenblum & Taska, 2014), empowerment via stress inoculation and risk-reduction is suggested. As concluded by Ozer and Bandura (1990), ASST-FSD is effective for both prevention of sexual assault and positive mental health outcomes attributed to increased self-efficacy and resilience, and in their critical review of feminist self-defense training, Gidycz and Dardis (2014) conclude that the positive outcomes include (1) empowerment and self-efficacy in resisting sexual assault, (2) confidence and assertive sexual communication, (3) positive mental health outcomes, including reduced PTSD symptoms, (4) more engagement in social and recreational activities, and (5) reduced rates of sexual victimization and re-victimization (p. 323). While this study and those that preceded it did not establish the physiological correlates of these reported cognitive-behavioral benefits, their methods and measures contribute important theoretical and practical implications.

## **Theoretical and Practical Implications**

Through its evolutionary framework and biosocial analysis of combative systems, Hopology contributes to communication studies by highlighting practical

interpersonal skills and training techniques; likewise, Communibiology, as a discipline which identifies and measures biological correlates to communication, can contribute to hoplological studies and stress inoculation efforts that are concerned with biosocial behaviors in aggressive contexts.

### ***Hoplology***

The theoretical and practical contributions of Hoplology derive from its evolutionary framework for violence and the biosocial analysis of combative systems' methods of stress inoculation. Ethology and neuro-imaging advances confirm Draeger's (1980) assertion that violence is rooted in the evolutionary brain which, according to the triune-brain cartography (MacLean, 1990; Jackson, 1958), contains the prototypical interactive schemas for predatory communication and fight-flight-freeze-appease behaviors. These models are applicable for the theoretical mapping of communication episodes and can be applied to psychoeducation in stress inoculation training (SIT). Combat-based ASST and crisis intervention are examples of military-derived SIT efforts which provide a theoretical basis for intrinsic human capacities for defense, resilience, and agency, and which are demonstrably applied in ASST-FSD. Hoplological analysis of this combative system indicates constructive stress-management, in conjunction with strategic and assertive communication skills, are effective measures of risk-reduction against bullying and problematic stress (e.g., posttraumatic stress and anxiety). The hoplological findings regarding ASST-FSD's conceptualization of common patterns of aggression, problematic stress, and communication, may be of benefit to marginalized

populations targeted for bullying as well as those in helping professions who must humanely manage aggression. With further research, applications of empowerment-based ASST may be developed to support integrative therapy and professional development, by incorporating appropriate scaffolding and social support to optimize coping and biomarkers of stress-reactivity to assess efficacy.

### ***Communibiology***

The communibiology of ASST-FSD conveys several theoretical and practical implications. Communication and biology play multi-dimensional roles: the emphasized biosocial components of effective defense against aggression, the means to induce a psychosocial stressor in training scenarios, and the means to provide targeted social support to optimize stress and influence constructive SISR. While the historical precedents and theoretical foundations of its training methods can be ascertained through Hopology, Communibiology, with its evolutionary biological perspective upon communication, integrates with Hopology and contributes established parameters for the methodology of stress research within social contexts (e.g., Afifi et al., 2015; Floyd & Riforgiate, 2008; Haverfield & Theiss, 2020). Reflexively, Hopology expands the communibiological paradigm in its conceptualization of anxiety as a trait-like state (as opposed to *neuroticism* – an assumed “stable” or genetically inherited personality trait associated with HPA dysregulation; Beatty & McCroskey, 1998; Zobel et al., 2004) where biopsychosocial expressions may be reduced through strategic communication (e.g., stress inoculation training). For communication scholarship, this adds an element of

'biopsychosocial construction' to existing interpretive-critical-practical theories based on the social construction of reality (e.g., the Coordinated Management of Meaning; Pearce, 2007), which may be applied for the mapping of and interventions for domestic- and gender-violence (e.g., Sundarajan & Spano, 2004). Given the evidence that the stress-response potentiates meta-learning and that a dysregulated stress response underlies problematic anxiety and contributes to victimization-cycles, Communibiology can inform the research, development, implementation, and quantitative evaluation of stress inoculation and empowerment efforts.

### ***Limitations***

The study design has several limitations. Key issues include the psychosocial stressor being tested (verbal-only scenario), the type and effect of communication being measured (predatory communication for stress induction / crisis intervention for stress inoculation), and data collection in terms of timing schedules and measures employed.

In testing the impact of predatory communication, it is difficult to conceive of an experiment design that would be considered ethical, authentic, and sufficiently controlled. Representative of ASST-FSD's trauma-informed approach, IMPACT's ethical guidelines limit the scenarios' reliability as a consistent psychosocial stressor for research purposes. Unlike standardized psychosocial stressors employed in research to elicit a physiological response (e.g., the Trier Social Stress Test; Allen et al., 2016), the scenarios are interventions which are (ideally) modified for the benefit of each client, who is ostensibly informed, consenting, and prepared to engage.

Throughout the training, it is the responsibility of the male instructors -- who act as mock-assailants in the scenarios -- to get to know the clients and accordingly adjust scenario intensity. Clients who are perceived as experienced or confident are challenged more while those who are anxious or have a history of violence or abuse are given more support at lower intensity<sup>7</sup>. Throughout, instructors are known to provide comic relief and guide participants to successful outcomes – incorporating hedonic elements and presenting the simulated threats as “challenges” – which are factors known to mitigate physiological response<sup>8</sup> (Chance, 2015; Kemeny, 2003). Paradoxically, constructive SISR necessitates anxiety and stress, pointing to the practical and ethical complexities in testing for stress-induction via predatory communication and stress inoculation based on crisis-intervention, especially within the same experiment, and particularly among individuals vulnerable to anxiety. Although the simulated verbal and physical assaults introduced agonistic social

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<sup>7</sup> The male instructors serve in two distinct capacities: (1) as “muggers” in the training scenarios and (2) as supportive assistant instructors in all other modules of the workshop. To minimize cognitive dissonance for clients, the “mugger” role is distinguished by context and costume (e.g., hat and sunglasses). They do not get into character without the hat and sunglasses, nor do they break character before removing them in scenarios (Gold & Belzer, 1998).

<sup>8</sup> While “muggers” simulate a variety of predatory behaviors, ethical considerations and trauma-informed pedagogy preclude the use of language that is personally degrading. Ironically, the “Mugger Code” mandates the authentic simulation of a threat but, unless specifically requested by the client, muggers are constrained from using commonly employed predatory communication tactics such as “negging” (i.e., strategically diminishing a target’s self-efficacy by insulting their appearance, intelligence, or identity) (M. Belzer, personal communication, July 11, 2021; M. Gold, personal communication, July 11, 2021).

dynamics, the overall training environment was highly supportive, positively integrating each challenge with community debriefing and emotional processing — which benefit the client but complicate data collection and analysis. As a biometric, salivary cortisol is relatively easy to obtain, but collection necessitates rigorous controls to ensure accuracy. SIT aims to reduce anxiety, and thus another important element that this study did not consider is that stress inoculation includes not only an “optimized” response to a stressor, but also adequate recovery: Due to chronic elevation or “blunting” of cortisol response in relation to anxiety, an optimized response may entail heightened physiological arousal and consistent return to baseline. As cortisol responsiveness is highly varied among individuals, context-specific pre-screening measures for stressor-sensitivity (e.g., assault history), as well as qualitative interviewing at the conclusion of the training could provide greater insight.

### ***Conclusions***

As academic disciplines which study the inter-relationships between stress, communication, and violence, Hopology and Communibiology together provide evolutionary frameworks for theoretical mapping and quantitative analysis of communication episodes. However, while neurobiology is a key focus within both disciplines, the biological stress response is highly individualized and requires further study to inform research and development in stress inoculation. Furthermore, an individual’s qualitative experience is multi-dimensional, with stress potentiating meta-learning across biological, psychological, and social domains. In periods of

crisis, appraisal and coping are predicted by past experience, yet the crisis management may reinforce or disrupt these patterns, with outcomes ranging from posttraumatic stress to increased mental toughness. An individual's appraisal and coping may be strategically modified by empowerment practitioners and bullies alike, and the two are not necessarily mutually exclusive. In addition to the socio-cultural inequities which make empowerment necessary, its practice requires a reflexive and critical perspective regarding the inevitable power-imbalances between client and practitioner. In response to gender-violence, the most ubiquitous form of bullying, ASST-FSD has developed promising and ethical methods of promoting resilience and mental toughness, which have far-reaching applications for marginalized populations likely to be targeted for violence. As there are different cultural approaches to communication and problematic stress, important considerations for researchers and developers of ASST include cultivating attitudes of cultural humility, developing person-centered communication skills, and emphasizing trauma-informed training environments. In the process of empowerment, communication plays multi-dimensional roles – as a means to provide support and mitigate stress, as a tool to create challenges and motivate action, and as a primary strategy emphasized for the avoidance and constructive management of aggression. In the promotion of safety and agency, these stress-based communicative strategies and concepts can benefit clients, practitioners, and researchers.



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## Appendix A: Baseline Survey

### I. Demographics

1. Age? \_\_\_\_\_

2. Gender? \_\_\_\_\_

3. Race / ethnicity? *Circle the letter of all that apply, write in specifics if applicable*

- a. Black or African American (e.g., African American, Jamaican, Ethiopian, Haitian, etc.)
- b. American Indian or Alaska Native (e.g., Navajo Nation, Blackfeet Tribe, Mayan, Aztec, etc.)
- c. Asian (e.g., Chinese, Vietnamese, Indian, Lebanese, etc.)
- d. Native Hawaiian or Pacific Islander (e.g., Kanaka Maoli, Samoan, Chamorro, etc.)
- e. Hispanic, Latinx, or Spanish Origin (e.g., Puerto Rican, Cuban, Salvadoran, etc.)
- f. White or Caucasian (e.g., German, Irish, Italian, etc.)
- g. Write In \_\_\_\_\_

## II. Stress

*How often have you been bothered by the following in the past 2 weeks? (Check one)*

GAD-7	not at all	several days	more than half the days	nearly every day
	(0)	(1)	(2)	(3)
1. feeling nervous, anxious, or on-edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. not being able to stop or control worrying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. worrying too much about different things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. trouble relaxing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. being so restless that it's hard to sit still	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. becoming easily annoyed or irritable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. feeling afraid as if something awful might happen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## III. Resilience

*Please indicate how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt. (Check one)*

CD-RISC 10	not true at all	rarely true	sometimes true	often true	true nearly all the time
	(0)	(1)	(2)	(3)	(4)
1. I am able to adapt when changes occur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I can deal with whatever comes my way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I try to see the humorous side of things when I am faced with problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Having to cope with stress makes me stronger.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I tend to bounce back after illness, injury, or other hardships.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I believe I can achieve my goals, even if there are obstacles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Under pressure, I stay focused and think clearly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am not easily discouraged by failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I think of myself as a strong person when dealing with life's challenges and difficulties.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### IV. Self-efficacy

Please rate your level of agreement with how each statement describes you (check one).

MTQ-10	not true at all (0)	rarely true (1)	sometimes true (2)	often true (3)	true nearly all the time (4)
1. Even when under considerable pressure, I usually remain calm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I tend to worry about things well before they actually happen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I usually find it hard to summon enthusiasm for the tasks I have to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I generally cope well with any problems that occur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I generally feel that I am a worthwhile person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. "I just don't know where to begin" is a feeling I usually have when presented with several things to do at once.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. When I make mistakes, I usually let it worry me for days after.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I generally feel in control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I am generally able to react quickly when something unexpected happens.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I generally look on the bright side of life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Appendix B: Post-Training Survey

### Part I. Resilience

*Please indicate how much you agree with the following statements as they apply to you in the last 24 hours. If a particular situation has not occurred in that time, answer according to how you think you would have felt (Check one)*

CD-RISC 10	not true at all (0)	rarely true (1)	sometimes true (2)	often true (3)	true nearly all the time (4)
1. I am able to adapt when changes occur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I can deal with whatever comes my way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I try to see the humorous side of things when I am faced with problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Having to cope with stress makes me stronger.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I can bounce back after illness, injury, or other hardships.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I believe I can achieve my goals, even if there are obstacles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Under pressure, I can stay focused and think clearly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am not easily discouraged by failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I think of myself as a strong person when dealing with life's challenges and difficulties.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Part 2. Self-efficacy

Please rate your level of agreement with how each statement describes you (check one).

MTQ-10	not true at all (0)	rarely true (1)	sometimes true (2)	often true (3)	true nearly all the time (4)
11. Even when under considerable pressure, I usually remain calm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I tend to worry about things well before they actually happen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I usually find it hard to summon enthusiasm for the tasks I have to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I generally cope well with any problems that occur.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I generally feel that I am a worthwhile person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. "I just don't know where to begin" is a feeling I usually have when presented with several things to do at once.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. When I make mistakes, I usually let it worry me for days after.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I generally feel in control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I am generally able to react quickly when something unexpected happens.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I generally look on the bright side of life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>